

THE UNIVERSITY OF MINNESOTA

BULLETIN

Vol. VII

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MINNEAPOLIS, MINN.

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THE REGISTRAR,

The University of Minnesota,
Minneapolis, Minn.

THE UNIVERSITY OF MINNESOTA

CATALOGUE

FOR THE YEAR

1903-1904

AND

ANNOUNCEMENTS

FOR THE YEAR

1904-1905

BY THE UNIVERSITY

MINNEAPOLIS

1904

The University

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

THE GRADUATE DEPARTMENT

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

THE SCHOOL OF MINES

THE DEPARTMENT OF AGRICULTURE, including—

the College of Agriculture

the School of Agriculture

the Dairy School

the Short Course for Farmers

THE COLLEGE OF LAW

THE DEPARTMENT OF MEDICINE, including—

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, including—

the Main Station at St. Anthony Park

the Sub-Station at Crookston

the Sub-Station at Grand Rapids

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 is a four-years course of study leading to the degree, bachelor of arts. The work of the first two years is elective within certain limitations as to the range of subjects from which the electives are to be chosen. The work of the last two years is entirely elective. The course is so elastic that it permits the student to make the general scope of the course, classical, scientific or literary, to suit the individual purpose.

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY, leading to the degrees analytical chemist or chemical technologist offers two courses of study of four years each in analytical and applied chemistry.

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

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS offers courses of study, of four years each, in civil, mechanical, electrical and municipal engineering leading to the degrees of civil, mechanical, electrical and municipal engineer. This college offers a four-years course of study in science and technology leading to the degree of bachelor of science, with an additional year leading to the engineer's degree in any one of the various lines offered in the college. This college also offers graduate work leading to the degree master of science.

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

THE COLLEGE OF AGRICULTURE offers a four-years course in agriculture. The degree of bachelor of agriculture is conferred on completion of the course. Students in this college may specialize along the line of forestry or home economics and secure the degree bachelor of agriculture (in forestry or in home economics).

THE SCHOOL OF AGRICULTURE offers a three-years course of study and is a training school for practical farm life and in domestic economy. The college of agriculture is open to graduates of this school who have completed the fourth year of work required for admission to the college.

The Dairy School offers practical instruction in dairying to those who are actually engaged in the manufacture of butter and cheese.

The Short Course for Farmers is designed to be of the greatest help possible to those actually engaged in farming.

THE COLLEGE OF LAW offers a three-years course of instruction leading to the degree of bachelor of laws. There is an evening class provided in this college. Graduate work leading to the degrees, master of laws, and doctor of civil law, is offered.

THE COLLEGE OF MEDICINE AND SURGERY and THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY offer four-year courses of study of nine months each. Upon completion of either of the prescribed courses the degree, doctor of medicine is conferred.

In the colleges of science, literature and the arts, of medicine and surgery, and homeopathic medicine and surgery, there has been established a combined course of six years leading to the degrees of bachelor of science and doctor of medicine.

THE COLLEGE OF DENTISTRY offers a four-years course of study of nine months each. Upon completion of the prescribed course the degree of doctor of dental surgery is conferred.

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

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

The University offers no correspondence courses.

Organization

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

The University is organized under the following act:

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

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

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

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

Sec. 2. There shall be established in the University of Minnesota five or more colleges or departments, that is to say, a College of Science, Literature and the Arts, a College of Agriculture, including "military tactics," a College of 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 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 a like manner, and shall hold their offices for the full term of three years from the first Wednesday of March succeeding their appointment and until their successors are appointed and qualified. The President of the University shall have the same rights, powers and privileges as other members, *except the right of voting, and shall be, ex-officio, the Corresponding Secretary of the Board of Regents.

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

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

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

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

side at the meetings of the Board; and in case of his inability to preside, the Board may appoint a President pro tempore.

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

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

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

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

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

Sec. 12. It shall be the duty of the Board of Regents herein provided for, to make arrangements for securing suitable lands, pursuant to the act of Congress, above mentioned, in the vicinity of the University, for an experimental farm, and as soon thereafter as may be to make such improvements thereon as will render the same available for experimental purposes in connection with the course in the agricultural college; and for such purposes, 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 amount 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 Board of Regents

- The HON. GREENLEAF CLARK, M. A., ST. PAUL, - 1910
President of the Board
- CYRUS NORTHROP, LL. D., MINNEAPOLIS, - - - *Ex-Officio*
The President of the University
- The HON. SAMUEL R. VAN SANT, WINONA, - - *Ex-Officio*
The Governor of the State
- The HON. JOHN W. OLSEN, ALBERT LEA, - - - *Ex-Officio*
The State Superintendent of Public Instruction
- The HON. STEPHEN MAHONEY, B. A., MINNEAPOLIS, - 1907
Secretary of the Board
- The HON. O. C. STRICKLER, M. D., NEW ULM - - - 1907
- The HON. JAMES T. WYMAN, MINNEAPOLIS, - - - - 1907
- The HON. ELMER E. ADAMS, B. A., FERGUS FALLS, - 1909
- The HON. THOMAS WILSON, ST. PAUL, - - - - - 1909
- The HON. WILLIAM M. LIGGETT, BENSON, - - - - 1909
- The HON. A. E. RICE, WILLMAR, - - - - - 1909
- The HON. EUGENE W. RANDALL, MORRIS, - - - - 1910

Executive Officers

THE UNIVERSITY

CYRUS NORTHROP, LL. D., *President*
E. BIRD JOHNSON, B. S., *Registrar*
ERNEST B. PIERCE, B. A., *Assistant Registrar*
B. F. CARTER, *Accountant and Purchasing Agent*

THE COLLEGES

JOHN F. DOWNEY, M. A., C. E., *Dean of the College of Science,
Literature and the Arts*
GEORGE B. FRANKFORTER, PH. D., *Dean of the School of
Chemistry*
FREDERICK S. JONES, M. A., *Dean of the College of Engineering
and the Mechanic Arts*
WILLIAM R. APPLEBY, M. A., *Dean of the School of Mines*
WILLIAM M. LIGGETT, *Dean and Director of Department of
Agriculture*
WILLIAM S. PATTEE, LL. D., *Dean of the College of Law*
PARKS RITCHIE, M. D., *Dean of the College of Medicine and
Surgery*
EUGENE L. MANN, M. A., M. D., *Dean of the College of Homeo-
pathic Medicine and Surgery*
WILLIAM P. DICKINSON, D. D. S., *Dean of the College of Dentistry*
FREDERICK J. WULLING, PH. G., *Dean of the College of Pharmacy*

LIBRARIES AND MUSEUMS

WILLIAM WATTS FOLWELL, LL. D., *Librarian*
LETTIE M. CRAFTS, B. L., *Assistant Librarian*
INA FIRKINS, B. L., *Library Assistant*
ANNA L. GUTHRIE, B. A., *Library Assistant*
MARY S. MCINTYRE, B. S., *Librarian of School of Agriculture*
THOMAS G. LEE, M. D., *Librarian of Department of Medicine*
HUGH E. WILLIS, LL. M., *Librarian of the College of Law*
CHRISTOPHER W. HALL, M. A., *Curator Geological Museum*
HENRY F. NACHTRIEB, B. A., *Curator of the Zoological Museum*

ALLEN W. GUILD, *Superintendent of Buildings*
EDWIN A. CUZNER, *Superintendent of Grounds*

CALENDAR FOR 1904-1905

1904

1905

JULY							JANUARY						
S.	M.	T.	W.	T.	F.	S.	S.	M.	T.	W.	T.	F.	S.
..	..	..	..	..	1	2	1	2	3	4	5	6	7
3	4	5	6	7	8	9	8	9	10	11	12	13	14
10	11	12	13	14	15	16	15	16	17	18	19	20	21
17	18	19	20	21	22	23	22	23	24	25	26	27	28
24	25	26	27	28	29	30	29	30	31	..	..	..	..
31	..	..	..	..	..	..	..	..	..	..	..	..	..
AUGUST							FEBRUARY						
..	1	2	3	4	5	6	..	..	..	1	2	3	4
7	8	9	10	11	12	13	5	6	7	8	9	10	11
14	15	16	17	18	19	20	12	13	14	15	16	17	18
21	22	23	24	25	26	27	19	20	21	22	23	24	25
28	29	30	31	..	..	..	26	27	28	..	..	..	..
..
SEPTEMBER							MARCH						
..	..	..	..	1	2	3	..	..	..	1	2	3	4
4	5	6	7	8	9	10	5	6	7	8	9	10	11
11	12	13	14	15	16	17	12	13	14	15	16	17	18
18	19	20	21	22	23	24	19	20	21	22	23	24	25
25	26	27	28	29	30	..	26	27	28	29	30	31	..
..
OCTOBER							APRIL						
..	..	..	..	..	..	1	..	..	..	..	..	..	1
2	3	4	5	6	7	8	2	3	4	5	6	7	8
9	10	11	12	13	14	15	9	10	11	12	13	14	15
16	17	18	19	20	21	22	16	17	18	19	20	21	22
23	24	25	26	27	28	29	23	24	25	26	27	28	29
30	31	..	..	..	..	..	30	..	..	..	..	..	..
NOVEMBER							MAY						
..	..	1	2	3	4	5	..	1	2	3	4	5	6
6	7	8	9	10	11	12	7	8	9	10	11	12	13
13	14	15	16	17	18	19	14	15	16	17	18	19	20
20	21	22	23	24	25	26	21	22	23	24	25	26	27
27	28	29	30	..	..	..	28	29	30	31	..	..	..
..
DECEMBER							JUNE						
..	..	..	..	1	2	3	..	..	..	..	1	2	3
4	5	6	7	8	9	10	4	5	6	7	8	9	10
11	12	13	14	15	16	17	11	12	13	14	15	16	17
18	19	20	21	22	23	24	18	19	20	21	22	23	24
25	26	27	28	29	30	31	25	26	27	28	29	30	..
..

University Calendar, 1904-1905.

FIRST SEMESTER.

AUGUST	30	T	Entrance examinations and registration.	
	31	W	Entrance examinations and registration.	
SEPTEMBER	1	T	Entrance examinations and registration.	
	2	F	Entrance examinations and registration.	
	3	S	Entrance examinations and registration.	1 w
	5	M	Examinations end and registration completed.	
	6	T	Classes called for regular work.	
	10	S	.....	2 w
	15	T	(First College classes organized, 1869)	
	17	S	.....	3 w
	24	S	.....	4 w
OCTOBER	1	S	.....	5 w
	8	S	.....	6 w
	15	S	.....	7 w
	22	S	.....	8 w
	29	S	.....	9 w
NOVEMBER	5	S	.....	10 w
	12	S	.....	11 w
	19	S	.....	12 w
	24	T	Thanksgiving Day. Holiday.	
	26	S	.....	13 w
DECEMBER	3	S	.....	14 w
	6	T	Annual Meeting of the Board of Regents.	
	10	S	.....	15 w
	17	S	Holiday recess begins (no classes).....	16 w
	25	S	Christmas Day.	
JANUARY	1	S	New Year's Day.	
	3	T	Work resumed in all departments.	
	7	S	.....	17 w
	14	S	.....	18 w
	16	M	Semester examinations. I and II hour work.	
	17	T	Semester examinations. III and IV hour work.	
	18	W	Semester examinations. V and VI hour work.	
	19	T	Semester examinations. VII and VIII hour work.	
	21	S	.....	19 w

SECOND SEMESTER.

JANUARY	24	T	Second Semester begins—Classes called for regular work.	
	28	S	.....	1 w
FEBRUARY	4	S	.....	2 w
	11	S	.....	3 w
	12	S	Lincoln's Birthday.	
	18	S	University Charter, 1868. General Sibley died, 1894	4 w
	22	W	Washington's Birthday.	
	23	S	.....	5 w
MARCH	4	S	.....	6 w
	11	S	.....	7 w
	18	S	.....	8 w
	25	S	.....	9 w
APRIL	1	S	.....	10 w
	8	S	.....	11 w
	15	S	.....	12 w
	22	S	.....	13 w
	29	S	.....	14 w
MAY	6	S	.....	15 w
	13	S	.....	16 w
	20	S	.....	17 w
	22	M	Semester examinations. I and II hour work.	
	23	T	Semester examinations. III and IV hour work.	
	24	W	Semester examinations. V and VI hour work.	
	25	T	Semester examinations. VII and VIII hour work.	
	27	S	.....	18 w

COMMENCEMENT WEEK.

SUNDAY	MAY 28	BACCALAUREATE SERVICE.
MONDAY	MAY 29	SENIOR CLASS EXERCISES.
TUESDAY	MAY 30	SENIOR PROMENADE.
WEDNESDAY	MAY 31	ALUMNI DAY.
THURSDAY	JUNE 1	COMMENCEMENT DAY—The Thirty-third Annual Commencement.
FRIDAY	JUNE 2	SUMMER VACATION BEGINS.

PROGRAM OF EXAMINATIONS, SEPTEMBER, 1904.

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.
 THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS.
 THE SCHOOL OF MINES.
 THE COLLEGE OF LAW.
 THE SCHOOL OF CHEMISTRY.

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

Day	Hour	Subjects for admission to the freshman class.
Tuesday, August 30,	8:00-10:30	†English Classics .....13
	10:45- 1:15	*English Composition 1
	2:30- 5:00	*Elementary Algebra .....22
Wednesday, Aug. 31,	8:00-10:30	*Higher Algebra .....22
	10:45- 1:15	*Plane Geometry .....22
	2:30- 5:00	*Solid Geometry .....22
Thursday, Sept. 1,	8:00-10:30	†All History Subjects.....17
		†Civics .....16
		†Political Economy .....16
	10:45- 1:15	*German .....21
	2:30- 5:00	*French .....28
Friday, September 2,	8:00-10:30	*Latin Grammar 4
		*Greek .....25
		*Cæsar 4
		†English Literature .....13
	10:45- 1:15	*Cicero 4
	2:30- 5:00	*Vergil 4
Saturday, Sept. 3,	8:00-10:00	§Chemistry
		**Physics
		‡Botany .....29
		‡Zoology .....35
		*Astronomy B
	10:45- 1:15	‡Geology .....18
2:30- 5:00	¶Physiography .....18	
	¶Drawing .....24	
	¶Shop Work	

*Main Building; †Library Building; ‡Pillsbury Hall; §Chemical Laboratory; **Armory; ¶The Shops.

The Faculty

- CYRUS NORTHROP, LL. D., President, 519 Tenth Avenue S. E.
 FRANK MALOY ANDERSON, M. A., 1629 University Avenue S. E.
 Assistant Professor of History.
- WILLIAM R. APPLEBY, M. A., 911 Fifth Street S. E.
 Dean of the School of Mines and Professor of Metallurgy.
- FREDERICK H. BASS, C. E., Minneapolis
 Assistant Professor of Sanitary Science, in charge of
 Municipal and Sanitary Engineering.
- GEORGE N. BAUER, Ph. D., Minneapolis
 Assistant Professor of Mathematics.
- JOHN PARSONS BEACH, Harvard Chambers
 Assistant Professor of Music.
- CHARLES W. BENTON, M. A., Litt. D., 516 Ninth Avenue S. E.
 Professor of the French Language and Literature.
- JABEZ BROOKS, D. D., 1708 Laurel Avenue.
 Senior Professor of the Greek Language and Literature.
- RICHARD BURTON, Ph. D., Boston, Mass.
 Special Lecturer on English Literature.
- JOHN S. CARLSON, Ph. D., 827 Seventh Street S. E.
 Professor of the Scandinavian Languages and Literatures.
- JOHN S. CLARK, B. A., 729 Tenth Avenue S. E.
 Professor of the Latin Language and Literature.
- ADA L. COMSTOCK, M. A., Minneapolis
 Assistant Professor of Rhetoric.
- FRANK H. CONSTANT, C. E., 1803 University Avenue S. E.
 Professor of Structural Engineering.
- LOUIS J. COOKE, M. D., 906 Sixth Street S. E.
 Director of the Gymnasium.
- JOHN F. DOWNEY, M. A., C. E. 825 Fifth Street S. E.
 Dean of the College of Science, Literature and the Arts,
 and Professor of Mathematics.
- HENRY T. EDDY, C. E., Ph. D., 916 Sixth Street S. E.
 Professor of Engineering and Mechanics.
- JOHN J. FLATHER, Ph. B., M. M. E., 1103 Fourth Street S. E.
 Professor of Mechanical Engineering.
- WILLIAM W. FOLWELL, LL. D., 1020 Fifth Street S. E.
 Professor of Political Science; Lecturer on International Law;
 Librarian.

- GEORGE B. FRANKFORTER, M. A., Ph. D., Flat 1, 602 Fourth Avenue S.
Professor of Chemistry and Dean of the School of Chemistry.
- EDWARD M. FREEMAN, M. S., St. Paul
Assistant Professor of Botany.
- JOHN E. GRANRUD, Ph. D., 605 Delaware Street S. E.
Assistant Professor of Latin.
- BENJAMIN F. GROAT, B. S., 1312 Fifth Street S. E.
Assistant Professor of Mathematics and Mechanics, School of Mines.
- CHRISTOPHER W. HALL, M. A., 803 University Avenue S. E.
Professor of Geology and Mineralogy; Assistant Curator of the
Museum.
- ARTHUR EDWIN HAYNES, M. S., M. Ph., Sc. D., 703 River Parkway
Professor of Engineering Mathematics.
- WILLIAM R. HOAG, C. E., 1516 Seventh Street S. E.
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WALDEMAR SCHULZ, Ph. D., Instructor in German.	Minneapolis
GEORGE E. SENKLER, M. D., Clinical Instructor in Medicine, College of Medicine and Sur- gery.	Minneapolis
JUANIATA L. SHEPPERD, M. A., Instructor in Cooking, Laundering, and Home, College of Ag- riculture.	St. Anthony Park
ROYAL R. SHUMWAY, B. A., Instructor in Mathematics.	Minneapolis
EDWARD K. SLATER, Assistant Instructor in Creamery Work, Dairy School.	St. Anthony Park
EDITH J. SNELL, B. A., Instructor in Mathematics, Geography, History, School of Agri- culture.	St. Anthony Park
M. SONDEGAARD, Instructor in Cultures and Starters, Dairy School.	St. Anthony Park
DAVID F. SWENSON, B. S., Instructor in Philosophy.	Minneapolis
JAMES M. TATE, Instructor in Wood Work, College of Engineering and the Me- chanic Arts.	Minneapolis
WILLIAM I. THOMAS, Instructor in Rhetoric.	Minneapolis
HENRY L. ULRICH, M. D., Assistant in Clinical Microscopy, College of Medicine and Sur- gery.	Minneapolis
J. A. VYE, Instructor in Penmanship and Accounts, School of Agriculture, and Secretary of the Experiment Station.	St. Anthony Park
ALBERT M. WEBSTER, B. A., Instructor in Latin, College of Medicine and Surgery.	Minneapolis
JAMES M. WALLS, D. M. D. Instructor in Operative Technics and Demonstrator of Operative Dentistry, College of Dentistry.	St. Paul
H. L. WHERLAND, Assistant Engineer, College of Engineering and the Mechanic Arts.	Minneapolis
B. D. WHITE, Instructor in Creamery Management, Dairy School.	St. Anthony Park
GRACE L. WHITTRIDGE, Assistant in Physical Culture for Women, School of Agriculture.	St. Anthony Park

M. RUSSEL WILCOX, M. D., Demonstrator of Physiology, Department of Medicine.	Minneapolis
VAN H. WILCOX, M. D., Assistant in Operative Surgery, College of Medicine and Surgery.	Minneapolis
ELEANOR M. WILKINSON, Instructor in Physiology and Dietetics, College of Medicine and Surgery.	Minneapolis
HUGH E. WILLIS, LL. M., Quiz Master and Instructor in Law, College of Law.	Minneapolis
LOUIS B. WILSON, M. D., Senior Demonstrator of Pathology, College of Medicine and Surgery.	Minneapolis
F. R. WRIGHT, M. D., Clinical Instructor in Dermatology and Genito-Urinary Diseases, College of Medicine and Surgery.	Minneapolis
FRANK R. WRIGHT, D. D. S., M. D., Lecturer on Anæsthesia and Chief of the Anæsthetic Clinic, College of Dentistry.	Minneapolis
ANTHONY ZELENY, M. S., Instructor in Physics.	Minneapolis

 UNIVERSITY SCHOLARS.

- In Anatomy*—Karl Klemer, C. C. Tyrrell.
- In Animal Biology*—Neil S. Dungay, E. E. Hemingway, M. A.
- In Bacteriology and Pathology*—Chelsea Pratt, Robert L. Tebbitt, S. E. Williams, George C. Dittman, George E. Dix, John L. Devine, George E. Thomas.
- In Botany*—Daisy Hone, B. A., Arthur M. Johnson.
- In Chemistry*—Marjorie Cole, Arnold V. Dahlberg, Francis C. Frary, Frank Grout, Edward Gutsche, Joseph Hopkins, Frank J. Longworth, William Methley, Charles D. Poore, Anton R. Rose, A. E. Carr, E. A. Loomis.
- In Drawing*—Franklin R. McMillan.
- In French*—Jules T. Frelin.
- In Geology*—E. McM. Pennock.
- In Gymnasium*—Frederick R. Schweitzer.
- In Histology and Embryology*—E. E. Olander, C. W. Wilkowski, J. E. Hynes and Charles McMahan.
- In History*—Helen E. Camp, B. A.
- In Observatory*—Sturla Einarson.
- In Pedagogy*—Charles M. Holt.
- In Philosophy*—Bernice M. Cannon, B. A.
- In Physics*—Alois F. Kovarik.
- In Political Economy*—Irwin A. Churchill.
- In Rhetoric*—Ella C. Ruscoe.
- In Surgical Pathology*—Hugh S. Willson.

Equipment

GROUNDS AND BUILDINGS.

The University grounds comprise about forty-five acres lying between University avenue and the River and between Eleventh and Eighteenth avenues southeast. The grounds command a fine view of the Falls and the city, but are sufficiently removed from the business center of the city to insure desirable quiet and retirement. The buildings upon the campus number twenty, and are valued at over \$730,000. A special clinical building for the use of the department of medicine, located in the southern part of the city, where there is an abundance of clinical material, is within easy reach of the University. The campus is valued at about \$350,000 and the equipment of the buildings at about \$275,000.

The State Experimental Farm, upon which are located the buildings of the experiment station and the department of agriculture, consist of over two hundred and fifty acres of very valuable land half way between the twin cities and within a thirty-minutes' ride of either city. The farm is valued at \$300,000, and the sub-stations located at Crookston and Grand Rapids, at \$30,000 more. The buildings and equipment of the department of agriculture are valued at over \$300,000.

LIBRARIES.

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

Minneapolis—The University Libraries, 106,000 volumes; the Public Library, 125,000 volumes; the Minneapolis Bar Association, the Guaranty Loan Law, and the New York Life Insurance Law Libraries, numbering a total of about 30,000 volumes, are open under certain restrictions to law students; the Minnesota Academy of Natural Sciences, 7,000 titles.

St. Paul—The State Historical Library, 70,000 volumes; the State Library, 35,000 volumes; Public Library, 55,000 volumes.

The University Library consists of:

1. **The General Library.**

2. **College Libraries**, including Law, Medicine, Engineering, Agriculture.

3. **Departmental Libraries**, including Art, Astronomy, Biology, Botany, Chemistry, French, Geology, German, Greek and Latin, History, Military Science, Pedagogy, Physics, Rhetoric, Scandinavian.

The private collections of professors are available when necessary for research.

The whole number of bound volumes owned by the University is about 112,000. Unbound books and pamphlets, about 30,000. About 500 current periodicals are received in the general and other libraries.

The departmental libraries consist mainly of books of reference and current periodicals relating to technical subjects.

The general library is open to students and the public from 8:00 a. m. to 9:30 p. m., every day of the University year, except Sundays and legal holidays.

The Law Library has been greatly increased during the past year. It now contains nearly all the English Reports, including those of Canada, from the earliest decisions down to the year 1900; nearly all the reports of the different states of the Union; all the reports of the United States Supreme Court, and all the Federal Court reports. It contains also the digests of these reports and an excellent selection of standard textbooks and law dictionaries.

The Nelson Law Library is a rare collection of fifteen hundred volumes, donated to the University by the Honorable R. R. Nelson, of St. Paul, upon retirement from the Federal bench. It contains many old English reports, in addition to those already mentioned, and many ancient treatises upon common law.

A rare and unique addition to the Law Library has been secured by the donation of Judge Collins and former Attorney-General Childs turning over to the University all the Briefs and Paper-Books in the causes argued in the Supreme Court of Minnesota since 1888, making a fine collection of over five hundred bound volumes.

The Medical Library contains a large and well assorted collection of books, sets of journals, bound and unbound pamphlets, relating to all branches of medicine. All of the leading

medical journals are on file in the reading room. The various laboratories have also reference libraries devoted to their special lines of work.

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

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

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 George F. Kunz; several suites of crystalline rocks secured from various sources; the Ward collection of casts contributed in part by citizens of Minneapolis; collections of the rocks, fossils, minerals and economic products of Minnesota; upwards of 9,000 entries gathered by the geological survey of the State; the Sardeson collection of paleozoic fossils of Minnesota, Wisconsin, Iowa and neighboring states, comprising 4,500 entries and more than 30,000 specimens; a series of thin sections of typical rocks and minerals largely representing Minnesota localities; purchased material comprising a fine collection of crystals; 5,000 minerals and 3,000 specimens of economic minerals and crystalline rocks.

(b) **In Zoology:** All the material collected by the State Zoologist; a collection of mounted Minnesota birds representing about one-third of the species found in the State; a number of the mammals of the State and a few from the more western states; a collection of fishes, molluscan shells, corals and other foreign material.

The ornithological room contains the excellent Thomas S. Roberts and Franklin Benner collection of skins, nests and eggs of Minnesota birds. Other groups of animals are more or less

numerously represented, and are receiving annual additions from the Zoological Survey.

(c) **In Botany:** The general herbarium numbering about 250,000 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, dyewoods 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:** Some material illustrating classical geography, topography, chronology, mythology, archaeology, and art has been collected, consisting mainly of plans and charts, casts, pictorial illustrations, fac-similes of manuscripts and inscriptions.

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

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

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

(i) **Electrical Engineering Museum:** This museum contains a growing collection of samples furnished by various man-

ufacturers and dealers for demonstrating the merits of different products and for illustrating modern practice; an excellent collection showing the development of electrical instruments, lightning arresters, switches, primary and secondary batteries, early forms of dynamos and motors, lighting apparatus and various industrial applications of electricity; also a collection of samples from repair shops and elsewhere, illustrating the effects of wear, accidents and abuse.

ASTRONOMICAL OBSERVATORY.

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

GYMNASIUM.

The gymnasium is located in the Armory, and is well equipped with a variety of gymnastic appliances. The object of the gymnasium is to provide all of the students of the University opportunity for exercise to build up their general health. It also provides special training to correct physical defects and functional derangements. The gymnasium is in charge of a professional medical director and assistant and the training is under their direct supervision. A thorough physical examination is offered each student immediately before and after the gymnasium course, a record is made of the same. The examination of these records shows a marked improvement in the standard of health of the average student during his college course. The gymnasium is open at all times to all young men in the University who are free to use the apparatus and to pursue a course of physical training under the direct supervision of the director and his assistant. In some of the colleges of the University, this work is required of all men.

General Information.

THE UNIVERSITY YEAR.

The University year covers a period of thirty-eight weeks beginning on the Tuesday before the first Thursday in September, and is divided into nineteen-week semesters. Commencement day comes on the first Thursday in June.

THE ONE MILE LIQUOR LAW.

A special act of the legislature provides that "it shall be unlawful for any person to sell or dispose of any spirituous, vinous or malt liquors within the distance of one mile of the main building of the University of Minnesota, as now located in the city of Minneapolis; provided that the provisions of this section shall not apply to that part of the city of Minneapolis lying on the west side of the Mississippi River."

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 and is meant to be the rallying point of all the Christians in college. All persons in sympathy with the object of the association are eligible to membership.

The Young Men's Christian Association has as its object the promotion of "growth in grace and Christian fellowship among its members and aggressive Christian work, by and for students." The association rents the S. C. A. building and keeps it open, with a general secretary in charge, at all times. All men in sympathy with the object of the association are eligible to membership. This building is maintained as the social and religious headquarters of all young men in the University.

The association provides an employment bureau whose services are free to students in all departments of the institution and a committee to help students to find comfortable rooms and boarding places. The association also maintains an educational department in which students may make up their entrance conditions without any charge for instruction.

The general secretary will be pleased to correspond with any young man intending to come to the University. Address the General Secretary of the Y. M. C. A., University of Minnesota, Minneapolis, Minn.

The Young Women's Christian Association is the center of Christian life among the young women of the University. Its object is "To deepen spiritual thought in the University woman, to environ her with a semblance of home, to bring to her friendship, assistance and sociability by stimulating student fellowship, to give her personal help when necessary; thus developing in her the Christ ideal of culture in womanhood."

To this end frequent socials and informal teas are given throughout the year; twice each week twenty minute prayer meetings are held, a dozen circles meet one hour a week for devotional Bible study; and from time to time interesting missionary meetings are held. The general secretary devotes all of her time to the association and will be pleased to correspond with any young woman who wishes information regarding the University.

All young women are invited to visit the Y. W. C. A. room before registering. A group of upper classmen will be there during the opening days to give advice and assistance.

THE UNIVERSITY CATHOLIC ASSOCIATION.

The University Catholic Association was organized by the Catholic students in the spring of 1900. The purpose of the association is the study of the Bible and of the doctrines and history of the Catholic church. Membership is open to any one connected with the University. Regular meetings are held every Sunday afternoon in the rooms of either the Young Men's or of the Young Women's Christian Association, through the courtesy of those organizations.

Aside from the religious objects, the association tends to promote good fellowship among its members. In the fall a reception is tendered to new students and during the year two or more socials are held.

Further information may be obtained by addressing the secretary of the association at the University.

LITERARY, SCIENTIFIC AND PHILOSOPHICAL.

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

The Minnesota Literary Union—Is a federation of the members of the following societies: Shakopean, Forum, Castalian, Minerva, Hermean and Arena. Four meetings are held each year.

Shakopean—Membership limit, 35; men: **Forum**—Membership limit, 30; men: **Minerva**—Membership limit, 30; women: **Law Literary**—Unlimited; law students: **Castalian**—Membership limit, 35; men: **Kent**—Membership limit, 30; law students: **Theta Epsilon**—Membership limit, 30; women: **Arena**—Membership limit, 30; men: **Society for Legal Culture**—Membership limit, 30; men.

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

Greek Club—Is a society organized by professors, students and alumni of the department of Greek for the study of Greek life, language and customs.

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

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

The Dramatic Club is organized for the study and practice of dramatic art. A play is put on the stage each year.

The Society of Engineers meets once in two weeks to listen to addresses by prominent engineers and for the discussion of various engineering topics.

The Geological Club is an organization of instructors and students interested in geology, for the discussion of geological problems.

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

The Federated Debating Board has charge of home and inter-collegiate oratorical contests.

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

The Mining Society is an organization of mining engineering students who meet for the purpose of hearing lectures and discussing mining engineering problems.

The Camera Club is an organization of instructors and students interested in photography and photographic chemistry.

The Botanical Students' Journal Club is an organization of juniors, seniors and graduate students, of the department of botany, for the review of current botanical literature.

The Zoological Journal Club for instructors and advanced students who meet for the discussion of current zoological literature.

The University Liberal Association is an organization of students and faculty members formed for the discussion of topics of broad and current interest. It meets twice a month, usually on Saturday evening.

The Zoological Reading Club is for instructors and graduate students. Its purpose is the reading and discussion of philosophical works on Zoology.

The Physical Colloquium is composed of instructors and graduate students and meets for the discussion of recent investigations in physical science.

The Pharmaceutical Journal Club is composed of the senior students and graduates of the pharmacy department. The purpose of the club is to read and discuss pharmaceutical, chemical and medical literature of special interest to pharmacists.

The Glee and Mandolin Clubs give a public concert each year at the University and make a tour of the state during the holidays.

The University Band furnishes music for many University affairs.

Women's League is an organization of the women of the University for mutual helpfulness and sociability. The League is planning for the erection of a building upon the campus for the use of the women of the University.

The Northern Oratorical League is composed of the oratorical associations of the University of Michigan, Northwestern University, the University of Wisconsin, Oberlin College, the

State University of Iowa, the University of Chicago, and the University of Minnesota. Its purpose is to foster an interest in public speaking and to elevate the standard of oratory by holding annual contests. The contests are open only to undergraduates.

The Central Debating League is composed of the debating associations of the University of Michigan, the University of Minnesota, Northwestern University, and the University of Chicago. Its purpose is to discuss in public leading questions of the day and in this way to develop ready and forceful speakers.

The four universities are arranged in two groups for the semi-final debates, which are held the second Tuesday in January. On the first Friday in April in each year, the winners from the groups meet in a final debate in the city of Chicago.

ATHLETICS.

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

Control of Athletics. The athletic sports of the University are under the supervision of a Board of Control made up of eleven members; two are members of the faculty, two are alumni and seven are students. This board has general supervision of all matters connected with athletic contests: they pass upon the eligibility of players, investigate charges of misconduct and arrange the schedule of games. It is the purpose of this board to foster a spirit in favor of fairness and honesty in all athletic contests.

Northrop Field is an enclosed athletic field containing about six acres immediately adjoining the armory.

SCHOLARSHIPS.

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

1. The appointments are made by the executive committee of the Board of Regents, upon the recommendation of the department in which the appointment is desired, after approval by the general faculty.
2. Recipients of scholarships may be either graduate or undergraduate students.

3. The scholarships are not intended as gifts or benefactions from the state to the recipients, but as provisions under which services may be rendered the University.

4. It is understood that these services are of a nature which shall assist the holder of a scholarship to attain the mastery of some line of work in the department to which he is appointed.

PRIZES.

THE PILLSBURY PRIZE.

Three prizes of \$100, \$50 and \$25, offered by the heirs of the Hon. John S. Pillsbury, are awarded 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 award is made by a professor of history in some other institution.

THE MOSES MARSTON SCHOLARSHIP IN ENGLISH.

Friends and pupils of the late Professor 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.

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 SCHURMEIER PRIZE.

Hon. Theodore L. Schurmeier, of St. Paul, offers through the department of Sociology, a prize of twenty dollars for the best essay presented by an undergraduate student on the subject of "The Social Forces in the Making of Emerson."

The essay must consist of three thousand words and should

be handed to the professor of sociology on or before May 10. Judges may reject any or all essays at their pleasure.

THE WILLIAM JENNINGS BRYAN PRIZE.

The Hon. William Jennings Bryan has given the University the sum of \$250.00 for the encouragement of studies in political science. The annual income will be given as a prize to the writer of the best essay.

The competition is open to all students of the college of science, literature and the arts.

The essays must contain not less than 2,000 nor more than 3,000 words, neatly typewritten, and must be handed to the professor of political science on or before May 10. The usual devices for securing impersonality must be adopted. The judges will be appointed by the president of the University.

THE BRIGGS' PRIZE IN FOUNDRY PRACTICE.

For the encouragement of studies in foundry practice, Mr. O. P. Briggs, President of the Twin City Iron Works, offers \$75 annually, in two prizes which are to be accompanied by gold medals.

The competition is open to sophomores in the college of engineering, and the prize will be awarded for the best essay relative to the above subject.

Essays should contain about 3,000 words, and must be submitted to the professor of rhetoric on or before May first.

THE DUNWOODY PRIZE.

Mr. William H. Dunwoody, president of the St. Anthony and Dakota Elevator Company, has provided a cash prize of \$75 for the members of the team winning the inter-sophomore debate, and another prize of \$25 for the student in the sophomore class writing and delivering the best oration.

THE LOWDEN PRIZE.

Mr. Frank O. Lowden, of Chicago, offers as a prize to be competed for by the Northern Oratorical League, an endowment of \$3,000, which will yield an annual income of about \$175. A prize of \$100 will be given to the winner of the first place, \$50 to the orator who gets second place, and the remainder will be set aside each year for an interest fund to accumulate, and, in time, produce another endowment.

THE PEAVEY PRIZE.

Mrs. Heffelfinger continues the prize of \$100, established by her father, the late Frank H. Peavey. This prize consists of

\$75 for the members of the team winning the freshman-sophomore debate, and another prize of \$25 to the student in the freshman or sophomore class writing and delivering the best oration.

THE WYMAN PRIZE.

A prize of twenty-five dollars is offered by the Honorable James T. Wyman, of Minneapolis, through the department of political science, for the best essay of three to five thousand words by an undergraduate student, on the subject of "The Labor Question in Farming Communities."

THE ELLIOT SCHOLARSHIP LOAN FUND.

To fulfill the wish of the late Dr. A. F. Elliot to aid young men who find their efforts to obtain a practical education embarrassed through lack of means, the income of \$5,000, amounting to \$250 per year, is placed in the hands of the Board of Regents to be used as a scholarship loan fund for assisting young men in the school of mines.

The conditions of granting the scholarship loans are: The financial needs of the applicant, his scholarship, moral character, enthusiasm shown in his work and promise of usefulness in his profession. When money is available it may be loaned to pay expenses of worthy students during sickness. The loans are to be repaid, without interest, at the earliest convenience of the recipients.

THE GILFILLAN TRUST FUND.

The Honorable John B. Gilfillan has given to the University the sum of fifty thousand dollars, yielding an annual income of twenty-five hundred dollars, to be used by the Board of Regents to assist worthy students, needing such aid, to secure an education. The Regents are empowered to give this aid in the way of loans or gifts, according to the circumstances of the case. As a rule the fund is used as a loan fund, and a small rate of interest is charged. The details of the regulations which have been adopted by the Regents for the administration of the fund may be learned by addressing the President of the University.

PUBLICATIONS.

The University Bulletins are published by authority of the board of Regents six times a year—every six weeks during the

university year. Bulletins will be sent gratuitously, postage paid, to all persons who apply for them.

The Minnesota Alumni Weekly is published every Monday during the University year. The Weekly is published entirely in the interest of the alumni and is devoted to alumni news and such University news as may be of special interest to the alumni.

The Minnesota Daily is published five times each week during the University year by an organization of University students.

The Junior Annual, called the "Gopher," is a book published annually by the junior class of the University.

The Minnesota Magazine is a monthly magazine devoted to the cultivation of literary taste and effort among the students of the University. It is managed by a board of editors chosen from the senior class.

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

EXPENSES OF YOUNG MEN.

At the request of University officials, in past years, a considerable number of students have kept strict accounts of their expenses, and the following statement shows fairly the possibilities as to expenses for a year's work at the University.

Class and society dues.....	\$ 6.00	\$ 8.25	
Room rent (9 months).....	36.25		
Board (39 weeks).....	85.05	208.75	\$ 175.00
Laundry	9.95		
Books and stationery.....	13.95	32.51	30.00
Street car fare	3.80	4.95	
Clothing	20.80	74.25	50.00
Benevolence, including amusements	17.35	24.90	
Railroad fare		16.25	30.00
Miscellaneous	24.35	27.23	
Total expenses	\$ 217.50	\$ 397.09	\$ 285.00
Saved during summer.....	\$ 35.00		
Earned during the year....	237.75	272.09	265.00
	<u>272.75</u>		
Expenses	217.50		
Balance, over expenses.....	\$ 55.25		
Balance		\$ 125.00	\$ 20.00

This table does not represent the fees to be paid by students, and students who are planning to attend the University should take that into account.

The students represented in the above statements are fairly representative; they were neither extravagant nor did they deny themselves unduly to get along.

The student who learns some trade before coming to the University has a great advantage over the student who has to earn his money by ordinary manual labor. Students have earned their whole expenses while attending the University, and have made good records at the same time. Other students have done so much work that they have not been able to keep up their studies, and have thus missed the one thing for which they were attending the University.

If it is possible for the student to have a part of his expenses paid, he should not attempt to earn his way entirely by his own exertions. It is a comparatively easy thing for a young man to earn half his living while attending the University and yet do good work in his classes. Students who want work seldom fail to find it. In coming to the University, the student 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.

Rent	} \$ 75.21	{ \$ 40.75	\$ 58.00
Board, light, laundry			
Fuel	} 9.32	{ 7.25	138.00
Railroad fare and cartage.....			
Street car fare.....	} 2.16	{ 27.80	30.22
Stationery			
Amusements and membership dues	7.50	5.85	6.00
Personals and clothing.....	32.63	8.97	
Books, fees and incidentals.....	23.26	10.56	20.19
		72.51	67.59
		18.94	35.60
Totals	\$ 150.08	\$ 240.05	\$ 355.60

A pamphlet has been published containing five papers (one by a young woman), relating actual experience of students who have made their way through the University.

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

THE
GRADUATE DEPARTMENT

The Graduate Department

This department affords an extension of the work of the college of science, literature and arts, the college of engineering and the mechanic arts, the school of mines, the college of law, and the college of agriculture. It meets the threefold purpose of extending general culture, for which master's 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.

COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

FEES.

All students doing work in this department are required to pay an annual fee of ten dollars. Those doing laboratory work must pay the usual laboratory fees in addition to the regular fee.

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

II. A candidate for a degree is required to present his application on the proper blank, stating the 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 must present their applications with the necessary credentials, to the committee on graduate studies and degrees, who shall examine said applicant and report ac-

cordingly 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. Professors shall report to the faculty early in second semester 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 departments of study offered to candidates :

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

IV. THE AMOUNT OF WORK done by the candidate shall be equivalent to that done by the senior class, viz: an average of sixteen hours a week throughout the year.

V. METHOD OF SELECTING WORK:

1. The candidates shall select work in three distinct departments from the table of studies in number III.

2. One of the subjects he shall indicate as a major, the other two as minors.

3. The candidate shall devote not less than one-half of his work to the major, and not less than one-eighth to each minor.

4. The thesis shall be on some theme connected with the major subject.

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

VII. All examinations shall be held at the University, at which the professors in charge of the subjects pursued by the candidate for the master's degree shall be present as the examining committee of said candidate, the professor in charge of the major subject being chairman. The examination must be completed by the second Thursday preceding commencement, and the examining committee shall make its report to the committee on graduate studies and degrees.

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

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

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

THE COLLEGE OF AGRICULTURE.

The college of agriculture provides graduate work, under the same general plan as the college of science, literature and the arts. Work leading to the master's degree is open to bachelors of this or any reputable agricultural college. Applicants for graduate

work in this college are referred to the dean and committee on graduate work.

COLLEGE OF LAW.

For the benefit of students who wish to pursue legal studies more advanced than they are able to secure as undergraduates, graduate courses are offered, leading to the degrees of master of laws and doctor of civil laws.

The graduate courses required for the degree of master of laws, are as follows:

Philosophic basis of jurisprudence.

Roman law.

Political science.

Constitutional jurisprudence and history.

Theories of taxation.

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 college requiring a three years' course of study. Those who spend the entire year in the work prescribed for this course, and pass a satisfactory examination upon the subjects taken, will be entitled to the degree of master of laws. Any person who possesses the requisite legal learning may, however, enter this course as a special student and pursue any or all of the studies offered.

Students who have received the degree of bachelor of laws, from this or some other law college requiring three years' course of study for said degree, and who have also received the degree of master of laws, from this or some other college after not less than one year of graduate study, and who have taken high rank in all the studies leading to these degrees, may apply to the faculty for the degree of Doctor of Civil Law. A knowledge of French or German, as well as of Latin, is required, and special proficiency in Roman history is necessary to entitle a student to entrance for such degree.

There is no prescribed time within which students are required to do their work in this course, but they must make themselves proficient in the subjects of Roman law, political science, comparative constitutional law, and the philosophy of jurisprudence before any thesis will be accepted.

Neither of the aforementioned degrees will be conferred until a satisfactory thesis is presented to the faculty by the student. The thesis for the doctor's degree must be one evincing original investigation and special excellence.

DEGREE OF DOCTOR OF PHILOSOPHY.

The degree of doctor of philosophy is conferred on bachelors of this, or any reputable college or university, under the following rules:

Applicants for the degree are referred with the necessary credentials, to the committee on graduate studies and degrees, who determine upon the fitness of said applicant for the work proposed and report accordingly to the faculty.

The candidate must elect his work in three departments, a major subject in one department, and two minor subjects in other departments. In special cases the faculty may, upon the recommendation of the committee on graduate studies and degrees, allow the work to be elected in two departments.

Candidates for this degree must devote at least three years of graduate study to the subjects approved. One of these three years, namely, that in which the final examination is held, must be spent in residence at the University. In lieu of the other years the candidate may offer an equivalent term of resident graduate work at some other university.

The candidate must pass satisfactory examinations on his major and minor subjects. In these examinations he must evince an exhaustive knowledge of the special field selected and must show such acquaintance with the minors and the entire field of his major as the committee of examination may require. The candidate must also have a reading knowledge of German and French.

The examination on the major subject is held on or before the second Tuesday in May of the year in which the candidate expects to receive the degree. The examination on the minor subjects is held at any time one year prior to the examination on the major. All examinations must be reported to the committee on graduate studies and degrees.

The candidate must present a thesis to the committee of examination on or before the first day of May of the year in which he expects to receive the degree. The thesis must give evidence of original and independent research, and must be a contribution to knowledge.

The committee of examination shall consist of five professors appointed by the committee on graduate studies and degrees, which number shall include, if practicable, the professors in charge of the candidate's work.

After the above examinations have been satisfactorily passed and the thesis approved by the committee of examination, the candidate is presented to the faculty by the professor in charge of

his major subject for final examination. The presenter submits a written statement of the academic life of the candidate, of the character and scope of his examinations, and of the scope and value of the thesis. Any member of the faculty is then at liberty to ask of the candidate or of the presenter any questions he may desire. Upon the evidence before them the faculty then decide by a vote whether the candidate shall be recommended for the degree.

THE COLLEGE OF
SCIENCE
LITERATURE AND
THE ARTS

The College of Science, Literature and the Arts

THE FACULTY

- CYRUS NORTHROP, LL. D., *President.*
JOHN F. DOWNEY, M. A., C. E., *Dean and Professor of Mathematics.*
WILLIAM W. FOLWELL, LL. D., *Professor of Political Science.*
JABEZ BROOKS, D. D., *Senior Professor of Greek.*
JOHN G. MOORE, B. A., *Professor of German.*
CHRISTOPHER W. HALL, M. A., *Professor of Geology and Mineralogy.*
JOHN C. HUTCHINSON, B. A., *Professor of Greek.*
JOHN S. CLARK, B. A., *Professor of Latin.*
MARIA L. SANFORD, *Professor of Rhetoric and Elocution.*
CHARLES W. BENTON, M. A., Litt. D., *Professor of French.*
HENRY F. NACHTRIEB, B. S., *Professor of Animal Biology.*
FREDERICK S. JONES, M. A., *Professor of Physics.*
CONWAY MACMILLAN, M. A., *Professor of Botany.*
WILLIS M. WEST, M. A., *Professor of History.*
GEORGE E. FRANKFORTER, M. A., Ph. D., *Professor of Chemistry.*
FRANCIS P. LEAVENWORTH, M. A., *Professor of Astronomy and Director of the Observatory.*
FREDERICK KLAEBER, Ph. D., *Professor of Comparative and English Philology.*
RICHARD BURTON, Ph. D., *Lecturer on English Literature.*
JOSEPH BROWN PIKE, M. A., *Professor of Latin.*
JOHN S. CARLSON, Ph. D., *Professor of Scandinavian Languages and Literature.*
CHARLES P. SIGERFOOS, Ph. D., *Professor of Zoology.*
FRANK L. MCVHEY, Ph. D., *Professor of Political Economy.*
JOHN ZELENY, B. S., B. A., *Associate Professor of Physics.*
SAMUEL G. SMITH, Ph. D., LL. D., *Professor of Sociology.*
CHARLES F. MCCLUMPHA, Ph. D., *Professor of English Literature.*
GEORGE FRANCIS JAMES, Ph. D., *Professor of Pedagogy.*
NORMAN WILDE, Ph. D., *Professor of Philosophy and Psychology.*
GEORGE H. MORGAN, Major U. S. A., *Professor of Military Science.*
EMIL OBERHOFFER, *Professor of Music.*
MATILDA J. WILKIN, M. L., *Assistant Professor of German.*
CHARLES F. SIDENER, B. S., *Assistant Professor of Chemistry.*
EDWARD EUGENE McDERMOTT, M. S., *Assistant Professor of Rhetoric and Elocution.*
EDWARD E. NICHOLSON, M. A., *Assistant Professor of Chemistry.*
LOUIS J. COOKE, M. D., *Director of Gymnasium.*
HENRY L. WILLIAMS, M. D., *Director of Athletics.*
FRANK M. ANDERSON, M. A., *Assistant Professor of History.*
CARL SCHLENKER, B. A., *Assistant Professor of German.*
ALBERT B. WHITE, Ph. D., *Assistant Professor of History.*

WILLIAM A. SCHAPER, Ph. D., *Assistant Professor of Political Science.*
 GEORGE N. BAUER, Ph. D., *Assistant Professor of Mathematics.*
 HOPE McDONALD, M. S., *Assistant Professor History.*
 JOHN PARSONS BEACH, *Assistant Professor of Music.*
 CHARLES ALBERT SAVAGE, Ph. D., *Assistant Professor of Latin and Greek.*
 FRANCES B. POTTER, M. A., *Assistant Professor of English.*
 JOSEPHINE E. TILDEN, M. S., *Assistant Professor of Botany.*
 EDWARD M. FREEMAN, M. S., *Assistant Professor of Botany.*
 JOHN E. GRANUD, Ph. D., *Assistant Professor of Latin.*
 ADA L. COMSTOCK, M. A., *Assistant Professor of Rhetoric.*
 SAMUEL N. DEINARD, M. A., *Assistant Professor of Semitic Language and Literature.*

INSTRUCTORS.

ARNOLD AZEMAR, *French.*
 JOSEPH W. BEACH, M. A., *Rhetoric.*
 FREDERICK E. BECKMAN, Ph. D., *Spanish and French.*
 EMMA BERTIN, *French.*
 JOHN C. BROWN, M. A., *Animal Biology.*
 OSCAR C. BURKHARD, B. A., *German.*
 ANNA M. BUTNER, *Physical Culture.*
 HENRIETTA CLOPATH, *Drawing.*
 LILLIAN COHEN, M. A., *Chemistry.*
 HANS H. DALAKER, B. A., *Mathematics.*
 HAL DOWNEY, B. A., *Animal Biology.*
 HENRY A. ERIKSON, B. E. E., *Physics.*
 JOSEPH E. L. FAYANS, *French.*
 OSCAR W. FIRKINS, M. A., *English and Rhetoric.*
 EVERHART P. HARDING, Ph. D., *Chemistry.*
 GEORGE H. JOHNSTON, M. A., *Psychology.*
 JANE KENNEDY, M. D., *Medical Examiner for Women.*
 JENNINGS C. LITZENBERG, B. S., M. D., *Gymnastics*
 HAROLD L. LYON, Ph. D., *Botany.*
 OSCAR W. OESTLUND, M. A., *Animal Biology.*
 ARTHUR L. PARSONS, B. A., *Mineralogy.*
 MARY G. PECK, M. A., *English.*
 BERT A. ROSE, *Band.*
 EDWARD P. SANFORD, M. A. *Rhetoric.*
 FREDERICK W. SAEDSON, Ph. D., *Paleontology.*
 WALDEMAR SCHULZ, Ph. D., *German.*
 ROYAL R. SHUMWAY, B. A., *Mathematics.*
 DAVID F. SWENSON, B. S., *Philosophy.*
 WILLIAM I. THOMAS, *Rhetoric.*
 ANTHONY ZELENY, M. S., *Physics.*

SCHOLARS AND ASSISTANTS.

GERTRUDE BALLARD, B. A., *Rhetoric.*
 MARGUERITE BARBOUR, *Physical Culture.*
 HELEN E. CAMP, B. A., *History.*
 BERNICE M. CANNON, B. A., *Philosophy.*
 RAYMOND P. CHASE, B. A., *Rhetoric.*
 IRWIN A. CHURCHILL, *Political Economy.*
 MARJORIE COLE, *Chemistry.*
 ARNOLD V. DAHLBERG, *Chemistry.*
 NIEL S. DUNGAY, *Animal Biology.*

STURLA EINARSON, *Observatory.*
FRANCIS C. FRARY, *Chemistry.*
JULES T. FRELIN, *French.*
FRANK GROUT, *Chemistry.*
EDWARD GUTSCHE, *Chemistry.*
E. E. HEMINGWAY, M. A., *Animal Biology.*
CHARLES M. HOLT, *Pedagogy.*
DAISY HONE, B. A., *Botany.*
JOSEPH HOPKINS, *Chemistry.*
ARTHUR M. JOHNSON, *Botany.*
ALOIS F. KOVARIK, *Physics.*
FRANK J. LONGWORTH, *Chemistry.*
LINDA H. MALEY, B. L., *Rhetoric.*
WILLIAM METHLEY, *Chemistry.*
LILLIAN NIXON, B. A., *Rhetoric.*
E. MCM. PENNOCK, *Geology.*
CHARLES D. POORE, *Chemistry.*
ANTON R. ROSE, *Chemistry.*
ELLA C. RUSCOE, *Rhetoric.*
JESSIE L. SCHULTEN, *Rhetoric.*
FREDERICK R. SCHWEITZER, *Clerk in Gymnasium.*

Regulations Governing Admission

ADMISSION

Examinations for admission will be held at the beginning of the year. See calendar and program of examinations.

No student will be registered for first semester's work after September 17th, 1904, and second semester's work after February 4th, 1905.

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

From and after the opening of the year **1904-05**, every person admitted to the University shall be examined in reading, writing, spelling and composing the English language, and all who fail to obtain a grade of seventy-five per cent, shall be required to pursue a course of instruction to be provided, and no person shall ever receive any diploma or other certificate of merit or proficiency until he shall have passed such examination and obtained the specified credit.

GENERAL REGULATIONS.

Students bringing records from accredited schools are required to present them on the blank form provided for the purpose by the University. Blank forms may be obtained from the Registrar. No other form of certificate will be accepted. Students who do not bring their certificates on the proper form of blank will not be allowed to register until they have secured the certificate on the required form.

- I. Students will be admitted to the freshman class on **passing the regular entrance examinations.**
- II. No student will be admitted **if conditioned in more than three half-year subjects, or their equivalent.**

- III.** Graduates of any Minnesota State high school will be admitted **without examination, provided—**
- (1) That the school maintain a **full four-year course** of high school work.
 - (2) That the applicant present to the registrar the principal's certificate showing the satisfactory completion of **all the studies required for admission** to the desired University course.
- IV.** Graduates of Minnesota State high schools who are deficient in **not more than three half-year subjects** or their equivalent, **may be excused** from entrance examinations in such subjects as the **enrollment committee may decide**; such candidates should present themselves to that committee **not later than Tuesday of examination week.**
- V.** Graduates of Minnesota State high schools whose principal's certificate shows them to be deficient in **more than three half-year subjects** or their equivalent, even though they have made such additional preparation as they deem necessary, must take, nevertheless, the regular entrance examination in all subjects, as provided in sections I and II unless excused by vote of the faculty; and persons wishing to present reasons for such excuse **should report to the enrollment committee not later than Tuesday of examination week.**
- VI.** Any Minnesota high school or academy **not under supervision of the State High School Board**, but requiring for graduation a **four-year's course**, exclusive of the common school branches, conforming **essentially in distribution of time** to the entrance requirements of at least one of the University courses, will, upon application, be inspected by a committee, and, after favorable recommendation, **may be accredited by the faculty** in all respects as are the state high schools, **provided—**
- (1) That the school be **open to inspection** at any time by the University;
 - (2) That it take such **supplementary examinations as may be prescribed** from time to time.
- VII.** Graduates from schools in other states, whose diplomas admit to **reputable colleges** in the state in which the school is located, will be received subject to the regulations that apply to graduates of Minnesota State high schools.

VIII. Applicants from schools not coming within any of the above classes **must take the regular entrance examinations** or present State High School Board certificates.

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

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

REQUIREMENTS FOR ADMISSION.

N. B.—Time element, as indicated with each subject, is essential.

English, four years, including

- (a) Classics.
- (b) Principles of composition.
- (c) Practice in written expression.

Algebra, elementary, one year.

Algebra, higher, one-half year.

Geometry, plane, one year.

Geometry, solid, one-half year.

In addition to the above named subjects which are required and for which substitutes cannot be accepted, applicants shall present evidence of preparation in **eight** year-credits, or their equivalent, to be chosen from the following list:

Note—It is provided that if any language is offered from the list of elective subjects, at least two years of that language shall be offered, save in the case of Latin Grammar, which will be accepted as the equivalent of one year of English.

Latin (four years).

Grammar, one year.

Caesar, four books, one year.

Cicero, six orations, one year.

Vergil, six books, one year.

Greek (two years).

Grammar, one year.

Anabasis, four books, one year.

German (two years)

Grammar, one year.

Literature, one year.

French (two years).

Grammar, one year.

Literature, one year.

Spanish (two years).

Grammar, one year.

Literature, one year.

History, Ancient, to Charlemagne, one year.

Modern, from Charlemagne, one year.

England, one-half year.

Senior American, one-half year.

Until the opening of the University year 1907-08, half year-credits will be accepted in ancient, medieval and modern history.

Civics, one-half year.**Political Economy**, one-half year.**Physics**, one year

Chemistry, one year. One-half year credit will be accepted until the opening of the year 1907-08.

Botany, one-half or one year.**Zoology**, one-half or one year.**Astronomy**, one-half year.**Geology**, one-half year.**Physiography**, one-half year.**Commercial Geography**, one-half or one year.

SYLLABUS.

The following statements indicate, in a general way, the ground expected to be covered in the study of the various subjects accepted for admission.

English (four years).

In order to secure a definite plan of study and unity of method on the part of preparatory schools, the entrance requirement in English is outlined below somewhat in detail. Where texts are mentioned they are merely suggestive and not arbitrary. Equivalents will be accepted in lieu of any of the texts mentioned. The entrance requirement in English covers four years of the high school course, and not less than four hours a week should be devoted to the subject. The headings under which instruction will naturally fall are:

- (a) English classics.
- (b) The principles of rhetoric.
- (c) Practice in written expression.
- (a) English classics should include a critical reading, in class, of English masterpieces. The following are suggested as well adapted for such

study: Shakespere's "Macbeth," Milton's "Paradise Lost," books one and two; Burke's "Conciliation with America;" Carlyle's essay on "Burns." In the study of these works the student should come to know the leading facts connected with the author and his time; he should become familiar with the subject matter of the work; thoroughly at home with the story and have a clear idea of the form and structure of the work as a whole.

A less critical knowledge of other standard or classic works, which may perhaps be read by the student at home, with written reports and brief oral discussions in class. The following works are noted as indicative of the minimum amount of work expected: At least two of Shakespere's plays, beside the one read in class, one of Irving's works, one of Hawthorne's novels, one of Stevenson's novels, one of Webster's orations.

(b) The work in the principles of composition should include the principles and technical terms of ordinary texts upon the subject, whether acquired by the direct study of such texts or mainly by the study of selected English masterpieces. It should not be forgotten that this is not an end in itself, but simply a means of teaching the student the correct use of English.

(c) Not less than one hour each week throughout the four years of the high school course should be devoted to practice in written expression. The instructor may choose such topics as local conditions may require or make most profitable, but whatever line of work is pursued, the student should be taught to use language correctly and forcibly and learn to express himself clearly and logically in writing.

Elementary Algebra (one year).

Addition, subtraction, multiplication, division, factoring, highest common divisor, lowest common multiple, fractions, simple equations (with one, two, and several unknown quantities) followed by problems, theory of exponents, involution (including the binomial theorem for positive integral exponents), evolution, radicals, inequalities, ratio, proportion, progression, and quadratic equations with problems.

Higher Algebra, First Part (one-half year).

While this subject does not include any topics not named under elementary algebra, a much fuller treatment of those topics is expected in this work. Principles as well as processes should be learned, theorems and rules should be rigorously demonstrated, the exercises and problems should be more difficult, and students should be drilled in short methods and rapid work. Unless candidates have a good knowledge of the fundamental topics named below, they are not prepared to pursue successfully at the University the second part of higher algebra.

The topics are addition, subtraction, multiplication, division, factoring, highest common divisor, lowest common multiple, fractions, theory of exponents, involution, evolution, surds, imaginaries and simple equations with problems.

Plane Geometry (one year).

Any of the standard texts on this subject will furnish the necessary preparation. Isoperimetry, symmetry and maxima and minima of figures are not required. The exercises requiring solutions and demonstrations should not be omitted.

Solid Geometry (one-half year).

Any of the standard texts on this subject will furnish the necessary preparation. The exercises requiring solutions and demonstrations should not be omitted.

Latin Grammar (one year).

This will include the subjects of orthography, etymology and syntax. Proficiency is particularly desired in the following subjects: the analysis of the verb forms, the rules of syntax, and the principal parts of the irregular verbs.

Cæsar (one year).

First four books, or selections from the seven books equivalent to four; or three books, with thirty pages of Cornelius Nepos, or two books with sixty pages of Cornelius Nepos. 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 the text. The student is expected to be familiar with the life of Caesar and an account of his wars.

Cicero (one year).

Six orations: four against Catiline and any two of the following: "Poet Archias," "Ligarius," "Marcellus," "Manilian Law" (to count as two orations), the Fourteenth Philippic, the student should be familiar with the life of Cicero and the history of his times.

Vergil (one year).

Six books of Aeneid, or five of Aeneid and one of the Metamorphoses of Ovid, or the Eclogues. The student should be familiar with the life of Vergil, and an account of his times and writings. A correct rythmical reading of the text is to be encouraged.

Greek Grammar (one year).

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

German (two years).

First year—the pupil should acquire:

- (1) A correct pronunciation, training of the ear, eye and organs of speech.
- (2) A vocabulary of a thousand words of every day use; facility in combining these words into simple sentences. (As a means to this, 100 to 150 pages of easy narrative prose and poetry should be read, from which questions and answers may be formed. To test the student's memory and knowledge of the word-order he should relate or write out the story anew in his own words.)
- (3) From two to three hundred German idioms.
- (4) The essentials of German grammar, to be taught by means of oral and written exercises based upon the reading lessons.

Second year—

- (1) Read 150 to 200 pages of prose and poetry.
- (2) Practice in reading smoothly and with expression.
- (3) Carefully translate selected passages of the text into idiomatic English (to translate easy sentences which the student already understands is a waste of time).
- (4) Translate sentences from English into German, using words and idioms of the text read.
- (5) Study typically German grammar; chief rules of orthography, etymology and syntax; illustrate these by words, phrases and sentences selected or composed by the student.

French (two years).

The principles of French grammar, including acquaintance with the verb, regular and irregular; an ability to translate easy English sentences into French and simple French prose into English.

Spanish (two years).

First year—Grammar and reader.

Second year—Grammar reviewed; reading of some modern writer; composition and conversation.

Ancient History (one year).

- (a) This study should begin with from five to seven weeks upon the oriental peoples who have most influenced European development, noting the early civilizations in the valleys of the Nile and Euphrates, the spreading and meeting of these civilizations in the intermediate region, with notice of the more important states in that district, and the union of the East under Persia. This survey should aim to give an idea of the reach of recorded history, of the distinguishing features of the successive oriental nations, and of their more important influence upon later European development.
- (b) In the Greek and Roman age emphasis should be put upon the evolution of institutions, and considerable attention should be paid to the later Hellenistic period, after the rise of Macedon, and to the Roman Empire, with its bearing upon subsequent history. Some of the work should be illustrated by the use of sources, and maps should be used constantly.
- (c) The subject should be carried down to the establishment of Charlemagne's Empire. This will bring together all the chief lines of in-

fluence which were afterwards to make our modern world, will show the meaning of the preceding eras as can not be done if the study stops at an earlier date, and will leave the subject at a period of comparative order and simplicity.

Modern History (one year).

From Charlemagne to the present. The topics to which special attention are called are the period of disorder after Charlemagne and the consequent rise of feudalism, the Holy Roman Empire and the papacy, the medieval church, the crusades, the free cities, the rise of national monarchies, the intellectual renaissance and the Protestant reformation, the French Revolution and the subsequent democratic movements in politics and industry.

It is desirable to give at least half of the year to this last period from 1789.

Instead of these two subjects, Ancient and Modern History, the University will, until 1907, continue to accept the following:

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

Medieval History (one-half year).

Modern History (one-half year).

English History (one-half year).

The Saxon period should be passed over rapidly. In the remainder of the work, besides the narrative, constitutional points should receive attention, and easily accessible documents, like Magna Charter, should receive careful study.

Senior American History (one-half year).

No attempt should be made to cover the whole field in this time. Either the colonial history or the period from 1783 to 1832 offers quite enough material. In any case considerable use should be made of collections or documents and sources.

Civics (one-half year).

The subject should be approached from the historical side. The best arrangement is to combine the study with the senior American history and to give a year to the two.

Political Economy (one-half year).

Some good elementary text book should be mastered. It is desirable that students be encouraged to study local and general economic phenomena and conditions. The time should be wholly devoted to the elements of the science of political economy. The beginner should not be confused with problems of applied economics such as tariff, trusts, bimetalism, etc.

Physics (one year).

It is suggested that the year's work be confined to four of the seven subjects mentioned below.

1. Mechanics of solids;
2. liquids and gases;
3. sound;
4. heat;
5. light;
- 6 and 7, electricity and magnetism (to count as two subjects but not to be divided).

Chemistry (one or one-half year).

The full year's work should include a study of both the non-metals and metals with laboratory experiments illustrating the common chemical laws and the commoner chemical reactions.

The half year's work should cover the non-metals only, with laboratory experiments similar to the first half of the full year's work.

After the opening of the year 1906-07, the one-half year credit will not be accepted for admission.

Botany (one or one-half year).

Schools which give one-half year of botany should devote particular attention to plant relations, making the course largely ecologic in bearing.

When a whole year is given to the subject, additional work upon plant structures should be offered, and together with fundamental conceptions of ecology a general idea of morphology and taxonomy should be the aim of the course.

Zoology (one or one-half year).

The course of zoology, whether a half year or a year course, should be a natural history rather than a modern morphological course. Collecting and classifying (as a means) should be encouraged as much as possible.

Animals should be studied as living units, in their relation to one another and their environment. The general and special structural feature in relation to the habits, the food and manner of obtaining it, the enemies and means of protection against them, hibernation, migration, the differences in habits, form and structure between the old or mature animal and the young, the relation of parents to their offspring, etc.—in short, all about the life of the animal under consideration should be the prominent feature, and as much as possible of this should be made out by direct observation of the animal in its natural home and in confinement. The course, on the whole, should aim to foster and develop a love for nature, train the power of observation toward accuracy and give a healthful stimulation to the imagination. The pupil should be guarded against the habit of confounding the facts of observation with his interpretation, his judgments.

The animals for direct observation should be selected from as many branches of the animal kingdom as possible, and the changes during the year in the character of the fauna of the locality in general as well as of some particular region should be noted. In some localities the work will of necessity be largely restricted to land and air animals, but no locality in Minnesota is so poor in animal life that very profitable work cannot be laid out along the line indicated above.

It will be noticed that such a course of necessity includes so-called laboratory work. The amount and extent of the laboratory work will depend upon conditions, but even under the best conditions it is hardly advisable to go into detailed dissections and embryology. Continued, repeated and close observation, aided now and then, by a simple hand lens or a compound microscope, will reveal an abundance of material and opportunity for disciplining the mind.

Astronomy (one-half year).

An elementary course in general astronomy as presented in any good modern text-book.

Geology (one-half year).

These sub-divisions should receive special attention; physiographic geology, which treats of the building of the land and the evolution of its existing contours; geo-dynamics, the study of the forces, atmosphere, water, terrestrial heat, plants and animals, modifying the earth; and a brief survey of historical geology.

Physiography (one-half year).

The following topics should be emphasized: Meteorology, to an orderly arrangement of the leading facts relating to the atmosphere, and its phenomena, including some acquaintance with the work of the U. S. Bureau; Land Sculpture, as it treats of the origin, development and decadence of land forms and the influence of these processes on the physical environment of man.

ADVANCED STANDING.

Advanced standing—The University accepts records from all reputable colleges for credit to advanced standing. Such records are accepted as far as they are equivalent to the work done in this University, subject to the approval of the departments concerned. In bringing records from other institutions, the certificate must be on the official blanks of the institution granting the certificate, and should show:

1. The subject studied; if a language, the work read, etc.
2. The time spent upon each subject.
3. Ground covered in laboratory work in case of laboratory subjects.
4. The result—it is sufficient to state that the subject was creditably completed.

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

CREDIT FOR NORMAL SCHOOL WORK.

Graduates of the "advanced graduate course" of a Minnesota state normal school will be admitted with advanced standing equivalent to one year's credit, and will receive the degree of bachelor of arts upon completing in the University the following courses: freshman mathematics, two years of science from the subjects prescribed for the freshman and sophomore years, two years of language (not including English) from those years, sophomore rhetorical work, and enough additional work to make total amount of work completed equivalent to three full years of the college course.

Provided that such students shall not be permitted to elect courses I and II in pedagogy, and that before registering for the freshman mathematics they shall be required to make good any deficiencies in their preparatory mathematics, under the regulations that apply to all other candidates for the bachelor's degree.

Individual graduates of the "advanced Latin course" (five-year) or of the "advanced English course" (five-year), of a Minnesota state normal school, who, on the basis of maturity and ability, present certificates of special fitness from the president of the normal school, will be admitted with advanced standing under the same regulation and proviso.

DAILY ROUTINE.

The morning session begins at 8:30 o'clock; a general assembly of the faculty and students is held each day at 10:25 o'clock, at which there are brief and simple religious exercises. Work extends through six days of the week.

EXAMINATIONS.

At the close of each semester, examinations are held in the studies of that semester.

Students are reported as "excellent," "good," "passed," "incomplete," "conditioned," or "failed."

An incomplete must be removed within one month from the opening of the following semester or it becomes a condition.

A "condition" not made up before the subject is offered again becomes a "failure," subject to rules governing failures.

"Failures" must be pursued again in class.

A student who at any time is deficient in more than half a year's work, loses his class rank and is regarded as a member of the next lower class.

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

FAILURE TO KEEP UP WITH THE CLASS.

Any student receiving conditions or failures in 60 per cent of the work the first semester shall be dropped from the rolls, and shall not be allowed to re-enter the University until the opening of the following year.

Any student failing to pass in one-half of the work of any year shall not be allowed to register until reinstated by action of the faculty upon recommendation of the committee on students' work.

FEEES.

All students in the college, who are residents of the state, are charged an incidental fee of ten dollars a semester. Non-residents are charged double the fee required of residents of the state, or twenty dollars a semester. No reduction is made for late entrance or for leaving before the end of the semester. Save in the case of the first registration, the incidental fee is increased 25 cents for each day's delay in registration, beginning with the day set for recitations to begin. In addition to this fee, students who take work in laboratories are charged a sum sufficient to cover the cost of material and breakage. The following is a statement of fees charged per semester for freshman year. *Chemistry, \$5; botany, \$3; zoology, \$3.

GRADUATION.

Students completing the course of study to the satisfaction of the faculty of the college, are entitled to receive the baccalaureate degree. Any person may undergo, at suitable times, examination in any subject, and if such person pass in all the studies and exercises of the course, he is entitled to

the appropriate degree; **provided**, however, that at least one full year (the one immediately preceding the granting of the degree) must be spent at the University, before such degree shall be granted, and **provided**, the examination, in every case, be held before a committee of the faculty appointed for that purpose.

UNCLASSED STUDENTS.

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

Four-fifths of the first year's work of an unclassified student must be chosen from subjects open to freshmen. Unclassed students shall pursue an amount of work equivalent to that required of students enrolled in regular classes.

The committee on enrollment, to which all applicants for admission as unclassified students must present themselves, will meet daily during examination (the first) week of the first semester, to consider applications, and all applications must be presented to the committee and not to individual members. Unclassed students will not be admitted after the third week of the semester. Action upon application made after that time will be deferred until the beginning of the following semester.

THE UNIVERSITY STATE TEACHER'S CERTIFICATE.

Upon graduation from the college of science, literature and arts, students who have completed one semester of psychology, and three semesters of pedagogy, may apply for, and will receive upon the vote of the faculty, the University State Teacher's Certificate, which by state law authorizes them to teach in the public schools of Minnesota for two years from date. After that time, upon satisfactory evidence of success, the certificate may be made perpetual by the endorsement of the state superintendent of public instruction and the president of the university.

Course of Study

NOTES.

The degree of bachelor of arts will be conferred upon any student who completes, from the courses offered in this college, an amount of work equivalent to **sixty-three hours a week, for one year**, in addition to the required exercises in drill, gymnasium and physical culture. Of the courses selected **five** or more shall be **long courses**, and at least one long course shall be chosen from each of the following groups:

- (a) English, French, German, Greek, Latin, Rhetoric.
 - (b) Animal Biology, Astronomy, Botany, Chemistry, Mineralogy, Physics.
 - (c) History, Philosophy, Political Science, Sociology.
- No student shall receive credit for more than two beginning language courses save by special permission.

A **long course** means an amount of work equivalent to not less than six hours per week, in one department, for one year.

A **double period** in laboratory subjects counts as **one credit-hour**.

FRESHMAN YEAR.

Students who have been found deficient in entrance **English** are required to pursue a special course in that subject, through the first semester, or longer if necessary. Such students do not receive credit toward their degree, for this work, nor are they allowed to pursue more than the specified sixteen hours of work, including this course.

Freshmen with an entrance condition in mathematics will not be allowed to pursue the work in mathematics, nor are they allowed to pursue work in place of mathematics omitted, but are required to devote their time to the remaining work of the year and to removing their entrance conditions.

Mathematics (3)—Required of all during freshman year.

Military Drill (2)—Required of men.

Gymnasium (1, in two periods)—Required of men.

Physical Culture (3)—Required of women.

Rhetorical Work (1)—Required of all who do not choose the **3-hour** course in rhetoric.

In addition, students shall choose **eleven or twelve credit-hours** of work, from the following list, and shall pursue the courses selected through the year.

Animal Biology [3²], Course I. General zoology.

Animal Biology [3²]. Course II. Representatives of the phyla of the animal kingdom.

May be pursued in connection with course I or independently by those with proper preparation.

Botany [3²], Course I, Short.

Botany [3²], Course II, 1st year of long course.

Chemistry [3²], Course I, General.

English [3], Courses I (Chaucer) and II (Spenser).

- French** [5], Course I, Grammar and translation, composition and conversation.
- French** [3], Course III, Beginnings of French literature and translations from modern authors.
- German** [5], Course I, Grammar, translation, pronunciation, conversation and composition.
- German** [3], Course IV, Advanced, 3d year's work.
- Greek** [5], Course I, Grammar, Anabasis and composition.
Course II may be pursued at the same time to advantage.
- Greek** [1], Course II, Composition.
- Greek** [3], Course III, Oratory and history.
- History** [3], Course I, 31 B. C. to 1500 A. D.
- History** [3], Course II, English Constitutional. Open to students who have completed the equivalent of course I.
- Latin** [3], Courses I (Sallust), and II (Cicero), or III (Livy).
- Rhetoric** [3], Course I, Composition.
- Rhetoric** [3], Course II, Debate. This course is open only to students who have had special preparation in debate, and by consent of the head of the department.
- Rhetoric** [3], Course III Reading. This course is open to students in courses I or II.
- Scandinavian** [5], Course I, Grammar and composition; practice, including writing, speaking and translating Swedish.
- Scandinavian** [5], Course II, Grammar and composition; practice, including writing, speaking and translating Danish-Norwegian.
- Scandinavian** [3], Course III, History of Scandinavian literature and study of authors.
- Spanish** [5], Course I, Grammar and composition, conversation and translation.

SOPHOMORE YEAR.

Rhetorical Work [1]—Required of all who did not pursue the 3-hour subject in the freshman year.

Military Drill [2]—Required of men.

In addition, students shall elect **fifteen credit-hours** of work from the subjects open to sophomores. See departmental statements.

JUNIOR AND SENIOR YEARS.

The work of these two years is entirely elective, it being provided that no student shall elect **less than fifteen nor more than eighteen** hours of work in any semester, save by permission of the committee on students' work.

1. Students who carry **military drill** [2], through the junior and senior years, completing the same in a satisfactory manner, will be allowed a **2-hour credit through the senior year**.

2. Seniors contemplating entering the **medical department** are permitted to elect the courses in **anatomy, chemistry, histology, and physiology** (it being understood that no repetition of work is allowed) in the medical department. The work completed in any or all of these departments will be applied toward the work required for a degree in this college.

3. Members of the senior class of this college are permitted to elect as **one subject throughout the senior year, work in the college of law**, including the **elements of contracts, domestic relations, torts and criminal law**. The satisfactory completion of the above named courses will give the student a **four-hour senior credit**, and will entitle him to admission to the middle class of the college of law. No student will be permitted to take **more than one lecture each day in the college of law**, without special permission of the faculty of this college. The work must be taken with the **night class** in the college of law.

SIX YEAR COURSE IN MEDICINE.

There has been established a six years' course of study, arranged especially for students of medicine. This course is conducted in the colleges of science, literature and the arts, and of medicine and surgery. It leads to the degree of bachelor of science at the end of the first four years and to the degree of doctor of medicine at the end of six years' course. The work of the first two years is adapted especially to the needs of the student of medicine.

The work of the first two years is outlined as follows:

FIRST YEAR.

1. **German.*
2. *Botany.*
3. *Chemistry.*
4. *Zoology.*
5. *Higher Algebra and Plane Trigonometry.*

SECOND YEAR.

1. *Rhetoric.*
2. *German or French.*
3. *Chemistry.*
4. *Comparative Anatomy of Vertebrates.*
5. *Physics, (special course.)*

*Note—Students who enter with two years of German may elect French in its stead in the first or second years.

Courses of Instruction

Unless otherwise specified all courses are three credit-hour courses.

ANIMAL BIOLOGY.

Course I. General zoology.

I, II. PROFESSOR SIGERFOOS, MR. OESTLUND AND ASSISTANTS.

Text books, lectures, quizzes and laboratory work.

The course includes the elements of entomology, a general survey of the phyla of the animal kingdom and the elements of embryology. A collection of identified insects (which must be submitted during the first ten weeks of the course) is required of each student. Those intending to pursue the course may obtain directions from Mr. Oestlund during May and make the collection during the summer preceding the course.

Course II. Zoology.

Extension of course I.

I, II. PROFESSOR SIGERFOOS, MR. OESTLUND AND ASSISTANTS.

This course may be pursued either in connection with course I, thus completing a "long course" in general zoology during the first year, or independently by those sufficiently prepared. The object of the course is to acquaint the student with more representatives of the phyla of the animal kingdom and to give him practice in the use of references.

Course III. Histology.

I, II. PROFESSOR NACHTRIEB AND MR. DOWNEY.

Prerequisite, course I.

Lectures, quizzes, reference and laboratory work.

(a) General histology. A comparative study of the characters, properties and development of animal tissues.

(b) Vertebrate organology. The microscopic anatomy of the organs of vertebrates.

So far as possible the student will prepare the material himself and thus acquire not only a collection of personally-made preparations, but also a practical knowledge of histological methods and technique.

The text book and principal references are: Szymonowicz-MacCallum, A Text-Book of Histology and Microscopic Anatomy; Böhm and Davidoff-Huber, Text-book of Histology; Schneider, Lehrbuch der vergleichenden Histologie der Tiere; Oepel, Lehrbuch der vergleichenden mikroskopischen Anatomie der Wirbelthiere; Hertwig, Zelle und Gewebe; Wilson, The Cell; and others.

Course IV. Embryology of vertebrates.

I, II. PROFESSOR NACHTRIEB.

Prerequisite, courses I and III or their equivalent.

Lectures, reference and laboratory work.

In the laboratory the student will prepare series of various stages of several vertebrates, and with these personally prepared series and the laboratory collections he will be taught to work out developmental problems as well as verify the statements of the reference texts.

The text-book and general references of the course are: Hertwig-Mark, Text Book of the Embryology of Man and Mammals; Minot, A Laboratory Text-book of Embryology; Marshall, Vertebrate Embryology; Minot, Human Embryology; Roule, L'Embryologie Comparee, and Hertwig, Handbuch der vergleichenden und experimentellen Entwicklungslehre der Wirbelthiere.

Course V. Embryology of invertebrates. I, II. PROFESSOR SIGERFOOS.

Prerequisite, courses I and III or their equivalent.

Lectures, laboratory and reference work.

Text references: Haddon, An Introduction to the Study of Embryology; Korschelt and Heider, Text-book of Embryology of Invertebrates; Roule, L'Embryologie Comparee.

Course VI. Comparative anatomy of vertebrates. I, II. MR. BROWN.

Prerequisite, course I.

Lectures, quizzes, reference and laboratory work.

Reference and laboratory guides: Flower, Osteology of the Mammalia; Parker and Bettany, Morphology of the Skull; Reynolds, The Vertebrate Skeleton; Jayne, Mammalian Anatomy; Huxley, A Manual of the Anatomy of Vertebrated Animals; Owen, Comparative Anatomy and Physiology of Vertebrates; Wiedersheim, Comparative Anatomy of Vertebrates; Gegenbauer, Vergleichende Anatomie der Wirbelthiere.

Course VII. Taxonomy.

Prerequisite, course I. Days and hours are arranged with the instructor.

(a) Systematic entomology. I, II. MR. OESTLUND.

The course covers the general classification of insects and special problems in entomology.

(b) Ichthyology. I. PROFESSOR NACHTRIEB.

The classification of fishes, with detailed work on the fishes of Minnesota.

(c) Ornithology. II. MR. BROWN.

The classification of birds, with special reference to the birds of Minnesota.

Course VIII. Physiology. I. PROFESSOR SIGERFOOS.

Open to all juniors and seniors. Lectures, text-book and demonstrations. This course is at present offered on alternate years. It will be offered as an elective during 1904-5 and not during 1905-6.

Course IX. Nature study.

II. PROFESSORS NACHTRIEB AND SIGERFOOS AND ASSISTANTS.

Prerequisite, course I. The days and hours are arranged with the instructors.

The course consists of lectures, reference, laboratory and field work. It is intended for those who contemplate teaching zoology and is planned to give practical instruction in collecting, identifying and preparing laboratory and museum material for general courses of zoology.

Course X. Principles of zoology. I. PROFESSORS NACHTRIEB AND SIGERFOOS.

Open to all except freshmen.

Lectures on the general principles of animal morphology, physiology and embryology in connection with the life and habits of animals; and a discussion of the origin and evolution of animals. The lectures will be illustrated by means of specimens, charts and lantern slides.

This course is alternated with course XI and will be given in the odd-numbered years. Accordingly it will not be offered in 1904.

Course XI. Animal intelligence and instinct. I. PROFESSOR NACHTRIEB.

Open to all juniors and seniors.

Lectures upon animals at work and at play.

This course alternates with course X and is given in the even-numbered years.

Course XII. Economic zoology. II. PROFESSOR NACHTRIEB.

Open to all juniors and seniors.

Lectures on the uses made of animals and parts of animals; methods of preparation and preservation, etc. Given only in the even-numbered years.

Course XIII. Problems in animal embryology or morphology.

I, II. PROFESSORS NACHTRIEB AND SIGERFOOS.

Open only to those who have satisfactorily completed courses I, III and IV or V or their equivalent.

Course XIV. Phytosopnawu zoology.

PROFESSOR NACHTRIEB.

Open to those pursuing advanced courses.

Occasional lectures upon special topics. Days and hours determined with the professor.

FOR GRADUATES.

For graduates of the department and those of equal preparation from other institutions, whether candidates for the Master's or Doctor's degree or not, any line of research or advanced work that can be carried on profitably.

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

JOURNAL CLUB.

This club is composed of the professors, instructors and advanced students of the department. It meets once a week throughout the year. The object is to keep its members informed on the latest investigations carried on in the various branches of zoology through abstracts, reviews and discussions of the articles in the current periodicals. While the attendance is voluntary all advanced students are expected to take an active part.

FRIDAY NIGHT READING CLUB.

This club meets Friday nights during the winter months at the home of one of the professors to read and discuss writings not so technical as those of the Journal Club, such as the biographies and philosophical writings of prominent biologists. Attendance is voluntary.

ASTRONOMY.

FOR UNDERGRADUATES.

Course I. General astronomy.

I, II. PROFESSOR LEAVENWORTH.

A study of the general principles of astronomy, illustrated by observational work. Open to those who have completed trigonometry.

Course II. Practical astronomy. [3 or 6.]

I, II. PROFESSOR LEAVENWORTH.

The theory of instruments, the use of the ephemeris and nautical almanac; the various methods of determining time, latitude and longitude, parallax, the position of the celestial bodies, and the method of least squares; observatory practice including photography, and spectrum-analysis. Open to those who have completed analytical geometry, calculus and general astronomy.

FOR GRADUATES.

Course III. Extended course in practical astronomy.

PROFESSOR LEAVENWORTH.

Course IV. Orbit work.

PROFESSOR LEAVENWORTH.

Course V. Astrophysics.

PROFESSOR LEAVENWORTH.

Course VI. Astrophotography with photographic measurements.

PROFESSOR LEAVENWORTH.

BOTANY.

Course I. General botany.

I, II. DR. LYON.

This course comprises a general survey of the plant kingdom with laboratory work on the cell, on algae, lichens, fungi, mosses, ferns, gymnosperms and flowering plants. Lectures and laboratory. Open to all.

Course II. General plant morphology.

First year.

I, II. ASSISTANT PROFESSOR TILDEN.

This course comprises a thorough laboratory discipline in bacteria, algae, fungi and lichens and also includes a brief survey of economic plants. It is the prerequisite for course III. Lectures, laboratory and collateral reading throughout the year. Open to all.

Course III. General plant morphology.

Second year.

I, II. PROFESSOR MACMILLAN AND ASSISTANT PROFESSOR FREEMAN.

A view of mossworts, ferns and flowering plants is given, with lectures, laboratory work and collateral reading throughout the year. Open to students who have completed course II, of which it is a continuation.

Course IV. Taxonomy.

Junior or senior I, II.

PROFESSOR MACMILLAN AND ASSISTANT PROFESSOR FREEMAN.

Lectures, reference reading and herbarium work. The course is primarily designed to afford students an opportunity to become proficient in the determination of plant species. Open to those who have completed course I or III.

Course V. Cytology.

Junior or senior I, II.

PROFESSOR MACMILLAN AND DR. LYON.

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

Course VI. Algology.

Junior or senior.

I, II. ASSISTANT PROFESSOR TILDEN.

Lectures, laboratory and reference work. Instruction is also given in the preservation of material. The work of the first semester includes a detailed comparative morphological and taxonomic study of the freshwater algae, Cyanophyceae and Chlorophyceae, (with a systematic examination of the forms found in the Minneapolis water supply) and of the second semester a similar course in the seaweeds, Phaeophyceae and Rhodophyceae. Either semester may be taken as a unit. Open to those who have completed course III. Open also as a major or minor to candidates for the degree of master of science.

Course VII. Industrial botany.

Junior or senior I. ASSISTANT PROFESSOR FREEMAN.

Lectures, demonstrations, topics and laboratory work. Includes distribution, source and botanical study of food and industrial products of plants, important drug plants, diseases of agricultural and horticultural plants, animal diseases of plant origin, industrial processes dependent upon plants. Open to those who have completed course I or III.

Course VIII. Mycology and plant pathology.

Junior or senior II. ASSISTANT PROFESSOR FREEMAN.

Lectures, laboratory and reference work. The course includes a comparative morphological and taxonomic survey of the fungi and a study of plant diseases of fungus origin with collateral readings. Open to those who have completed course I or III.

Course IX. Plant ecology.

Junior or senior II. ASSISTANT PROFESSOR FREEMAN.

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

FOR GRADUATES.

Course X. Morphology and taxonomy.

PROFESSOR MACMILLAN.

Important literature and necessary apparatus will be provided for whatever research is entered upon under the direction of the department, and the results of the investigation will be required to be prepared for publication. The course is an elastic one and will be adapted to the special training and requirements of those pursuing it. Open as a major or minor to candidates for an advanced degree.

Course XI. Problems in plant pathology and mycology.

ASSISTANT PROFESSOR FREEMAN.

Morphological, physiological and cultural problems in the diseases of plants. Methods of infection and culture in the study of disease in plants will be given. Open as a major or minor to candidates for an advanced degree.

Course XII. Problems in algology.

ASSISTANT PROFESSOR TILDEN.

Research work may be done on special groups or along any of the following lines: the freshwater algae of Minnesota; the algae of the Minneapolis and St. Paul water supplies; the algae of hot springs; lime-secreting algae; arctic marine algae (material from Vancouver Island); tropical marine algae (material from the Hawaiian Islands); Special facilities for study are offered by the Minnesota Seaside Station on Vancouver Island which is open during the summer vacation. Open as a major or minor to candidates for an advanced degree.

Course XIII. Problems in cytology and embryology.

DR. LYON.

Special problems in cell morphology, life histories, embryology and histogenesis. The student will be provided with the necessary reagents, apparatus and plant-house facilities. Those so desiring may also select a subject for research from a large number of important problems, material on which has already been carefully selected and preserved for cytological and embryological study. Open as a major to candidates for an advanced degree.

Course XIV. Paleobotany.

DR. SARDESON.

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

CHEMISTRY.

FOR UNDERGRADUATES.

Course I. General chemistry.

Freshman I, II. PROFESSOR FRANKFORTER.

Lectures and laboratory work. The course includes a detailed study of chemical and physical properties of the non-metals and their more important compounds, with an introduction to organic chemistry.

Course II. Qualitative analysis.

I. ASSISTANT PROFESSOR NICHOLSON.

Lectures and laboratory work. The course includes the general reactions of the metals and their qualitative separation.

Course III. Identification of the acids.

II. ASSISTANT PROFESSOR NICHOLSON.

Lectures and laboratory work. Open to those who have completed course II.

Course IV. Quantitative analysis.

I. ASSISTANT PROFESSOR SIDENER.

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

Course V. Volumetric analysis.

II. ASSISTANT PROFESSOR SIDENER.

Lectures and laboratory work. A continuation of course IV.

Course VI. Organic chemistry.

I, II. PROFESSOR FRANKFORTER.

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. Also the aromatic series with a preparation of some of the more important compounds supplemented by Fischer's Organischer Präparate. Open to those who have completed course III.

Course VII. Theoretical chemistry.

I. DR. HARDING.

Lectures and readings. The course includes a study of Lothar Meyer's Modernen Theorien der Chemie, Oswald's Grundriss der Allgemeinen Chemie and Remsen's Theoretical Chemistry. Open to those who have completed course VI.

- Course VIII. History of chemistry.* I. PROFESSOR FRANKFORTER.
Lectures and reading. This course includes a full historical discussion of alchemy and chemistry. Open to those who have completed course vi.
- Course IX. Water analysis.* I. PROFESSOR FRANKFORTER.
Lectures and laboratory work. The course includes an exhaustive discussion of the chemical and sanitary properties of water. Open to those who have completed course v.
- Course X. Gas analysis.* I. DR. HARDING.
Lectures and laboratory work. The work includes an exhaustive chemical examination of the common gases, with a determination of light and heat efficiency of combustible gases. Open to those who have completed course v.
- Course XI. The chemistry of sugar.* I. ASSISTANT PROFESSOR NICHOLSON.
Lectures and laboratory work. The course includes a discussion of the carbohydrate group with the important methods of analysis.
- Course XII. Industrial chemistry.* II. ASSISTANT PROFESSOR SIDENER.
Laboratory work and reading. The course includes the analysis of various commercial products.
- Course XIII. Wine and beer analysis.* I. DR. HARDING.
Lectures and laboratory work. The course includes the determination of alcohol and other constituents in wine and beer, with a special study of fermentation.
- Course XIV. Special problems.* I. ASSISTANT PROFESSOR SIDENER.
Laboratory work. The course includes the working out of various mineralogical, technological and metallurgical problems.
- Course XV. Photographic chemistry.* II. PROFESSOR FRANKFORTER.
Lectures and laboratory work. The course includes a study of the compounds affected by the chemical rays of light, and a discussion of developers and fixers, photo-engraving, photo-reliefs and color photography.
- Course XVI. Electro-chemical analysis.* II. ASSISTANT PROFESSOR NICHOLSON.
Lectures and laboratory work. The course includes the qualitative and quantitative separations of the metals by electrolysis.
- Course XVII. Micro-chemical analysis.* II. DR. HARDING.
Lectures and laboratory work. The course includes the methods for the determination of minute quantities of substance by means of the microscope.
- Course XVIII. Food adulterations.* II. DR. HARDING.
An examination of common food products for adulterants.
- Course XIX. Iron and steel analysis.* II. ASSISTANT PROFESSOR SIDENER.
Lectures and laboratory work. The course includes the rapid determination of iron by the various methods, as well as the determination of the associated elements, sulphur, phosphorus, silicon, manganese and carbon.
- Course XX. Mineral analysis.* I. ASSISTANT PROFESSOR SIDENER.
The course includes the analysis of building stones and some of the most important minerals.
- Course XXI. Inorganic preparations.* II. DR. HARDING.
The preparation of inorganic salts, supplemented by *Bender's Anorganische Praparatkunde*.
- Course XXII. Colloquium.* II. PROFESSOR FRANKFORTER.
A thorough quiz in general inorganic chemistry.
- Course XXIII. Colloquium.* II. PROFESSOR FRANKFORTER.
A thorough quiz in general organic chemistry.
- Course XXIV. Special problems.* I. ASSISTANT PROFESSOR SIDENER.
This course includes work on ores of base metals, limestones, slags, etc.
- Course XXV. Physical chemistry.* II. PROFESSOR FRANKFORTER.
Lectures and laboratory work. The laboratory work will include that laid down by Jones with such references as Nernst, Ostwald and Walker.

All the above technical courses are open to those who have completed course v.

COURSES FOR GRADUATE STUDENTS.

1. *Special inorganic chemistry.*
2. *Electro-chemistry.*
3. *Organic chemistry.*
4. *The alkaloids.*
5. *Analytical chemistry.*

COMPARATIVE PHILOLOGY.

PROFESSOR KLAEBER.

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

FOR UNDERGRADUATES.

- Course I. General introduction to the science of language.* [2] I.
 The principles of linguistic growth; the psycho-physical and the historical aspect of language; classification of languages; methods of comparative philology. Lectures and exercises; discussion of standard works.
 This course will be sufficiently general in its nature to be of use to all students who wish to obtain an insight into the life of language.
- Course II. Principles of etymology and semasiology.* [2] Junior and senior I.
 Growth of vocabulary; change of words in form and meaning. Lectures and exercises, with special reference to English and other Teutonic languages.
- Course III. Introduction to Teutonic philology.* [1] II.
 Outlines of the historical and comparative study of the Teutonic languages. The external history and the internal development (phonological, morphological, lexical) of the various branches of the Teutonic group.
- Course IV. Comparative phonology of English and German.* [2] II.
 Elements of phonetics; history of English and German sounds; orthography. The lectures will be supplemented by practical exercises.

FOR GRADUATES.

- Course V. Gothic grammar.*
 The relation of Gothic to the other Teutonic dialects will be particularly emphasized. Braunes Gotische Grammatik; Heyne's Ulfilas (9th edition); Uhlenbeck's Kurzgefasstes etymologisches Wörterbuch der gotischen Sprache; Paul's Grundriss der Germanischen Philologie.
- Course VI. Old Saxon.*
 Grammar and interpretation of the Heliand.
- Course VII. Urgermanische grammatik.*
 Relation of the Teutonic to the other Indo-European languages. The Germanic portions of Brugmann's Grundriss der vergleichenden Grammatik der indogermanischen Sprachen; Kluge's Vorgeschichte der altgermanischen Dialekte; Noreen's Abriss der urgermanischen Lautlehre; Streitberg's Urgermanische Grammatik, etc.
- Course VIII. Old High German.*
 Braune's Althochdeutsche Grammatik; Braune's Althochdeutsches Lesebuch.
 See also under "German Department."
- Course IX. Comparative grammar*
 of the Greek, Latin and Teutonic languages; with a general survey of the field of Indo-Germanic Philology.
- N. B.—The undergraduate courses are open to graduate students subject to the rules of the Graduate Department.
 Related courses will be found under English.

DRAWING.

- Course I. Freehand.* 1. MISS CLOPATH.
Drawing from objects, plants and geometrical forms; principles of perspective; drawing from cast; sketching from figure poses.
- Course II. Studies in black and white and in color.* II. MISS CLOPATH.
Special instruction in the theory and practice of teach drawing under the aspects found most successful in public school work. Open to those who have completed course
- Course III. Composition.* I, II. MISS CLOPATH.
Exercises in composition illustrating the various principles of decorative work. Lectures and collateral reading. Open to those who have completed course I.
- Course IV. Applied design.* I, II. MISS CLOPATH.
Adaptation of plant forms for practical designs. Work in day with applied design. Open to those who have completed course III.

ENGLISH LANGUAGE AND LITERATURE.

- Course I. Chaucer.*
Freshman I. MISS PECK, MR. FIRKINS AND PROFESSOR KLAEBER.
- Course II. Spenser.* Freshman II. MISS PECK AND MR. FIRKINS.
- Course III. Early English.*
Sophomore, junior and senior I, II. PROFESSOR KLAEBER.
- Course IV. Sixteenth and seventeenth century prose.*
Sophomore, junior and senior I. MISS PECK.
- Course V. Shakspeare's predecessors.*
Sophomore, junior and senior II. MISS PECK.
- Course VI. Milton.* Sophomore, junior and senior I. MRS. POTTER.
- Course VII. Shakspeare.* Sophomore, junior and senior II. MRS. POTTER.
- Course VIII. Construction and development of modern drama.* I. MISS PECK.
- Course IX. Late nineteenth century drama.* Junior and senior II. MISS PECK.
- Course X. Early nineteenth century poetry.* Junior and senior I. MRS. POTTER.
- Course XI. Late nineteenth century poetry.* Junior and senior II. MRS. POTTER.
- Course XII. Poetics: study of the development of versification.* [2]
I. MRS. POTTER.
- Course XIII. Teachers' course in English, with special reference to English in the high schools.* [2] Junior and senior II. MRS. POTTER.
- Course XIV. Advanced work in English philology: Beowulf.*
I. PROFESSOR KLAEBER.
- Course XV. English drama from Miracle plays to Shakspeare.* [2]
I. PROFESSOR MCCLUMPHA.
- Course XVI. Shakspeare.* Junior and senior I. PROFESSOR MCCLUMPHA.
- Course XVII. Nineteenth century English essays.*
Junior and senior I. PROFESSOR MCCLUMPHA.
- Course XVIII. Tennyson and Browning.*
Junior and senior II. PROFESSOR MCCLUMPHA.
- Course XIX. Studies in eighteenth century fiction.* [2]
Sophomore, junior and senior II. PROFESSOR MCCLUMPHA.
- Course XX. Fiction: the modern novel of realism.*
Junior and senior II. PROFESSOR MCCLUMPHA.
- Senior Seminar (1905-06.) Literature of travel and adventure in the sixteenth century.*
MISS PECK.

FOR GRADUATES.

(Graduate students will not receive credit for work taken in undergraduate courses.)

Graduate courses offered by PROFESSOR MCCLUMPHA.

- Course I. Eighteenth century fiction. 1904-5.*
- Course II. English drama from Restoration to present time. 1905-06.*

Graduate courses offered by PROFESSOR KLAEBBER.

Course I. *Middle English. Grammar and reading of select texts.*

Course II. *Critical study of old English texts.*

Graduate courses offered by MRS. POTTER.

Course I. *The Epic: a comparative study. 1904-5.*

Course II. *The rise of continental drama and its connection with Elizabethan drama. 1905-06.*

FRENCH.

(Italian and Spanish.)

FOR UNDERGRADUATES.

Course I. *French begun.* [5]

Fraser & Squair's French Grammar and Reader; modern texts.

Course II. *French, second year's work.*

Grammar and composition continued; French literature to the XVIII. century taught in form of conversation in the French; modern texts will be read including selections from Merimee, Daudet and Scribe.

Course III. *Advanced grammar and composition.*

Francois' Introduction to French composition; conversations on the beginning of French literature up to XVIII century; readings from modern authors including selections from Coppee, Feuillet, Sandeau.

Open to those who have completed the French required for entrance.

Course IV. *Lectures and conversations concerning the writers of the classical period and readings of works produced during this period, including La Fontaine, Corneille, Racine, Moliere; some modern authors will be read for the purpose of comparison.*

Open to those who have completed courses I and II or course III.

Course V. *Lectures, in French, on the literature of the XIV century.* I, II.

The works of many of the writers of this century will be read and reports given in class, including Chateaubriand, Victor Hugo, Balzac, Renan, Taine, Bourget; Francois' Advanced French Composition.

Course VI. *Romance philology.*

(a) Old French [1]. Lectures on the phonetical development of the French and other Romanic languages from popular Latin. Reading old French texts.

(b) Italian [2] Edgren's grammar, Dante, Goldoni, Alfieri, Manzoni.

Course VII. *Spanish, begun.* [5]

Freshman I, II.

Grammar and easy texts, including Galdos, Alarcon, etc.

Course VIII. *Spanish, advanced.*

I, II.

Advanced grammar, Cervantes, Calderon, Lope de Vega.

FOR GRADUATES.

Course IX. *Romance languages. Old French.*

French and other Romantic languages from popular Latin. Reading old *sis des Auteurs Francais du Moyen Age, par L. Cledat.* Some of the oldest monuments of the French language interpreted and translated into modern French, such as *Serments de Strasbourg; La Vie de Saint Alexis; La Cantilene d'Eulalie; the chronicles of Villehardouin, La Chanson de Roland, Froissart.* Phonetic changes studied and their laws examined. Special attention is given to those forms which have entered into the English language. This course is especially valuable to students in English Philology.

Course X. *History of the drama.*

Course XI. *Italian. Dante's Divine comedy.*

Course XII. *Old Spanish. Development of Castilian dialect. El Poema del Cid.*

GEOLOGY.

Course I. General geology. Junior or senior I. PROFESSOR HALL.

Comprises: 1, geodynamics in which are set forth phenomena of the atmosphere, water, heat, gravity and plants and animals as geologic agents; 2, structural geology when stratification, displacement and veining of rock masses are described; 3, physiographic geology, by pointing out prominent earth features and inquiring into the causes producing them; 4, an outline of historical geology.

Course II. The essentials of physical geography.

Junior or senior I. PROFESSOR HALL.

An outline discussion of the principles of earth sculpture with special reference to the ethnic movements and commercial activities of mankind.

Course III. Geography and geology of Minnesota.

Junior or senior II. PROFESSOR HALL.

An outline of physiographic features; a review of the geography, petrology, paleontology and stratigraphy of the several periods of geologic history embraced within the state; a discussion of the mineral resources of Minnesota, particularly in clays, building stones and metalliferous products.

Course IV. Field and laboratory practice.

PROFESSOR HALL.

A study of the geography and geology of Minneapolis, Saint Paul and adjacent territory, embracing the salient physiographic stratigraphic and economic features of this interesting region. Relief, topography and map work will receive attention in the laboratory as well as in the field. For teachers and others who wish to learn the methods of field geology.

Course V. Historical geology.

Junior or senior II. DR. SARDESON.

A course in historical geology from the biologic side including a study of the more important types of fossils in their geological relations. Lectures and demonstrations. Open to those who have completed course I, course II or course XIII.

Course VI. Paleontology.

Junior or senior I. DR. SARDESON.

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

Course VII. Paleontology.

Senior I, II. DR. SARDESON.

The several chief types of organisms as represented by fossils will be studied successively. The leading fossils and their phylogenetic history will be treated with considerable detail. Lectures and demonstrations. Open to students of geology and biology.

Course VIII. Paleontologic practice.

Senior I, II. DR. SARDESON.

The course may be taken by advanced students in geology and biology in conjunction with course VII. Exercise in the preparation and study of materials, examination of collections, and reading will be carried on with a view to more complete knowledge of the groups of fossil organisms as presented in course VII. Laboratory, and field work.

Course IX. Elements of rock study.

Junior or senior I. MR. PARSONS

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

Course X. Petrography.

Junior or senior II. MR. PARSONS.

An investigation of the megascopic and microscopic characters of crystalline rocks; a discussion of their habit, mineral composition and genetic relations. The course discusses the historical succession of the pre-Cambrian terranes, and the broader stratigraphic relations of rocks; it also extends into an examination of some Minnesota groups of crystallines. Practically a continuation of course IX. Laboratory, with lectures and reference reading.

Course XI. Applied geology. Junior or senior I. MR. PARSONS.

An outline of the economic relations of geology. The course comprises a discussion of the nature and distribution of non-metallic materials of economic value, including coal, mineral oil and natural gas; phosphates and other natural fertilizers; soils; the geologic conditions of water supply; abrasive and fitile materials; natural and artificial building stones; mortars and cements; road-making materials followed by a brief summary of the nature and distribution of ore deposits. Williams Applied Geology and reference reading.

Course XII. Ore deposits. Junior or senior I. PROFESSOR HALL.

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

Course XIII. An outline of general geology. [1]

Junior or senior I, II. PROFESSOR HALL.

This course treats of the leading physiographic facts and principles; the macroscopic characters of the common rocks and a discussion of the general principles of petrographical and stratigraphical geology. Lectures and reading supplemented by excursions and practical problems. Designed especially for teachers.

Course XIV. Special problems.

Senior II. PROFESSOR HALL.

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

FOR GRADUATES.

Course XV. Petrographical problems. PROFESSOR HALL AND MR. PARSONS.

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

Course XVI. The Keweenaw eruptives I. PROFESSOR HALL AND MR. PARSONS.

of eastern and northeastern Minnesota, their stratigraphic relations, textural and structural characters; or other problem to be selected on consultation.

Course XVII. Glacial geology.

I. PROFESSOR HALL.

The local features of glacial phenomena. Field work will form the special feature of this course, embracing the formations at Minneapolis or some area accessible from it, as a survey of the glacial lakes in the vicinity, the gorge of the Falls of Saint Anthony, the Dalles of the Saint Croix and other problems. The special field to be selected on consultation.

Course XVIII. Paleontologic geology.

DR. SARDESON.

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

Course XIX. Paleontology.

DR. SARDESON.

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

Note: "Double courses" may be arranged by students of geology by electing the following "Single courses:" Courses I and IV; I and VI; I and IX; VI and VII; VII and VIII; XI and XII for the first semester, and courses III and V; VII and VIII; VII and X for the second semester.

GERMAN LANGUAGE AND LITERATURE.

Course I. German, begun. [5]

I, II.

ASSISTANT PROFESSORS WILKIN AND SCHLENKER, DR. SCHULZ AND MR. BURKHARD. Pronunciation, grammar, selections in prose and verse. German conversation and composition (Bernhardt) short stories.

Course II. German intermediate.

I, II. ASSISTANT PROFESSOR WILKIN, DR. SCHULZ AND MR. BURKHARD.

First semester—Selections from modern prose, narrative and descriptive; German lyrics and ballads. Second semester.—A drama of Lessing, Goethe or Schiller. Open to students who have completed course I.

Course III. Scientific prose, intermediate. I. DR. SCHULZ AND MR. BURKHARD.

First semester.—Hodge's German Science Reader (or equivalent). Second semester.—Brandt & Day's German Scientific Reading. This course aims to give the student a reading knowledge of German for the use of the language in his scientific studies. Open to students who have completed course I.

Course IV. Classic prose and poetry.

I, II. PROFESSOR MOORE, ASSISTANT PROFESSOR WILKIN, DR. SCHULZ AND MR. BURKHARD.

First semester—Schiller's Historische Skizzen and Heine's Harzreise; Spanhoofd's Deutsche Grammatik.

Second semester—Goethe's Prosa and Gedichte; Deutsche Grammatik completed.

Open to students who have presented German for admission.

Course V. Conversation and composition. [2]

I, II. DR. SCHULZ AND MR. BURKHARD.

Translation into German of short English selections; conversation on topics of every day life; narrative and descriptive essays, and letters in German. This course is designed to be supplementary to course II, III or IV.

Course VI. The drama. I, II. ASSISTANT PROFESSORS SCHLENKER AND WILKIN.

First semester. Modern drama.—Sudermann's Johannes, and Hauptmann's Die versunkene Glocke. Study of the present day drama in Germany. Assigned readings and reports; occasional lectures on related subjects.

Second semester. Classic drama. Lessing's Emilia Galotti and Goethe's Egmont. Study of dramatic structure; history of the drama in the 18th century. Open to students who have completed course II, III, IV.

Course VII. Advanced scientific reading.

I, II. DR. SCHULZ.

Reading of monographs and periodicals. Open to students who have completed course III or IV.

Course VIII. Advanced composition and conversation. [2]

I, II. ASSISTANT PROFESSORS SCHLENKER AND WILKIN.

Translation into German of longer selections from good English authors; original essays in German on assigned themes; oral debates; oral reports in German on collateral readings in German and English authors. Open to those who are taking or have completed course VI.

Course IX. German literature of the classic period. I, II. PROFESSOR MOORE.

First semester.—Goethe's Faust; its genesis; Faust legend; its treatment in literature before and since Goethe's time. Plan of Goethe's Faust; change in the order of the scenes; solution of the Faust Problem in Part II. Lectures and collateral reading; essays by the class. Schiller's ballads and other representative poems of this period. German versification.

Second semester.—Reading and discussion of Lessing's more important critiques; the Laocoon and Dramaturgie. Open to those who have completed course VI.

Course X. History of German literature. [2]

I, II. PROFESSOR MOORE.

First semester.—From the earliest times to the Renaissance.

Second semester.—To the Nineteenth Century. Lectures.

Course XI. Modern authors. German literature of the Nineteenth century. [2]

I, II. PROFESSOR MOORE.

First semester.—Romantic school and Junge Deutschland.

Second semester.—German literature since 1848.

Course XII. Seminar in German drama. [1] I, II. PROFESSOR SCHLENKER.

This course aims to give in outline the history of German dramatic literature from its beginnings to, and including, the classic drama. Open to graduates; also by permission of the instructor, to undergraduates, but without credit.

- Course XIII. History and literature of the Reformation.* [2]
I, II. PROFESSOR MOORE.
Brandt, Luther, Hutten, Sachs, Murner and Fischart. Selections from Jansen and Egelhaef. Open to seniors and graduates.
- Course XIV. Middle High German.* [2] I, II. PROFESSOR SCHLENKER.
Study of the language and literature of the period. Paul's Mhd. Grammatik. Selected readings from Der Arme Heinrich, Niebelungen Lied, Gudrun, Walter Von der Vogelweide, etc. Open to senior and graduates.
- Course XV. Teacher's course.* [2] I, II. PROFESSOR MOORE.
This course is especially designed for students who intend to become teachers in the high schools.

GREEK.

- Course I. Greek begun.* [5] I, II. PROFESSOR HUTCHINSON.
Brook's Introduction to Attic Greek, and Anabasis; Greek composition in connection with the text.
- Course II. Greek composition.* [1] I, II. PROFESSOR HUTCHINSON.
Required of students who may desire a recommendation as teachers of Greek. Optional for all others.
- Course III. Oratory and history.* Andocides, Demosthenes, Herodotus, collateral reading in history and antiquities.
I, II. ASSISTANT PROFESSOR SAVAGE.
- Course IV. History.* I. PROFESSOR HUTCHINSON.
Thucydides, collateral reading; lectures on the development of Greek prose.
- Course V. Philosophy.* II. PROFESSOR HUTCHINSON.
Plato; Apology and Crito, collateral reading, theses, lectures. Open to all who have finished course III.
- Course VI. Lyric and bucolic poetry.* I. PROFESSOR BROOKS.
Collateral reading, study of dialects, theses, lectures. Open to all who have finished course III.
- Course VII. Tragedy.* II. PROFESSOR BROOKS.
Sophocles, Tyrannus, Coloneus, Antigone or Aeschylus, three of his tragedies; or Euripides, three of his tragedies. Collateral reading, theses, lectures on dramatic poetry. Open to those who have completed course VI.
- Course VIII. Modern Greek.* II. PROFESSOR BROOKS.
Open to all who have completed course III.
Courses VII and VIII are not both offered in the same year. Either will be given as the class may elect.
- Course IX. Philosophy, advanced course.* I. PROFESSOR HUTCHINSON.
Plato. The Republic, collateral reading, theses, lectures. Open to those who have completed course V.
- Course X. Oratory, advanced course.* I. PROFESSOR HUTCHINSON.
Demosthenes, de Corona, collateral reading, theses. Open to all who have completed courses II, IV, V.
Courses IX and X will be given in alternate years. Course IX in 1904-05.
- Course XI. Epic poetry.* II. PROFESSOR HUTCHINSON.
Homer. The Iliad and the Odyssey in alternate years. The Odyssey in 1904-5. Open to all who have finished courses III, VI and VII.
- Course XII. Seminar in Greek.* [1] I, II. PROFESSORS BROOKS AND HUTCHINSON.
The subjects of investigation will vary from year to year. Open to students who have taken courses III, VII, inclusive.
- Course XIII. Archaeology of Greek art.* [2] I, II. PROFESSOR BROOKS.
Open to all students. A knowledge of Greek is not required.

GRADUATE COURSES.

Course XIV. Advanced course in Greek poetry.

The entire field of Greek poetry is considered in its historic development, with critical reading of authors.

Epic poetry.

PROFESSOR HUTCHINSON.

Lyric and dramatic poetry.

PROFESSOR BROOKS.

Course XV. Advanced course in Greek oratory. ASSISTANT PROFESSOR SAVAGE.

A study in the historic development of Greek oratory, based on critical readings from the various orators.

Course XVI. Later Greek.

PROFESSOR HUTCHINSON.

A study of the later language as seen in the writings of the common dialect, the Hellenistic, and the "Atticists."

Course XVII. Modern Greek.

PROFESSOR BROOKS.

HISTORY.

Course I or course II is required for admission to any of the higher courses.

Course I is open to all students; but students who have had the requisite entrance history (see next paragraph) may omit I and take II. Course I admits directly to II, III, IV or XV.

Course II is required for all courses in American history (V, VIII, XIII and XIV) and will admit also to III, IV, or XV. Students who intend to specialize in history should elect this course as early as possible. It is open to freshmen who have previously completed two years of general history, one year in ancient history and one in modern history. See statement of entrance requirements. For the years 1904-5 and 1905-6, any two years in preparatory history will be accepted for admission to this course. Students without such preparation can not take course II until they have completed I, unless they pursue the two courses at the same time.

SUMMARY OF COURSES.

The starred courses are offered only in alternate years.

Course.	Requirement for Admission.	Semester.
I.	Europe, 31 B. C.—1500 A. D. None	I, II.
II.	English Constitutional I (or two years "preparatory" history)	I, II.
III.	Renaissance and Reformation I OR II	I, II.
IV.	Europe since 1789 I OR II	I, II.
V.	American Constitutional to 1840 II	II.
* VI.	American Constitutional since 1840 II, V.	I, II.
* VII.	Making the Constitution II, V	I, II.
* VIII.	American Constitutional Law II, V, VII	I.
* IX.	American Statesmen II, V	I.
* X.	Historical Masterpieces III, IV OR V	I.
* XI.	American Diplomacy II, V	II.
* XII.	European Diplomacy since 1789 IV	II.
* XIII.	Colonial Administration IV OR V	II.
* XIV.	New England Sources [2] II OR V	I, II.
* XV.	Historical Method I OR II	II.
* XVI.	French Medieval Institutions [2] II OR III	I, II.
* XVII.	English Medieval Institutions [1] II	I, II.
* XVIII.	American Expansion (Roads) II, V	I, II.
* XIX.	History of "Philosophy of History" Three year courses I, II. [2]	I, II.
XX.	England, 1783-1830 [2] II	I, II.

Course I. European history from the establishment of the Roman Empire to the Reformation, 31 B. C.-1500 A. D.

I, II. ASSISTANT PROFESSORS ANDERSON AND McDONALD.

The course will show how modern institutions are largely derived from Roman imperial institutions. The leading topics will be the gathering up of the contributions of the older world by Rome, the imperial organization of this first "political people," the Germanic invasions, the

growth of the Frankish state and Charlemagne's premature attempt at organization, the medieval church, the feudal system, the crusades, the rise of the towns, and the development of modern nations. This last topic will be studied mainly as it is illustrated in the history of Germany and of France from 814 to 1500.

A definite portion of the course (about one-third) will go to the careful use of source material.

Course II. English constitutional history to the accession of George I.

I, II. ASSISTANT PROFESSORS WHITE AND McDONALD.

Open to those who have completed course I or two years of "preparatory history."

Course III. European history, 10th century to 1618.

I, II. ASSISTANT PROFESSOR WHITE.

Open to those who have completed either I or II.

Down to the Reformation the minor European states are treated only incidentally, the work being made to center about the development of the German and French nations.

The Renaissance and Reformation, however, are studied as general European movements. Some use will be made of the sources, and, as far as possible, a first-hand knowledge gained of these movements and their leaders.

Two theses and several short themes are required of each student.

Course IV. Europe since 1789.

I, II. ASSISTANT PROFESSOR ANDERSON.

Open to those who have completed course I or II. The chief aim of the course is to put the student into appreciative contact with immediately contemporary history. Two of the three hours are given up to lectures and recitations attended by the entire class; the third hour is devoted to source and topical study in small sections. Much of the research work is done from periodicals, annual registers, year books and the like. In the lectures, much attention is given to the matter of political geography; a large number of maps have been specially prepared for this purpose under the direction of the instructor.

The first three or four weeks are devoted to a study of the political, economic and social condition of Europe on the eve of the French Revolution; the next ten weeks are given to the French Revolution and the Napoleonic period, the history of all Europe being grouped about that of France; the remainder of the year is taken up in the study seriatim of the history of the leading national states, and, as far as time permits, of the minor nationalities.

During the course of the year the following books are required: Anderson's Constitutions and Other Documents illustrative of the History of France, 1789-1901, Andrews' Historical Development of Modern Europe (student's edition), and Mathews' French Revolution.

Course V. Constitutional history of the United States to 1840.

I, II. PROFESSOR WEST.

Open to those who have completed course II; and required for courses VI-IX, and for XI, XIII, and XIV. The aim is to make this a "practice course;" the work is done partly by co-operative topical reports, and students are expected to consult primary sources to a greater degree than is possible in most undergraduate courses. During part of the year the class will meet once a week in small sections for the study of documents.

Course VI. American constitutional history since 1840.

PROFESSOR WEST.

Three hours a week in the second semester of alternate years. Open to those who have completed or who are pursuing course V.

Course VII. The making of the constitution of the United States.

I, II. PROFESSOR WEST.

Open to those who have taken course V with distinction, and to graduates. Each member of the class studies in detail the transition in one of the original colonies to commonwealth government, with the constitution of his chosen state. The work of the Philadelphia convention is then taken up and the accounts of later writers are compared with the sources. "We the people," the "compact" theory, and the province of the supreme court as "final arbiter," are topics especially investigated, with such further aids as the writings of the day and the discussions of the ratifying state conventions afford. Besides the class work each student will

present a written report upon the history of some important bill providing for the admission of a state, and some constitutional question in connection with congressional legislation.

Course VIII. American history since 1789 as shown in the development of constitutional law. PROFESSOR WEST.

In alternate years, not offered in 1904-5. Open to seniors who completed course v, to graduates, and to qualified law students. Course VII is a desirable preparation. This course is not designed to be a systematic treatment of either history or constitutional law. It consists of a careful analysis of cases selected from Thayer's Cases on Constitutional Law, studied in their historical setting and with reference to the course of development.

Course IX. Studies in American biography.

I. ASSISTANT PROFESSOR ANDERSON.

Open to seniors who have completed course v and to graduates.

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

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

It is the aim to give each member of the class an opportunity to work up carefully topical divisions of the field and an acquaintance with the entire body of writings relating to the subject somewhat more special than can be secured in the general course. Not given in 1904-5. When next offered, the subject will be Thomas Jefferson.

Course X. A critical study of historical masterpieces.

I. ASSISTANT PROFESSOR ANDERSON.

Open to undergraduates who have taken two courses in history, and to graduates. Courses IX and X are given in alternate years.

The object of this course is to develop the habit of reading history critically. Each year a masterpiece of historical literature will be minutely and critically studied. Every student will be required to read critically the entire work studied and in addition, to analyze and report upon assigned portions of it. These reports will be made the basis of the class work, which will consist mainly of discussions carried on by the students under the direction of the instructor. In 1904-1905 the masterpiece for study will be Gardiner's History of England, 1603-1641.

Course XI. The history of American diplomacy.

II. ASSISTANT PROFESSOR ANDERSON.

Offered to seniors and graduate students who have had two courses in history or one in history and one in international law. History V is the best preparation. The course is designed to afford instruction upon the following matters: (1) The organization and methods of the diplomatic corps. (2) The history of the most important diplomatic negotiations. (3) The effect of the foreign policy upon the internal affairs of the country. To alternate with course XII.

Course XII. The history of European diplomacy. 1814-1878.

II. ASSISTANT PROFESSOR McDONALD.

Offered to seniors and graduate students who have had two courses in history or one in history and one in international law. History IV is the best preparation. Students will have Debidour's *Histoire Diplomatique de l'Europe, 1814-1878*, second edition. Ability to read French is required. Not offered in 1904-1905.

Course XIII. Colonial expansion and system of administration.

II. PROFESSOR WEST.

Open to students who have completed course IV or V. The history of the colonial acquisitions of the great nations will be surveyed rapidly, and colonial institutions and governments will be studied and compared in detail.

Course XIV. A critical study of authorities for early New England history—based upon a reading of Winthrop's New England. [2]

I. II. PROFESSOR WEST.

Open to graduates and seniors who have completed course v. This is primarily a course in historical criticism. Each member of the seminar

has a group of secondary authorities assigned him which he is to criticize in the light of the original sources. The study involves also a careful comparison of the chief sources with each other, and incidentally it leads to a minute treatment of political, social and economic development in early New England. The number admitted to the course is strictly limited to eight. Given in alternate years.

Course XV. *Historical method and bibliography.*

II. ASSISTANT PROFESSOR WHITE.

Open to those who have completed course I or course II. The course is designed especially for those intending to teach or do advanced work in history. It aims to make clear to the student the genesis of the modern historical method and to introduce him in a practical way to the use of the best tools in historical study. The work divides naturally as follows:

1. Exercises in historical criticism and interpretation. One or more important historical sources will be studied intensively by the class.
2. History of historical writing; especially the work of Von Ranke and his followers and the origin of the seminar system. Some account will be taken of present methods and advantages of study in Germany and France.
3. Bibliography. Purpose, to gain a working knowledge of existing helps to historical study, such as standard bibliographies, historical magazines, source material, etc.

While the knowledge of Latin or the modern languages is an advantage, it is not a necessity in this course. Not given until 1905-6.

Course XVI. *Interpretation of mediæval economic documents.* [2]

I, II. ASSISTANT PROFESSOR WHITE.

Open to qualified graduates and to seniors who have completed not less than two year-courses in history.

Characteristic documents relating mainly to 12th and 13th century economic history are to be carefully studied with reference both to language difficulties and historical criticism. Such documents will be selected as will tend to throw the most light on the leading economic problems of the mediæval period. The work is to be based on Documents Relatifs a L' Historie et du Commerce en France, edited by Fagniez. Not offered in 1904-5.

Course XVII. *English constitutional history.* [1]

I, II. ASSISTANT PROFESSOR WHITE.

Open to graduates and to undergraduates who have completed course II. Critical and detailed study of the reigns of Henry III and Edward I, with special attention to the establishment of the great Charter and the evolution of Parliament. Based on a careful reading of Bracton and the chronicles of Matthew Paris and William Rishanger. A working knowledge of Latin is required.

Course XVIII. *Expansion of America as studied in its highways of immigration.*

I, II. ASSISTANT PROFESSOR McDONALD

Open to students who have completed course V and to qualified graduates.

This is a study of roads and methods of pioneer travel in that westward movement of population which extended the inhabited area of the United States from the seaboard to the Mississippi valley.

Course XIX. *A history of the "Philosophy of History."* [2]

I, II. PROFESSOR WEST.

In alternate years with XIV. Open to qualified graduates and to undergraduates who have completed three year-courses in history.

Course XX. *England during the Tory supremacy. 1783-1830.* [2]

I, II. ASSISTANT PROFESSOR ANDERSON.

Open to those who have completed course II and course III, IV or V. The required readings consist mainly of extensive extracts from the writings, speeches and correspondence of Pitt, Canning, Castlereagh, Burke, Fox and Bentham. In the lectures and topics much attention will be given to the social changes of the period. Not offered in 1904-05.

LATIN.

Course I. *Sallust's Catiline.*

Freshman I.

PROFESSOR CLARK AND ASSISTANT PROFESSORS GRANRUD AND SAVAGE.

- Course II. Cicero de Senectute.* Freshman I. PROFESSOR CLARK.
Latin composition and review of Syntax in connection with both courses.
Students taking only one course are advised to take 1.
- Course III. Livy, selections,* with history of Roman institutions. Freshman II.
PROFESSOR CLARK AND ASSISTANT PROFESSORS GRANRUD AND SAVAGE.
- Course IV. Plautus and Terence.* Freshman II. PROFESSOR CLARK.
- Course V. Horace, odes and epodes.* Sophomore I. PROFESSOR PIKE.
- Course VI. Horace, satires and epistles.* Sophomore I.
ASSISTANT PROFESSORS GRANRUD AND SAVAGE.
- Course VII. Pliny's letters.* Sophomore II. ASSISTANT PROFESSORS GRANRUD AND PIKE.
- Course VIII. "Dialogus" of Tacitus and history of Roman literature.*
Sophomore II. PROFESSOR SAVAGE.
- Course IX. Teachers' course in Caesar.* Junior I. PROFESSOR PIKE.
A review and teachers' drill upon Books I-IV of the Gallic war. A review of grammar and elementary Latin composition; a discussion of various problems connected with the teaching of Latin.
For course IX and X, students must have taken 4 of courses I-VIII.
- Course X. Teachers' course in Vergil.* [3] Junior II. PROFESSOR PIKE.
A review and teachers' drill upon Books I-VI of the Aeneid, a review of prosody and practice in the quantitative method of pronouncing Latin verse.
- Course XI. Advanced Latin composition and lectures on Latin style.* [2]
Junior II. PROFESSOR PIKE.
- Course XII. Roman Elegiac poetry.* Senior I. PROFESSOR CLARK.
Catullus, Tibullus, Propertius and Ovid with a study of the rise and development of Roman Elegiac poetry. Open to students who have completed any four of courses I-VIII.
- Course XIII. Roman satire.* Senior II. PROFESSOR CLARK.
Reading of Juvenal Persius, Horace and fragments of early satire with a study of the rise and development of Roman satire. Open to students who have completed any four of courses I-VIII.

FOR GRADUATES.

- Course XIV. Roman law.* [2] PROFESSOR CLARK.
Reading, Institutes of Justinian and selections from the Digest, with a study of the development and principles of Roman law. (Open also to seniors.)
- Course XV. Graduate seminar.* [2] PROFESSOR PIKE.
History of the early empire from original sources, Tacitus, Suetonius, Paterculus, Dio Cassius.
- Course XVI. The philosophical works of Cicero.* [2] ASSISTANT PROFESSOR GRANRUD.
Reading and interpretation of the Tusculan Disputations and selections from the other treatises. Special attention will be given to ancient and modern views of immortality and the sufficiency of virtue for securing happiness.

MATHEMATICS.

FOR UNDERGRADUATES.

- Course I. Higher algebra and plane trigonometry.* Freshman I.
Algebra—variation, quadratic equations, special higher equations, differentiation of algebraic functions, development of functions, logarithms. Trigonometry—Formulas and the solution of triangles, with applications.
- Course II. Spherical trigonometry and elements of analytical geometry.* Freshman II.
With numerous applications.

Course III. Higher algebra and analytical geometry. [3 and 2] Shopomore I.

Algebra—Simultaneous equations of the second degree, theory of algebraic functions, indeterminate equations, theory of equations and solution of numerical higher equations, series, permutations and combinations, determinants.

Analytical geometry—the conic sections, both by rectilinear and polar coordinates, producing equations of loci whose law of development is known, constructing and discussing such equations, transformation of coordinates, properties of loci by means of their equations.

Course IV. Differential calculus. [3 and 2] Sophomore II.

Differentiation of algebraic and transcendental functions, development of functions, indeterminate forms, maxima and minima, treatment of tangents, subtangents, normals, subnormals, asymptotes, direction and rate of curvature, evolutes, envelopes and singular points.

Course V. Integral calculus I.

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, successive integration with applications, hyperbolic functions.

Course VI. Curve Tracing. II.

By aid of the calculus. Open to those who have completed the first five courses.

Course VII. Solid analytical geometry. I, II.

The plane, the straight line in space, quadric surfaces, applications. Each of the above courses requires all of the preceding courses.

Course VIII. Differential equations. I, II.

Open to those who have completed the first five courses.

Course IX. Method of least squares. [2]

A study of the combination and adjustment of observations and the discussion of their precision as applied especially to engineering, physics and astronomy. Open to those who have completed the first five courses.

Course X. Descriptive geometry.

Problems relating to points, lines, planes, solids, surfaces of revolution and warped surfaces; orthographic, isometric, horizontal, oblique, and perspective projections; shades and shadows. Recitations, lectures and practice. Open to those who have completed the first three courses.

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. Open to those who have completed the first five courses.

FOR GRADUATES.

Course XII. Advanced work in differential calculus.**Course XIII. Advanced work in integral calculus.****Course XIV. Quaternions.****Course XV. Theory of functions.****Course XVI. Hyperbolic and elliptic functions.****Course XVII. Spherical projections.****Course XVIII. History of mathematics.**

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

MILITARY SCIENCE AND TACTICS.

MAJOR GEORGE H. MORGAN, LL. B., 9th U. S. Cavalry, Commandant.

For the instruction in military drill and administration the students are organized into a corps of cadets, consisting of two battalions 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, modelled after the U. S. Military Academy cadet uniform, and costs in Minneapolis about \$15, and is as neat and economical dress as the student can obtain.

Drill is required of all men in the freshman and sophomore classes.

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

In addition to the above, a course is given in military science, optional with the seniors and juniors, during the 2d semester, two hours a week. This work when satisfactorily completed taken in connection with the year's drill will give a four-hour credit for the semester.

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

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

The officers and non-commissioned officers are required to be good students in the other departments, soldier-like in the performance of their duties, exemplary in their general deportment and able to pass a creditable examination in drill regulations. In general, the officers are selected from the senior class; the sergeants from the junior class; and the corporals from the sophomore class.

Freshman—Practical instruction in schools of the soldier, company and battalion; signals, ceremonies; schools of the cannoneer and battery.

Sophomore—Practical and theoretical instruction in schools of the company and battalion: Advance and rear guard drill; practical and theoretical instruction in guard duty. Gallery practice. Ceremonies.

Junior, senior—Theoretical instruction—Advance and rear guards, outposts, reconnaissance, camping: duties of company commander: articles of war: records.

ROSTER OF THE CORPS CADETS.

FIELD STAFF AND BAND.

Cadet Captain and Adjutant W. W. Thorpe.
Instructor of Music B. A. Rose.
Cadet Chief Musician Chas. Pehoushek.

FIRST BATTALION.

Cadet Major C. L. Haney.
Cadet First Lieutenant Battalion Adjutant P. A. Brooks.

COMPANY A.

Cadet Captain R. S. Pattee.
Cadet First Lieutenant A. B. Wells.
Cadet Second Lieutenant C. J. Thomson.

COMPANY B.

Cadet Captain P. S. Schouten.
Cadet First Lieutenant A. R. Fairchilds.
Cadet Second Lieutenant R. H. Smith.

COMPANY C.

Cadet Captain L. P. Campbell.
Cadet First Lieutenant C. W. Goodsell.
Cadet Second Lieutenant W. S. Covey.

COMPANY D.

Cadet Captain C. P. Barnum.
Cadet First Lieutenant H. E. Peterson.
Cadet Second Lieutenant A. T. Lagerstrom.

SECOND BATTALION.

Cadet Major F. Alex. Stewart.
Cadet First Lieutenant and Battalion Adjutant H. K. Jones.

COMPANY E.

Cadet Captain E. L. Noyes.
Cadet First Lieutenant R. B. Taplin.
Cadet Second Lieutenant A. C. Remele.

COMPANY F.

Cadet Captain, R. T. Hugo.
Cadet 1st Lieutenant, O. G. Kelsey.
Cadet 2d Lieutenant, H. E. Gerrish.

COMPANY G.

Cadet Captain, W. C. Adams.
Cadet 1st Lieutenant, A. R. Gibbons.
Cadet 2d Lieutenant, F. K. Cannon.

COMPANY H.

Cadet Captain, A. X. Schall.
Cadet 1st Lieutenant, E. W. Smith.
Cadet 2d Lieutenant, D. T. Smith.

THIRD BATTALION.

Cadet First Lieutenant and Adjutant D. S. Blair.

COMPANY I.

Cadet Captain J. R. Gillis
Cadet First Lieutenant D. W. Frear.
Cadet Second Lieutenant Jno. Crozier.

COMPANY K.

Cadet Captain T. J. Horton.
Cadet First Lieutenant G. H. Grant.
Cadet Second Lieutenant E. J. Washburn.

COMPANY L.

Cadet Captain Jno. Andrews.
Cadet First Lieutenant V. H. Gregg.
Cadet Second Lieutenant R. Emerson.

COMPANY M.

Cadet Captain W. T. Hagerman.
Cadet First Lieutenant A. R. Finseth.

MINERALOGY.

- Course I. Elements of mineralogy.* I. PROFESSOR HALL AND MR. PARSONS.
 (a) The morphology of minerals; the physical and chemical characters of minerals with demonstrations; a study of the native elements, and economic minerals; the basis of classification.
 (b) Laboratory work consists of practice in the recognition of crystal forms; tests illustrating the range of minerals, and the application of chemical and blowpipe analysis to the identification of species.
- Course II. Descriptive mineralogy.* II. PROFESSOR HALL AND MR. PARSONS.
 (a) A study of the rock-forming minerals; the projection and construction of figures of crystals; the calculation of crystal axes. Theses.
 (b) Laboratory work includes quantitative blowpipe analysis; crystal measurement, the sight determination of minerals, and reference reading.
- Course III. Quantitative mineralogy.*
 Sophomore or junior II. PROFESSOR APPLEBY AND MR. CHRISTIANSON.
 Determination of value of ores. Lectures, recitation and laboratory work.
 Course I, metallurgy, in the school of mines.
- Course IV. Optical mineralogy.*
 Junior or senior I. MR. PARSONS AND MR. PENNOCK.
 A study of the microscopic structure of crystals and crystal grains.
 An application of methods used in determining minerals by their optical properties; goniometric and stauroscopic practice, embracing the elements of lithology. Lectures and laboratory work.
- Course V. The morphology of minerals.* Junior or senior II. MR. PARSONS.
 A study of crystallography, embracing projection and the geometric relations of crystal planes. The identification of minerals from crystal measurement and mathematical calculation. Crystal nomenclature.
- Course VI. Physico-chemical methods with their applications.*
 Senior I. MR. PARSONS AND MR. PENNOCK.
 The method of micro-chemical analysis described and demonstrated; the leading elements found in minerals are determined through the aid of crystalline precipitates of known compounds. Special attention is given to the study and determination of the rock-making minerals.
- Course VII. An outline of mineralogy.* [1] Junior or senior. MR. PARSONS.
 A study of methods of identification of minerals, with their applications. Conferences, reading and demonstrations. Throughout the year.

FOR GRADUATES.

- Course VIII.* PROFESSOR HALL AND MR. PARSONS.
 Original problems in morphological and physical mineralogy.
- Course IX.* MR. PARSONS.
 Special investigations in physical and chemical mineralogy.
- Course X.* PROFESSOR HALL AND MR. PARSONS.
 Description of mineral occurrence and association. Genetic relationships. Field work in connection with the different phases of the particular problem in hand.

MUSIC.

- Course I. Theory of music—Harmony (thorough bass.)* [2]
 Junior I, II. PROFESSOR OBERHOFFER AND ASSISTANT PROFESSOR BEACH.
 (a) *First semester*—Intervals, scales, principal triads and their inversions; the chord of the dominant seventh and its inversions; a short practical course of ear-training to begin simultaneously with the triads.
 (b) *Second semester*—The secondary triads and secondary chords of the seventh and their inversions; the nature of modulations, suspensions, passing notes, organ point, chromatically altered chords; cross relations; chorals—ear-training to be continued part of semester, to be followed by short course of musical analysis; sonata form, the rondo, the string quartette, the symphony, illustrated on classic models.

Course II. Advanced musical theory—Counterpoint. [2]
 Senior I, II. PROFESSOR OBERHOFFER.

This course is open only to students who have completed course I, or equivalent.

(a) *First semester*—Single counterpoint, imitation, canon; musical history introduced, chronological, comparative and biographical.

(b) *Second semester*—Double counterpoint, the fugue composition; musical form and history continued.

Note—These courses will be offered providing there be not less than twenty desiring to pursue the work.

Course III. Choral culture. [2] Junior or senior I, II. PROFESSOR OBERHOFFER.

A popular course in choral practice for four-part mixed voices, with occasional selections for male voices and female voices separately; features—sight singing with hints on proper tone-production, correct breathing, vocalization and solfeggio; the art-forms in choral compositions will be studied and analyzed. (Chorus a capella, motet, cantata, oratorio.)

A single credit may be secured for chorus work, provided that students pursuing the work for credit pursue courses I or II at the same time. Students may pursue the chorus work, without credit, by paying the required fee and securing the consent of the director.

Course IV. Pianoforte (advanced) Junior and senior I, II.
 PROFESSOR OBERHOFFER AND ASSISTANT PROFESSOR BEACH.

For students who intend to pursue the higher branches of the art of pianoforte playing (2 years—4 semesters), for those who intend to fit themselves for piano teachers. While private lessons are the rule, classes of no more than four students may be arranged. Students in this course should have mastered technical difficulties of the degree of Czerny's School of Velocity and the easier Haydn and Mozart sonatas.

Resume—The practical aim of the theoretical courses is to acquaint the student with the laws underlying musical composition, enabling him at the same time through critical analysis to arrive at the keenest perception and appreciation of masterworks in music and finally to stimulate latent talent to self-expression of musical thoughts in correct form.

All students electing courses I or II must pay a registration fee of four dollars a semester; courses II and III five dollars; course III alone, two dollars. Students electing the piano must pay, in addition, a fee, the amount to be announced upon application.

Students entering the University for the express purpose of studying music, must register for at least one subject outside of the department of music.

PEDAGOGY.

Course I. History of education. Junior I. PROFESSOR JAMES.

An introductory study of educational history, conducted by means of lectures, assigned readings, with oral and written reports, and periodical summaries from various texts. The purpose of the course is the arousing of a permanent interest in educational problems, the securing of some perspective for use in current investigation, some command of the facts and some ease in the methods of educational history and study. The attempt is made to bring out education as one phase of civilization, and to show its connection with other important social institutions. Attention is focussed on a few typical periods, and preference is given to an intensive study of certain men, periods and systems, over an extensive survey of educational history. What may be lost in comprehensiveness is made up as far as possible in definiteness of educational conception, and permanence of educational interest.

Course II. The philosophy of education. Junior II. PROFESSOR JAMES.

This course includes a discussion of the nature, the aim and the elements of education, important problems in applied psychology, the proper conditions of physical, mental, and moral development, the fundamental questions of practical school organization, both in subject matter and in presentation, some discussions of materials and methods in secondary education, and a critical review of elementary school work.

Current educational ideals are compared and encouragement given to the formation by each student of an independent and substantial, even though provisional, viewpoint and standard for educational theory and practice.

Open to juniors and seniors who have had not less than one semester in psychology.

Course III. Educational systems and classics.

PROFESSOR JAMES.

An advanced course in educational history. Open to graduates and to undergraduates who have completed courses I and II, or have gained an equivalent, together with actual teaching experience either elementary or secondary.

Course IV. Current problems in education.

PROFESSOR JAMES.

An advanced course in the theory and practice of education; topics selected from school organization and administration, school legislation, secondary curriculum and methods of instruction, present and impending school reforms.

Open on same conditions as course III.

PHILOSOPHY AND PSYCHOLOGY.

The introductory courses in this department are I, VI, XII. Course I is required for all advanced work in psychology and either I or VII for all work in philosophy save XI, which is a short course designed for those not expecting to take a long course in philosophy. Students wishing a systematic course in the department are advised to take I, III, VII, VIII, IX, X.

Course I. Elements of psychology.

I OR II. PROFESSOR WILDE, MR. SWENSON, MR. JOHNSTON.

This course is required for all advanced work in psychology and for the teacher's certificate: it also serves as an introduction to the courses in philosophy. The purpose of the course is to acquaint the student with the general characteristics and laws of mental life and with the aims and methods of modern psychology. The work consists of text book, lectures, and essays. Open to sophomores, juniors and seniors.

Course II. Psychological problems. [2]

II. MR. JOHNSTON.

An advanced course treating in detail of such topics as the subject-matter of psychology, the relation of mind and body, the nature of the idea of self, alterations of personality, the sub-conscious self, hallucinations, telepathy, hypnotism. Lectures, papers and discussions. Open only to those who have completed course I.

Course III. Experimental psychology.

I OR II. MR. JOHNSTON.

Four hours' laboratory work in the psychology of the senses, supplemented by lectures and collateral reading, following in outline. Titchener's *Laboratory course in Experimental Psychology*. The student is introduced to the methods and accredited results of experimental psychology. Open only to those who have completed course I.

Course IV. Advanced experimental psychology.

I OR II. MR. JOHNSTON.

Four hours' laboratory work in psychology of the higher mental processes, collateral reading and a thesis. The work on the thesis is a preparatory training for original research. Open only to those who have taken course III.

Course V. Research problems in experimental psychology.

I, II. MR. JOHNSTON.

Original research on special topics. Open only to those who have completed course IV or its equivalent.

Course VI. Child psychology.

II. MR. SWENSON.

An outline of the development of the main psychological processes from infancy to adolescence, with references to animal psychology so far as it throws light on the genetic problems involved. The distinctive features of the kindergarten age, the school age and the period of adolescence will be discussed and some attention will be given to a study of the external signs of mental defect. Open only to those who have completed course I.

Course VII. Logic.

I. OR II. PROFESSOR WILDE, MR. SWENSON, MR. JOHNSTON.

A study of the nature of knowledge, the laws of reasoning and the principles and methods of scientific proof. The aim of the course is to produce accuracy of thought as well as to familiarize the student with the logical grounds of modern science. Textbook, lectures and reports. Open to sophomores, juniors and seniors.

Course VIII. Ancient and medieval philosophy.

I. MR. SWENSON.

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

Course IX. Modern philosophy.

II. PROFESSOR WILDE.

Lectures on the representative systems of modern philosophy from the Renaissance to our own day, the purpose of the course being to prepare the student to understand the philosophical tendencies of the present. The work will include a study of Bacon, Descartes, Spinoza, Leibnitz, Locke, Berkeley, Hume, Kant, Mill, Schopenhauer. Open only to those who have had course I or VII.

Course X. The principles of ethics.

I. PROFESSOR WILDE.

An introductory course, comprising a study of the distinction between moral and non-moral phenomena, an analysis of voluntary conduct, and a discussion of the nature of conscience, the meaning of right and wrong, the purpose of life, human responsibility, and the authority of moral law. Open to those who have completed course I or VII.

Course XI. Philosophy of religion.

II. PROFESSOR WILDE.

A study of the religious consciousness, its origin, development, and significance; an analysis of the conception of God and a discussion of the place and function of religion in modern life. Open only to those who have completed course I or VII.

Course XII. Introduction to philosophy. [2]

I. PROFESSOR WILDE.

This is a short course designed for those not specializing in philosophy but wishing a general view of its present meaning, problems and results. The treatment is positive rather than critical or historical. Open to sophomores, juniors and seniors.

Course XIII. Philosophy of Herbert Spencer. [2]

II. MR. SWENSON.

The course will consist of a critical reading of the First Principles, with references also to the philosophical position of such scientists as Huxley, Tyndall, and Darwin; the aim being to discuss the epistemological foundations of science, and to consider the relative position of science among the other interests of life.

FOR GRADUATES.

Courses from the following list will be offered to graduates each year as determined by the needs and qualifications of the students presenting themselves. It is desirable that students consult with the department as early in the session as possible in order that the courses and hours may be arranged to suit the greatest number.

Course XIV. Pre-Socratic philosophy.

MR. SWENSON.

A critical study of the fragments of early Greek philosophy, with attempts at systematic reconstruction.

Course XV. The philosophy of Aristotle.

MR. SWENSON.

A critical reading of his logical treatises, the *Metaphysics*, and the *Psychology* in the original Greek.

Course XVI. The philosophy of Kant.

MR. SWENSON.

A critical reading of the three critiques; the relation of Kant to the development of modern philosophy.

Course XVII. The philosophy of Hume.

MR. SWENSON.

A critical reading of Hume's philosophical works, the position of Hume in the development of English philosophy.

- Course XVIII. The history of ethics.* PROFESSOR WILDE.
A critical reading of the chief works in the history of ethics.
- Course XIX. Systematic ethics.* PROFESSOR WILDE.
A detailed study of the principles of conduct and the basis of moral obligation.
- Course XX. The idealistic philosophy of religion.* PROFESSOR WILDE.
A critical discussion of the philosophies of Fichte and Hegel.
- Course XXI. German Idealism.* PROFESSOR WILDE.
A critical discussion of the philosophies of Fichte and Hegel.
- Course XXII. Metaphysics.* PROFESSOR WILDE.
A critical and constructive discussion of theories of knowledge and reality.
- Course XXIII. Swedish philosophy.* PROFESSOR CARLSON.
A historical review of Swedish philosophy during the XIX century and a critical study of the rationalistic idealistic system of Bostrom and his followers.

PHILOSOPHICAL SEMINAR.

The seminar meets bi-weekly in the evening during the winter months to read and discuss contemporary philosophy. The membership consists of the professors, instructors, and qualified students of the department.

PHYSICAL CULTURE.

FOR WOMEN.

MISS BUTNER AND MISS BARBOUR.

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. A full year of work, in addition to the work required in this department, counts as a two-hour credit in the second semester of the senior year. The work consists of systematic exercises for the development of all parts of the body. Women pursuing this course are required to provide themselves with a gymnasium suit, consisting of a blouse waist and bloomers, with the regulation gymnasium shoes. All suits must be of black material.

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. These occasions attitudes and movements that are unseemly in appearance and unhealthful in their general effect.

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

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

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

FOR MEN.

DRS. COOKE AND LITZENBERG.

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

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

The decision of the director will be either:

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

Gymnasium work is required of all men in the freshman class, one hour per week, (in two half hour periods if the director so decides) throughout the year. The required work includes a course of lectures on personal hygiene, during the first term.

PHYSICS.

FOR UNDERGRADUATES.

Freshman mathematics are required as preparation for courses in this department.

Course I. General physics. [6]

With experimental lectures and laboratory work.

Course II. Electricity and magnetism.

Course III. Sound and light.

With experimental lectures and laboratory work. Open to those who have completed course 1.

Course IV. Advanced laboratory work. [3 or 6]

Senior I, II.

Open to those who have completed course 11 or course 111.

FOR GRADUATES.

Course V. Advanced work in some special field: experimental investigation being the principal feature of the work.

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

POLITICAL SCIENCE.

Course I. Elementary.

Sophomore and junior I. PROFESSOR MCVEY.

A thorough course in the elements of economics. The aim is to inculcate accepted doctrine, and show the nature and bearings of questions unsettled. Text book, problems, lectures and discussions.

Course II. Elements of American government.

Sophomore and junior II. ASSISTANT PROFESSOR SCHAPER.

An elementary course on American government intended as a preparation for the advanced courses in politics and for teaching in secondary schools, as well as for good citizenship. A study of the organization and actual workings of the national, state and local governments. A series of lectures on the nature and origin of the American governmental system precedes a study of the text and assigned topics. Special attention will be given to important statutes on naturalization, organization of the judiciary and executive departments, banking, bankruptcy, interstate commerce, trusts, etc.

Course III. Advanced economics. Sophomore and junior II. PROFESSOR MCVEY.

A continuation of course 1. In this course further consideration is given to selected topics from the course in elementary economics. Marshall's Principles of Economics is used as a text. So far as time permits the elevation of economic theory is considered as seen in the writings of Adam Smith and John Stuart Mill. Lectures, papers and discussions.

Course IV. The development of government.

Junior I. ASSISTANT PROFESSOR SCHAPER.

An account of the government as the agent of the state: comparative historical study of the evolution of the most important governmental systems, including an account of the tribal, patriarchal, and feudal forms, the Greek, Roman, modern European and American. The course emphasizes the evolutionary point of view in the study of government. Text-book with lectures and topical readings.

Course V. Money and banking.

Senior II. PROFESSOR MCVEY.

Students desiring but one year's work in economics are advised to take this course following the work in elements of economics, 1 semester. If a longer course is desired, advanced economics should follow course 1.

This is an elementary course, is illustrated by constant references to legislation. Text books, lectures, papers and discussions.

Course VI. The elements of jurisprudence.

Junior I. ASSISTANT PROFESSOR SCHAPER.

A study of those human relations requiring legal regulation considered from the American point of view; the nature and sources of law, status, rights and wrongs, sovereignty, corporations, etc. The course is intended as a preparation for active citizenship as well as for the study of law. The student will practice looking up cases summarizing principles. The course is based on a text, with lectures and assigned reading.

Course VII. Corporation finance.

Senior II. PROFESSOR MCVEX.

A study of the methods of financing modern corporations, and the analysis of their accounts and statements. Text-books, Green, Corporation Finance; Meade, Trust Finance; Sumner's Investment Securities; Woodlock, Anatomy of a Railroad Report. Lectures, collateral reading and problems.

Course VIII. Public finance Part I.

Senior I. PROFESSOR FOLWELL.

Public expenditures national, state and local, from the standpoint of public wants; budget framing; treasury administration and accounting; public debts in peace and war. Illustrations chiefly from American practice. Lectures and exercises.

Course IX. Public finance Part II.

Senior II. PROFESSOR FOLWELL.

The public revenue, national, state and local—from taxation and other sources. In particular the principles and practice of taxation in the United States.

Course X. Modern industrial problems.

Junior II. PROFESSOR MCVEX.

A course based upon McVey's Modern Industrialism. This course deals with the problems and legislation arising from industrial conditions such as labor questions, trusts, monopolies, etc. Assigned topics, lectures, and collateral reading.

Course XI. Theory of the state.

Junior II. ASSISTANT PROFESSOR SCHAPER.

A study in the theory of the state, its origin, nature, purpose and its justification; the state on its judicial side, that is, the elements of population and territory. Important theories, like the divine, contract, instinct, the modern socialistic, anarchistic and social welfare, are considered; also the question of state interference and state management of industries. It includes a study of classification of states and of governments, of sovereignty, the origin, nature and classification of law. This course follows course 1. A text book with lectures and topical readings.

Course XII. Transportation.

Senior II. PROFESSOR FOLWELL.

The evolution of transportation in the United States, and of railroads in particular. Economic aspects, public policy and finance of railroading. Open to senior engineers.

Course XIII. Municipal administration.

Senior I. ASSISTANT PROFESSOR SCHAPER.

A comparative study in modern city charters and methods of administration. The relation of the city to the state, the delimitation of its sphere of activity, its liability for tort, and an investigation into the causes of municipal corruption and merits of proposed reforms. This course takes the place of the one on city government offered heretofore, and differs essentially from it. A text and lectures.

Course XIV. International law.

Senior I. PROFESSOR FOLWELL.

An elementary treatment by lectures with required exercises; illustrations chiefly from American history.

Course XV. Monetary history of the United States.

Seniors and graduates [1] I, II. PROFESSOR MCVEX.

In this course the problems arising from the changes and alterations in the money of the United States from 1770-1900 are discussed. The work consists of lectures and assigned topics based upon Hepburn's Contest for Sound Money and Noyes' Thirty Years of American Finance. Students registering for this course are required to have the element of

economics, course i, or money and banking, course v. The section meets one hour each week throughout the year. The hour of meeting will be determined by the convenience of students and instructor.

Course XVI. *Economic schools and movements.*

[1] II. PROFESSOR FOLWELL.

A seminar for graduates and seniors especially interested and qualified.

Course XVII. *Politics and administration.* [2]

Senior I. ASSISTANT PROFESSOR SCHAPER.

A seminar course for graduates and seniors in politics and administration throughout the year. A study of American administration as a branch of public law and as a science, including an examination of the extra-legal institution, the political party; its nature, organization, function, evils and reforms. Such topics as the initiative and referendum, proportioned representation and direct primaries versus the convention plan are taken up. Besides the discussion of these topics each member of the seminar is given an opportunity to do a piece of independent research work along these general lines and embody the results in a carefully prepared thesis at the end of the year.

Course XVIII. *Introduction to political science.* [2]

Senior I. ASSISTANT PROFESSOR SCHAPER.

Intended primarily for seniors in the college of engineering.

Course XIX. *Methods of investigation.* [1]

Senior I. PROFESSOR McVEY.

A course in methods of using libraries, collecting and organizing material, followed by the actual investigation of important questions. Not given, 1904-5.

Course XX. *Economic geography.* Lecturer to be announced.

Course XXI. *Statistics and economics.*

PROFESSOR FOLWELL.

Course XXII. *History of political theories.*

PROFESSOR FOLWELL.

Course XXI and XXII alternate with course XXIV. Not given in 1904-5.

FOR GRADUATE STUDENTS.

The particular lines and subjects of study are selected by individuals or groups after consultation with the head of the department.

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

RHETORIC AND ELOCUTION.

RHETORIC.

Course I. *Rhetoric.*

Freshman I and II.

This course includes the study of formal rhetoric, the writing of compositions, and the study and analysis of masterpieces of prose.

Course II. *Argumentation.*

Freshman.

This course aims at instruction in the science of argumentation and in the art of debate. The work consists of the study of the laws and processes of reasoning, and their application to written and spoken argument. Speeches of eminent lawyers, made before courts in the trial of famous cases, are briefed and analyzed. Practical exercises in debate on the floor are a feature of the course. This course is open only, by permission of department to students who have had special training in debate.

Course III. *Reading.*

Freshman I and II.

This course is open to students of courses I and II. Its object is voice building and training in interpretation and expression. The text used is Shakspere's plays.

Course IV. *Rhetoric.* [1]

Freshman I and II.

This course is required of all freshmen who do not elect courses I or II. It consists in the study of formal rhetoric and of masterpieces of prose, and in writing compositions. The object will be to instruct students in correct technique.

Course V. Rhetoric. [11]

Sophomore I and II.

Continuation of course IV. Required of all sophomores who, as freshmen, were required to take course IV.

Course VI. Literary criticism.

Junior I, II. PROFESSOR SANFORD.

Study of models of English poetry, oratory, fiction, etc., with critical essays. Open to those who have completed course I.

Course VII. Lectures upon history of art.

Senior II. PROFESSOR SANFORD.

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

Course VIII. Debate.

Senior I, II. PROFESSOR SANFORD.

This course aims at the training of men in public speaking. It consists of theoretical work in argumentation. Standard debates and orations are analyzed and briefed; original debates are briefed, written and rehearsed for criticism. Special emphasis is laid upon class room debate with criticism on delivery, thought and composition.

Course IX. Advanced rhetoric.

Junior I, II. MR. FIRKINS.

In this course essays are written twice or three times a week. They aim at some specified excellence, such as coherence, vividness, strength of imagery, or logical plan; and examples of this specified excellence from the writings of great authors are read by the students as a preparation for the work. Text books are not used; the principles of the subject are orally explained or dictated by the instructor. The first semester is occupied with narrative and description; the second with exposition and argumentation.

ELOCUTION.

Course X. The physical side of vocal expression.

Junior, senior I. ASSISTANT PROFESSOR McDERMOTT.

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

Course XI. The psychological side of vocal expression.

Junior or senior II. ASSISTANT PROFESSOR McDERMOTT.

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

Course XII. American oratory.

Junior or senior I. ASSISTANT PROFESSOR McDERMOTT.

Standard orations are analyzed; synopses, oral biographies, accounts of historical settings and expositions of the orator's style and logic are required. Forensics and debates are prepared and one original oration each semester is required, and a short selection from the oration under consideration is committed for practice in delivery, and short stories from best modern authors are retold for fluent command of English. Besides class work each student is given a brief period for individual criticism; for this reason only a limited number can be admitted.

Course XIII. British oratory and ancient oratory.

Junior or senior II. ASSISTANT PROFESSOR McDERMOTT.

A continuation of course XII.

FOR GRADUATES.

Course XIV. Principles of criticism.

MR. FIRKINS.

This course consists of a brief survey of the elements of literature, and a longer review of the forms (e.g. the lyric, the epic, the drama, the short story, the novel, the biography, and the like), which literature assumes.

SCANDINAVIAN.

FOR UNDERGRADUATES.

- Course I. Swedish, begun.* [5] I, II. PROFESSOR CARLSON.
Grammar, composition, oral and written exercises, translations and an elementary study of the literature.
- Course II. Swedish, advanced.* I, II. PROFESSOR CARLSON.
- Course III. Danish-Norwegian, begun.* [5] I, II. PROFESSOR CARLSON.
Grammar, composition, oral and written exercises, translations and an elementary study of the literature.
- Course IV. Danish-Norwegian, advanced.* I, II. PROFESSOR CARLSON.
- Course V. Old Norse.* [2] I, II. PROFESSOR CARLSON.
Grammar and composition.
- Course VI. Scandinavian Literature.* PROFESSOR CARLSON.
History of the literature and a study of special authors.
(a) First semester—Norwegian literature of the XIX century with a special study of Henrik Ibsen.
(b) Second semester—Swedish literature of the XIX century with a special study of August Strindberg. This course is open to students who are familiar with any one of the Scandinavian languages.

FOR GRADUATES.

- Course VII. Icelandic or Old Norse.*
The history, language and literature of Iceland and Norway from earliest times to 1500 A. D.
- Course VIII. Old Swedish.*
The history, language and literature of Sweden from earliest times to 1500 A. D.
- Course IX. Old Danish.*
The history, language and literature of Denmark from earliest times to 1500 A. D.
- Course X. Modern Danish language and literature.*
- Course XI. Modern Swedish language and literature.*
- Course XII. Modern Norwegian language and literature.*

SOCIOLOGY.

- Course I. Elements of sociology.* I. PROFESSOR SMITH.
Giving field, methods, and important results of social science, the attempt being to prepare the student for any special investigations he may wish to make.
- Course II. Social pathology.* I. PROFESSOR SMITH.
Dealing with problems of poverty, crime, insanity, social degeneration, and a discussion of the child problem and methods of social amelioration.
- Course III. Social theory.* I. PROFESSOR SMITH.
This course includes a study of the leading American, English, French and German writers to discover their methods of approach to the science, and the leading results they have secured. Open to those who have completed course I.
- Course IV. Anthropology.* I. PROFESSOR SMITH.
The work in anthropology will include researches in primitive culture, the problem of races, and the results of anthropometrics in pathological inquiries. Open to those who have completed course I.
- Course V. Social groups.* I. PROFESSOR SMITH.
An examination of the clan and the village in primitive life, a study of demography to discover the effect of environment upon social organization, and a comparison with the nature and reasons for the modern city.

Course VI. The study of institutions.

I. PROFESSOR SMITH.

The genesis of custom and the beginnings of law with the geographical and race influences in the growth of states, will be studied, as well as the various forms of the family and their relation to forms of civilization.

Courses III, IV, V. will not be offered in 1904-5.

SEMITIC LANGUAGES.

Course I. Elementary Hebrew.

I, II. RABBI DEINARD.

Harper's Elements of Hebrew and reading of easy prose passages of the Old Testament.

Course II. Advanced Hebrew.

I, II. RABBI DEINARD.

Critical reading of some Old Testament book, with a review of Hebrew grammar.

Course III. Elementary Arabic.

I, II. RABBI DEINARD.

Socin's Arabic Grammar and reading of the prose selections contained in it.

Course IV. Advanced Arabic.

I, II. RABBI DEINARD.

Selected Suras of the Koran and a review of Arabic grammar.

Course V. Elementary Aramaic or Syriac.

I, II. RABBI DEINARD.

Strack's Grammatik des Biblischen Aramaisch, and Brockelman's Syrische Grammatik.

Course VI. History of the Hebrews to the close of the Persian period.

I, II. RABBI DEINARD.

Political, religious and social. The English Bible will be used as a text book, a careful study of the Palestinian and Assyro-Babylonian inscriptions will be made, and the works of some modern writers on Hebrew history will be consulted. No knowledge of any Semitic language is required for this course.

THE SCHOOL OF

TECHNICAL AND

APPLIED CHEMISTRY

The School of Chemistry

OFFICERS

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CHARLES F. SIDENER, B. S., *Assistant Professor of Chemistry*

EDWARD E. NICHOLSON, M. A., *Assistant Professor of Chemistry*

EVERHART P. HARDING, Ph. D., *Lecturer in Chemistry*

LILIAN COHEN, M. A., *Instructor in Chemistry*

EDWARD GUTSCHE, B. Chem., *Instructor in Chemistry*

FRANK F. GROUT, B. Chem., *Instructor in Chemistry*

JOSEPH HOPKINS, B. Chem., *Instructor in Chemistry*

FRANCIS C. FRARY, *Assistant in Chemistry*

MARJORIE COLE, B. A., *Assistant in Chemistry*

J. H. LONGWORTH, *Assistant in Chemistry*

ARNOLD V. DAHLBERG, *Assistant in Chemistry*

WILLIAM METHLEY, *Lecture Assistant*

ANTON R. ROSE, B. Chem., *Storekeeper*

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OFFICERS OF THE DEPARTMENT OF DRAWING

WILLIAM KIRCHNER, *Assistant Professor of Drawing*J. H. QUENSE, *Instructor in Drawing*

GENERAL REGULATIONS.

The general regulations applying to students of the college of science, literature and the arts, including requirements for admission, advanced standing, daily routine, failure to keep up with class and unclassified students, apply likewise to students of this school.

FEES.

All students in the college, who are residents of the state, are charged an incidental fee of fifteen dollars a semester. Non-residents are charged double the fee required of residents of the state, or thirty dollars a semester. No reduction is made for late entrance or for leaving before the end of the semester. Saved in the case of the first registration, the incidental fee is increased 25 cents for each day's delay in registration, beginning with the day set for recitations to begin. In addition to this fee, students who take work in laboratories are charged a sum sufficient to cover the cost of material and breakage.

GENERAL STATEMENT.

The two four year courses in chemistry are designed for those who wish to become teachers of chemistry, analysts, investigators, manufacturing and applied chemists. The course in analytical chemistry is arranged especially for teachers, analysts and general scientists. The course in engineering chemistry is intended for those who would become manufacturing and applied chemists and chemical technologists. The courses here presented include general, organic, analytical, technical, theoretical and applied chemistry. Besides chemistry, extended work is offered in physics, mathematics, metallurgy, mineralogy, crystallography, geology, engineering, botany, language and drawing.

Electives are offered in the senior year in order to give the students an opportunity of selecting subjects of special importance to them, but which are not included in the regular courses.

EQUIPMENT.

Laboratories. The building formerly known as Science Hall has been completely remodeled to meet the needs of the department of chemistry. The building is 198 by 78 feet, and consists of several large laboratories well equipped for a wide range of chemical work. The general laboratory is located on the first floor and is large enough to accommodate 350 students. The laboratory tables are arranged with cupboards, drawers and locks, and supplied with gas and water. Connected with this laboratory by means of sliding windows, is a preparation room which is directly joined to the general store room. The remaining part of this floor is given to cloak rooms, furnace and motor rooms and a large lecture room with a gallery designed to comfortably seat 350 students. The qualitative laboratory, located on the second floor, is arranged with tables similar to those of the general laboratory and will accommo-

date 250 students. The library and three technical laboratories are likewise on this floor. The third floor contains the quantitative laboratory large enough to accommodate 120 students. Directly connected with this laboratory are the balance, preparation, evaporation and drying rooms. There are also on this floor, six special laboratories, an organic laboratory, a physical laboratory, a lecture room and a museum. There is a suite of rooms on the fourth floor entirely given to photography.

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

INDUSTRIAL MUSEUM.

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

ANALYTICAL CHEMISTRY—COURSE OF STUDY.

FRESHMAN YEAR.

FIRST SEMESTER.	SECOND SEMESTER.
Mathematics [3]	Mathematics [3]
German, French or Spanish [3 or 5]	German, French or Spanish [3 or 5]
Chemistry (qualitative) [3]	Chemistry (qualitative) [3]
Drawing [4]	Drawing [4]
Rhetoric [3]	Rhetoric [3]
Military drill [2]	Military drill [2]
Gymnasium [1]	Gymnasium [1]

SOPHOMORE YEAR.

- | | |
|------------------------------|------------------------------|
| Chemistry (organic) [3] | Chemistry (organic) [3] |
| Chemistry (quantitative) [3] | Chemistry (quantitative) [3] |
| Mineralogy [3] | Assaying [3] |
| Botany [3] | Laboratory [4] |
| Inorganic preparations [2] | Botany [3] |
| Military drill [2] | Military drill [2] |
| Rhetorical work [1] | Rhetorical work [1] |

JUNIOR YEAR.

- | | |
|---------------------------|-----------------------------|
| FIRST SEMESTER. | SECOND SEMESTER. |
| History of chemistry [2] | Physical chemistry [3] |
| Theoretical chemistry [4] | Iron and steel analysis [4] |
| Special problems [2] | Optical mineralogy [3] |
| Geology [3] | Physics [6] |
| Physics [6] | Metallurgy [3] |
| Metallurgy [3] | Mineral analysis [2] |

SENIOR YEAR.

- | | |
|--------------------------------|----------------------------|
| Chemistry of carbohydrates [2] | Photographic chemistry [2] |
| Gas analysis [2] | Industrial chemistry [2] |
| Colloquium [2] | Colloquium [2] |
| Metallurgy [4] | Electro chemistry [2] |
| Water analysis [2] | Metallurgy [4] |
| Wine and beer analysis [2] | Food adulterations [2] |
| Crystallography [3] | Micro chemistry [2] |
| Thesis | Thesis |

APPLIED CHEMISTRY—COURSE OF STUDY.

FRESHMAN YEAR.

- | | |
|------------------------------------|------------------------------------|
| FIRST SEMESTER. | SECOND SEMESTER. |
| Chemistry (qualitative) [3] | Chemistry (qualitative) [3] |
| Mathematics [3] | Mathematics [3] |
| German, French or Spanish [3 or 5] | German, French or Spanish [3 or 5] |
| Drawing [4] | Drawing [4] |
| Shop work [4½] | Shop work [4½] |
| Rhetoric [3] | Rhetoric [3] |
| Military drill [2] | Military drill [2] |

SOPHOMORE YEAR.

- | | |
|------------------------------|------------------------------|
| Chemistry (quantitative) [3] | Chemistry (quantitative) [3] |
| Mathematics [5] | Mathematics [5] |
| Physics [6] | Physics [6] |
| Drawing [3] | Drawing [2] |
| Rhetorical work [1] | Rhetorical work [1] |
| Military drill [2] | Military drill [2] |

JUNIOR YEAR.

- | | |
|----------------------------|---------------------------|
| Chemistry (organic) [3] | Chemistry (organic) [3] |
| Mechanics [5] | Mechanics [5] |
| Physics [3] | Electrical laboratory [3] |
| Mechanical laboratory [4] | Mechanical laboratory [4] |
| Machine design [2] | Machine design [2] |
| Industrial electricity [3] | Dynamos and motors [3] |

SENIOR YEAR.

- | | |
|----------------------------|----------------------------|
| Chemistry (industrial) [4] | Chemistry (industrial) [4] |
| Gas analysis [2] | Chemistry (applied) [4] |
| Water analysis [2] | Metallurgy [3] |
| Metallurgy [3] | Political science [2] |
| Political science [2] | Electives [4] |
| Electives [4] | Thesis |
| Thesis | |

COURSES IN CHEMISTRY.

Course II. Qualitative analysis.

Freshman I.

ASSISTANT PROFESSOR NICHOLSON

Lectures and laboratory work. The course includes the general reactions of the metals and their qualitative separation.

- Course III. Qualitative analysis.* Freshman II. ASSISTANT PROFESSOR NICHOLSON
Lectures and laboratory work. Reactions and identification of the acids.
- Course IV. Quantitative analysis.* Sophomore I. ASSISTANT PROFESSOR SIDENER
Lectures and laboratory work. The course includes an introduction to quantitative and a beginning of gravimetric analysis.
- Course V. Volumetric analysis.* Sophomore II. ASSISTANT PROFESSOR SIDENER
Lectures and laboratory work. The course includes an introduction to volumetric analysis with a discussion of standard solutions and the necessary stoichiometric calculations.
- Course VI. Organic chemistry.* Junior I. PROFESSOR FRANKFORTER
Lectures and laboratory work. This course includes the aliphatic series with a preparation of the more important compounds supplemented by Levy's Anleitung zur Darstellung Organischer Präparate.
- Course VII. Organic chemistry.* Junior II. PROFESSOR FRANKFORTER
Lectures and laboratory work. The course includes the aromatic series with a preparation of some of the more important compounds supplemented by Fischer's Organischer Präparate.
- Course VIII. Theoretical chemistry.* Junior I. DR. HARDING
Lectures and readings. The course includes a study of Lothar Meyer's Modernen Theorien der Chemie, Oswald's Grundriss der Allgemeinen Chemie and Remsen's Theoretical Chemistry.
- Course IX. History of chemistry.* Junior I. PROFESSOR FRANKFORTER
Lectures and reading. This course includes a full historical discussion of alchemy and chemistry.
- Course X. Water analysis.* Senior I. PROFESSOR FRANKFORTER
Lectures and laboratory work. The course includes an exhaustive discussion of the chemical and sanitary properties of water.
- Course XI. Gas analysis.* Senior I. DR. HARDING
Lectures and laboratory work. The work includes an exhaustive chemical examination of the common gases, with a determination of light and heat efficiency of combustible gases.
- Course XII. The chemistry of carbohydrates.* Senior I. ASSISTANT PROFESSOR NICHOLSON
Lectures and laboratory work. The course includes a discussion of the carbohydrate group with the important methods of analysis.
- Course XIII. Industrial chemistry.* Senior II. ASSISTANT PROFESSOR SIDENER
Laboratory work and reading. The course includes the analysis of various commercial products.
- Course XIV. Wine and beer analysis.* Senior I. DR. HARDING
Lectures and laboratory work. The course includes the determination of alcohol and other constituents in wine and beer, with a special study of fermentation.
- Course XV. Special problems.* Junior I. ASSISTANT PROFESSOR SIDENER
Laboratory work. The course includes the working out of various mineralogical, technological and metallurgical problems.
- Course XVI. Photographic chemistry.* Senior II. PROFESSOR FRANKFORTER
Lectures and laboratory work. The course includes a study of the compounds affected by the chemical rays of light, and a discussion of developers and fixers, photo-engraving, photo-reliefs and color photography.
- Course XVII. Electro-chemical analysis.* Senior II. ASSISTANT PROFESSOR NICHOLSON
Lectures and laboratory work. The course includes the qualitative and quantitative separations of the metals by electrolysis.
- Course XVIII. Micro-chemical analysis.* Senior II. DR. HARDING
Lectures and laboratory work. The course includes the methods for the determination of minute quantities of substance by means of the microscope.
- Course XIX. Food adulterations.* Senior II. DR. HARDING
An examination of common food products for adulterants.
- Course XX. Iron and steel analysis.* Junior II. ASSISTANT PROFESSOR SIDENER
Lectures and laboratory work. The course includes the rapid determination of iron by the various methods, as well as the determination of the associated elements, sulphur, phosphorus, silicon, manganese and carbon.

- Course XXI. Mineral analysis.* Junior II ASSISTANT PROFESSOR SIDENER
The course includes the analysis of building stones and some of the most important minerals.
- Course XXII. Inorganic preparations.* Sophomore I. DR. HARDING
The preparation of inorganic salts, supplemented by Bender's Anorganische Preparatkunde.
- Course XXIII. Colloquium.* Senior I. ASSISTANT PROFESSOR SIDENER
A thorough quiz in general inorganic chemistry.
- Course XXIV. Colloquium.* Senior II. PROFESSOR FRANKFORTER
A thorough quiz in general organic chemistry.
- Course XXV. Special problems.* Junior I. ASSISTANT PROFESSOR SIDENER
This course includes work on ores of base metals, limestones, slags, etc.
- Course XXVI. Physical chemistry.* Junior II. DR. HARDING
Lectures and laboratory work. The laboratory work will include that laid down by Reychler with such references as Nerst and Ostwald.

COURSES FOR GRADUATE STUDENTS.

1. *Special inorganic chemistry.*
2. *Electro-chemistry.*
3. *Organic chemistry.*
4. *The alkaloids.*
5. *Analytical chemistry.*

COURSES IN GEOLOGY AND MINERALOGY.

MINERALOGY

- Course I. General mineralogy.* Sophomore I.
The physical and chemical characters of minerals; a study of the native elements and the ores of the common metals; the occurrence and association of economic minerals.
Descriptive mineralogy and classification; rock-forming minerals; genetic relationships and distribution.
Laboratory work consists of tests illustrating the range of minerals and the application of chemical and blowpipe analyses to the determination of species; an introduction to the methods of quantitative blowpipe analyses; special topics; reference reading and discussions. Six hours a week.
- Course II. Optical mineralogy.* Junior II.
A study of the structure of crystals and crystal grains. An application of the methods of determination by optical properties; the use of the petrographers' microscope, embracing the elements of lithology. Lectures and laboratory work. Six hours a week.

GEOLOGY

- Course I. Physical geology.* Junior I.
1. Geodynamics, discussing the atmosphere, water, terrestrial heat, plants and animals, as geological agents. 2. Structural geology explaining stratification, displacements, dislocations, fractures, induced rock-structures and mineral veins in their relation to the arrangement of materials in the earth. 3. Physiographic geology, pointing out the more prominent earth features and discussing their origin, significance and the agencies affecting them. Field excursions are required. Scott's Introduction.
- Course III. Petrographical geology.* Junior I.
General consideration of the origin and occurrence of rocks, i. e., Petrogenesis. The structure and texture of rocks. Preliminary studies of the mineral, physical and chemical constitution of the crystalline rocks with a view to their general description. Kemp's Handbook of Rocks. Reference reading and demonstrations.
- Course VI. Petrography.* Junior II.
An investigation of the megascopic and microscopic characters of crystalline rocks; a discussion of their crystalline habit, mineral composition and genetic relations. The course extends into an examination of some Minnesota groups of crystalline rocks. Practically a continuance of course III of mineralogy. Laboratory, with lectures and reference reading.

COURSES IN BOTANY.

- Course I. General botany.* I, II. MR. LYON
This course comprises a general survey of the plant kingdom with laboratory work on the cell, on algae, lichens, fungi, mosses and ferns, gymnosperms and flowering plants. Lectures and laboratory.

- Course II. General plant morphology.* First year. MISS TILDEN
This course comprises a thorough laboratory discipline in algæ, fungi and lichens and is the introductory course for students specializing in botany. Lectures, laboratory work and collateral reading throughout the year.

COURSES IN MECHANICAL ENGINEERING.

- Course I. Carpentry and pattern making.* Freshman I.
Wood working, use of tools; lathe and bench work. Patterns for moulding, core boxes. Lectures and practice.
- Course II. Foundry practice and pattern making.* Freshman II.
Patterns and practice. Moulding, casting, mixing metals, brass work and core making. Shop practice, recitations and lectures.
- Course XI. Machine design.* Junior I and II.
Calculation and design of such machine parts as fastenings, bearings, rotating pieces, belt and tooth gearing. Recitations, lectures and drawing-room practice. Preparation, course V, mathematics, and course I physics.
- Course XXIII. Strength of materials.* Junior I, II.
Laboratory work, investigating the strength and physical qualities of iron, steel, brass, copper, belting, chains, beams, brick and stone. Preparation, course I applied mechanics. Four hours a week.
- Course XXIV. Mechanical laboratory.* Junior I.
Continuation of course XXI; also exercises in valve setting, indicator practice, calibration of steam gauges, efficiency of screws and hoists. Preparation, course XVI. Four hours a week.
- Course XXVIII. Mechanical laboratory.* Junior II.
Hydraulic measurements. Calibration of weirs, nozzles, meters and other hydraulic apparatus; calorimetry; tests of pumps, engines and boilers. Open to students who have completed course XXIV. Four hours a week.

COURSES IN METALLURGY.

- Course I. Assaying.* Sophomore II.
Determination of values of the ores. Lectures, recitations and laboratory work. Open to those who take courses I, II, III, chemistry, and have completed course I, mineralogy.
- Course III. General metallurgy and metallurgy of iron.* Sophomore I.
Including the subjects of combustion, fuels, refractory material and furnaces. Lectures and recitations on metallurgy of iron. Open to those who have completed course I.
- Course IV. Metallurgy of wrought iron and steel.* Sophomore II.
Lectures and recitations. Open to those who have completed course II.
- Course V. Metallurgy of the precious metals.* Senior I.
Gold, silver and platinum. Lectures and recitations. Open to those who have completed course VI.
- Course VI. Metallurgy of the base metals.* Senior II.
Associated with precious metals, including lead, copper, etc. Lectures and recitations. Open to those who have completed course V.

COURSES IN GERMAN.

FOR UNDERGRADUATES.

Courses I and II are for students who begin German in the University and must not be taken by those who have presented German for admission to the University.

Students who have taken courses I and II in the University cannot receive credit for course III.

Students who begin German in the University will take the courses in the following order: Courses I, II, V or IV, VI.

Those who have presented German for admission will elect in this order: Courses III, IV, V, VI.

For advanced courses, see Bulletin, College of Science, Literature and the Arts.

- Course I. German begun.* Freshman and sophomore
ASSISTANT PROFESSORS WILKIN AND SCHLENKER,

DR. SCHULZ AND MR. BERKHARDT

(a) Whitney's Brief German Grammar, Barnhardt's German Composition and Buchheim's German Poems.

- (b) *German prose selections.* Leander's Traumerien, Heyse's L'Ar-rabbiata, von Hillern's Hoher als die Kirche; grammar and com-position completed.
- (c) *Scientific prose.* Hodge's German Science Reader; grammar and composition completed.

Course III. Classic prose and poetry. Freshman and sophomore I, II.
 PROFESSOR MOORE, ASSISTANT PROFESSOR WILKIN AND DR. SCHULZ

- (a) Goethe's Prosa and Gedichte, author's life and works, Spanhoofd's Deutsche Grammatik. Oral and written exercises based on text.
- (b) Schiller's Belagerung von Antwerpen, Heine's Prosa and Buch der Lieder, life and works of the authors.
- (c) Brandt & Day's German Scientific Reading, Spanhoofd's Deutsche Grammatik completed, original letters and essays.

COURSES IN PHYSICS.

FOR UNDERGRADUATES.

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

- Course I.*
- (a) Mechanics of solids and fluids. Sophomore I, II.
 - (b) Heat and electrostatics.
- With experimental lectures and laboratory work.
- Course II.*
- (a) Electricity and magnetism. Junior I.
 - (b) Sound and light. Junior II.
- With experimental lectures and laboratory work.
- Course IV. Advanced laboratory work.* Senior I, II.
 Open to those who have completed course II.

COURSES IN DRAWING.

- Course I.* Freshman I, II.
- (a) *Freehand.*
 Lettering, geometric forms and engineering details in outline, includ-ing working sketches, translations and the elements of perspective.
 - (b) *Mechanical.*
 Conventional methods, lettering, machine and structural details and standard sizes and shapes.
 - (c) *Descriptive geometry.*
 Problems relating to points, lines, planes, solids, interpenetrations, sur-face of revolution, tangents and developments, including the con-structive geometry involved. Recitations and lectures.
- Course II.* Sophomore I, II.
- (a) *Descriptive geometry.*
 Orthographic, isometric, horizontal, topographic, oblique, and perspective projections, shades and shadows, line shading and brush tinting.
 Open to students who have completed course I.
 - (b) *Working drawings.*
 Engineering details, assembly drawings, mechanical movements, tracing and blue printing. Study of shop methods and drafting room sys-tems. Details are obtained from actual machines and structures as far as possible.

COURSES IN ELECTRICAL ENGINEERING.

- Course I. Industrial electricity.* 3 hours per week, first half first semester
 Outline of industrial uses of electricity; application of Ohm's law; methods and calculation of wiring. Preparation required; physics, course I.
- Course II. (a) Dynamos and motors.*
 3 hours per week, second half first semester and through second semester.
 Theory of electro-magnet and direct current dynamo and motor; meth-ods of regulation, construction and operation of dynamos and motors; methods of testing. Preparation required; electrical engineering, course I; physics, courses I and II (a); differential and integral calculus.

MATHEMATICS.

- Course I. Higher algebra and plane trigonometry.* Freshman I.
 Algebra—variation, quadratic equations, special higher equations, differ-entiation of algebraic functions, development of functions, logarithms.
 Trigonometry—Formulas and the solution of triangles, with applications.

Course II. Spherical trigonometry and elements of analytical geometry.

With numerous applications.

Freshman II.

Course III. Higher algebra and analytical geometry. [3 and 2] Shopomore I.

Algebra—Simultaneous equations of the second degree, theory of algebraic functions, indeterminate equations, theory of equations and solution of numerical higher equations, series, permutations and combinations, determinants.

Analytical geometry—the conic sections, both by rectilinear and polar coordinates, producing equations of loci whose law of development is known, constructing and discussing such equations, transformation of coordinates, properties of loci by means of their equations.

Course IV. Differential calculus. [3 and 2]

Sophomore II.

Differentiation of algebraic and transcendental functions, development of functions, indeterminate forms, maxima and minima, treatment of tangents, subtangents, normals, subnormals, asymptotes, direction and rate of curvature, evolutes, envelopes and singular points.

MILITARY SCIENCE AND TACTICS.

MAJOR GEORGE H. MORGAN, LL. B., 9th U. S. Cavalry, Commandant.

For the instruction in military drill and administration the students are organized into a corps of cadets, consisting of two battalions 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, modelled after the U. S. Military Academy cadet uniform, and costs in Minneapolis about \$15, and is as neat and economical dress as the student can obtain.

Drill is required of all men in the freshman and sophomore classes.

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

In addition to the above, a course is given in military science, optional with the seniors and juniors, during the 2d semester, two hours a week. This work when satisfactorily completed taken in connection with the year's drill will give a four-hour credit for the semester.

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

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

The officers and non-commissioned officers are required to be good students in the other departments, soldier-like in the performance of their duties, exemplary in their general deportment and able to pass a creditable examination in drill regulations. In general, the officers are selected from the senior class; the sergeants from the junior class; and the corporals from the sophomore class.

Freshman—Practical instruction in schools of the soldier, company and battalion; signals, ceremonies; schools of the cannoneer and battery.

Sophomore—Practical and theoretical instruction in schools of the company and battalion: Advance and rear guard drill: practical and theoretical instruction in guard duty. Gallery practice. Ceremonies.

Junior, senior—Theoretical instruction—Advance and rear guards, outposts, reconnaissance, camping: duties of company commander: articles of war: records.

COURSES IN POLITICAL SCIENCE.

Course I. Introduction to political science.

Senior I. DR. SCHAPER

A study of the state, its growth, forms and people. Lectures and reading.

Course II. Transportation.

Senior. PROFESSOR FOLWELL

The evolution of transportation in the United States, and by railroads in particular.

Economic aspect and public policy of railroads.

THE COLLEGE OF

ENGINEERING AND

THE MECHANIC ARTS

The College of Engineering and the Mechanic Arts.

FACULTY

CYRUS NORTHROP, LL. D., *President.*
FREDERICK S. JONES, M. A., *Dean.*

OFFICERS OF THE DEPARTMENT OF CIVIL ENGINEERING.

WILLIAM R. HOAG, C. E., *Professor of Civil Engineering, in charge of Road and Topographical Engineering.*
FRANK H. CONSTANT, C. E., *Professor of Structural Engineering*
FREDERICK H. BASS, C. E., *Instructor in Civil Engineering, in charge of Municipal and Sanitary Engineering.*

OFFICERS OF THE DEPARTMENT OF MECHANICAL ENGINEERING.

JOHN J. FLATHER, Ph. B., M. M. E., *Professor of Mechanical Engineering.*
WILLIAM H. KAVANAUGH, M. E., *Assistant Professor of Mechanical Engineering in charge of Experimental Engineering.*
EDD C. OLIVER, M. E., *Instructor in Machine Design.*
ROY S. KING, M. E., *Instructor in Mechanical Engineering.*
WILLIAM H. MERRIMAN, *Instructor in Machine Work.*
JAMES M. TATE, *Instructor in Carpentry and Pattern Work.*
EDWARD JOHNSON, *Instructor in Foundry Practice.*
HARRY C. GILMORE, *Assistant in Carpentry.*
WILLIAM AGATE, *Machinist.*
PETER JOHNSON, *Assistant in Forge Work.*
HARRY W. DIXON, *Chief Engineer.*
H. L. WHERLAND, *Assistant Engineer.*

OFFICERS OF THE DEPARTMENT OF ELECTRICAL ENGINEERING.

GEORGE D. SHEPARDSON, A. M., M. E., *Professor of Electrical Engineering.*
FRANK W. SPRINGER, E. E., *Assistant Professor of Electrical Engineering.*

OFFICERS OF THE DEPARTMENTS OF ENGINEERING AND MECHANICS, AND MATHEMATICS.

HENRY D. EDDY, C. E., Ph. D., LL. D., *Professor of Engineering and Mechanics.*
ARTHUR EDWIN HAYNES, M. S., M. Ph., Sc. D., *Professor of Engineering Mathematics.*
WILLIAM E. BROOKE, B. C. E., M. A., *Instructor in Engineering Mathematics.*

OFFICERS OF THE DEPARTMENT OF PHYSICS.

FREDERICK S. JONES, M. A., *Professor of Physics.*
 JOHN ZELENY, B. S., B. A., *Associate Professor of Physics.*
 ANTHONY ZELENY, M. S., *Instructor in Physics.*
 HENRY A. ERIKSON, B. E. E., *Instructor in Physics.*

OFFICERS OF THE DEPARTMENT OF CHEMISTRY.

GEORGE B. FRANKFORTER, M. A., Ph. D., *Professor of Chemistry.*
 CHARLES F. SIDENER, B. S., *Assistant Professor of Chemistry.*
 EDWARD E. NICHOLSON, M. A., *Assistant Professor of Chemistry.*

OFFICERS OF THE DEPARTMENT OF DRAWING AND INDUSTRIAL ART.

WILLIAM H. KIRCHNER, B. S., *Assistant Professor of Drawing.*
 JOHN H. QUENSE, C. E., M. E., *Instructor in Drawing.*
 FRANKLIN R. McMILLAN, *Student Assistant in Drawing.*

OFFICERS OF THE DEPARTMENT OF POLITICAL SCIENCE.

WILLIAM W. FOLWELL, LL. D., *Professor of Political Science.*
 WILLIAM A. SCHAPER, Ph. D., *Assistant Professor of Political Science.*

OTHER DEPARTMENTS GIVING INSTRUCTION.

FREDERICK W. SARDESON, Ph. D., *Instructor in Geology.*
 EDWARD P. SANFORD, M. A., *Instructor in English.*
 JOSEPH BEACH, M. A., *Instructor in English.*
 GEORGE H. MORGAN, MAJOR, U. S. A., *Professor of Military Science.*
 FRANCIS P. LEAVENWORTH, M. A., *Professor of Astronomy.*
 WILLIAM S. PATTEE, LL. D., *Lecturer on Contracts and Torts.*

STANDING COMMITTEES.

Enrollment—PROFESSORS CONSTANT, FLATHER, SPRINGER.
Curriculum—PROFESSORS EDDY, FLATHER, HOAG, JONES, SHEPARDSON.
Degrees—DEAN JONES, PROFESSORS FLATHER, SHEPARDSON, HOAG.
Library—PROFESSORS SPRINGER, CONSTANT, KAVANAUGH.
Military Affairs and Athletics—PROFESSORS HOAG, HAYNES, NICHOLSON.
Students' Work—PROFESSORS HAYNES, KIRCHNER, HOAG, SHEPARDSON,
 KAVANAUGH, BROOKE, JONES.
Graduate Studies and Degrees—PROFESSOR EDDY.
Program—PROFESSORS KIRCHNER AND BASS.

NON RESIDENT LECTURERS FOR 1903-04.

EDWARD P. BURCH, E. E., *Consulting Engineer*, Minneapolis, "Design of an Electric Light and Railway Plant." "Engineering Features of a Hydro-Electric Installation."
 S. C. McMEEN, *Telephone Engineer*, Western Electric Company, Chicago, "The Problems and Prospects of Telephone Engineering."
 A. C. PRATT, *Electrical Engineer*, Missouri River Power Company, Canyon Ferry, Montana, "The Operation of a High Tension Transmission Plant."
 A. L. ROHRER, *Electrical Superintendent*, General Electric Company, Schenectady, New York, "Post Graduate Courses in Electrical Factories."

ORGANIZATION OF THE COLLEGE.

In this college there are four regular courses of study, viz.: civil and municipal engineering, mechanical engineering and electrical engineering, leading to corresponding professional degrees.

There is also organized in this college a four years' course of study in science and technology, leading to the degree of bachelor of science, with an additional year leading to the professional degree.

UNCLASSED STUDENTS.

Unclassed students are permitted 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.

FEEES.

A registration fee of fifteen dollars per semester, payable in advance, is required of all residents of the state who register in this college. Non-residents are charged double this fee, or thirty dollars per semester. No reduction is made for late entrance or for leaving before the end of the semester. In addition to this fee students who take laboratory work are charged a sum sufficient to cover the cost of material and breakage. The fees are as follows: **Freshman year** (per semester)—Shop work, \$7; chemistry, \$5. **Sophomore year** (per semester)—Shop work, \$7.50; physics, \$3; chemistry, \$3, first semester only. **Junior year**—Shop work, \$4.50; mechanical laboratory, first semester, \$6; second semester, \$3; electrical laboratory, second semester, \$4.50. **Senior year**—Electrical laboratory, both semesters, \$3 or \$6; mechanical laboratory, first semester, \$4.50; second semester, \$6.

ADVANCED STANDING.

Advanced Standing—The University accepts records from all reputable colleges for credit to advanced standing. Such records are accepted as far as they are equivalent to the work done in this University. In bringing records from other institutions, the certificate must be on the official blanks of the institution granting the certificate, and should show:

1. The subject studied; if a language, the work read, etc.
2. The time spent upon each subject.
3. Ground covered in laboratory work in case of laboratory subjects.
4. The result—it is sufficient to state that the subject was creditably completed.

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

GRADUATION.

Students completing the course of study to the satisfaction of the faculty of the college, are entitled to receive the baccalaureate degree. Any person may undergo, at suitable times, examination in any subject, and if such person pass in all the studies and exercises of the course, he is entitled to the appropriate degree; **provided**, however, that at least one full year must be spent at the University, before such degree shall be granted, and **provided**, the examination, in every case, be held before a committee of the faculty appointed for that purpose. This regulation does not apply to the medical and law departments, in which departments the time element is a legal requirement.

ADMISSION.

Entrance examinations are held only at the beginning of the college year.

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

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

REQUIREMENTS FOR ADMISSION.

N. B.—Students proposing to enter this college should be specially thorough in their mathematical preparation, since the prosecution of the work of the course depends so largely upon the preliminary work done in this line. And, further-

more, no student will be admitted to this college with a condition in mathematics.

N. B.—Time element, as indicated with each subject, is essential.

A three years' course of reading in English classics; at least one hour each week shall be devoted to composition.

English Composition, one year.

Algebra, elementary, one year.

Algebra, higher, one-half year.

Geometry, plane, one year.

Geometry, solid, one-half year.

Chemistry, one year.

In addition to the above named subjects which are required and for which substitutes cannot be accepted, applicants shall present evidence of preparation in **seven** year-credits, or their equivalent; of the credits thus offered, at least **two** year-credits shall be chosen from one of the **language groups** other than English.

Latin (four years).

Grammar, one year.

Caesar, four books, one year.

Cicero, six orations, one year.

Vergil, six books, one year.

Greek (two years).

Grammar, one year.

Anabasis, one year.

German (two years).

Literature, one year.

Grammar, one year.

French (two years).

Grammar, one year.

Literature, one year.

Spanish (two years).

Grammar, one year.

Literature, one year.

English, literature.

History, Ancient, to Charlemagne, one year.

Modern, from Charlemagne, one year.

England, one-half year.

Senior American, one-half year.

- Civics, one-half year.
 Political Economy, one-half year.
 Physics, one year.
 Chemistry, one year.
 Botany, one-half or one year.
 Zoology, one-half or one year.
 Astronomy, one-half year.
 Geology, one-half year.
 Physiography, one-half year.
 Drawing, one year.
 Shop Work, one year.

GENERAL REGULATIONS.

- I. Students will be admitted to the freshman class on **passing the regular entrance examinations.**
- II. No student will be admitted if **conditioned in more than three half-year subjects**, or their equivalent.
- III. Graduates of any Minnesota State high school will be admitted **without examination, provided—**
 - (1) That the school maintain a **full four-year high school course.**
 - (2) That the applicant present to the registrar the principal's certificate showing the satisfactory completion of **all the studies required for admission** to the desired University course.
- IV. Graduates of Minnesota State high schools who are deficient in **not more than three half-year subjects** or their equivalent, **may be excused** from entrance examinations in such subjects as the enrollment committee may decide; such candidates should present themselves to that committee **not later than Tuesday of examination week.**
- V. Graduates of Minnesota State high schools whose principal's certificate shows them to be deficient in **more than three half-year subjects** or their equivalent, even though they have made such additional preparation as they deem necessary, must take, nevertheless, the regular entrance examination in all subjects, as provided in sections I and II unless excused by vote of the faculty; and persons wishing to present reasons for such excuse should report to the enrollment committee **not later than Tuesday of examination week.**

- VI.** Graduates of the advanced courses of Minnesota normal schools will be admitted upon the same terms as graduates of State high schools.
- VII.** Any Minnesota high school or academy not under supervision of the State High School Board, but requiring for graduation a four-year's course, exclusive of the common school branches, conforming essentially in distribution of time to the entrance requirements of at least one of the University courses, will, upon application, be inspected by a committee, and, after favorable recommendation, may be accredited by the faculty in all respects as are the state high schools, provided—
- (1) That the school be open to inspection at any time by the University;
 - (2) That it take such supplementary examinations as may be prescribed from time to time.
- VIII.** Graduates from schools in other states, whose diplomas admit to reputable colleges in the state in which the school is located, will be received subject to the regulations that apply to graduates of Minnesota State high schools.
- The University accredits schools in other states only under this general provision.
- IX.** Applicants from schools not coming within any of the above classes must take the regular entrance examinations or present State High School Board certificates. High School Board certificates will be accepted in lieu of an examination in the subjects which they represent.

Students bringing records from accredited schools are required to present them on the blank form provided for the purpose by the University. Blank forms may be obtained from the Registrar. No other form of certificate will be accepted. Students who do not bring their certificates on the proper form of blank will not be allowed to register until they have secured the certificate on the required form.

From and after the opening of the year 1904-05, every person admitted to the University shall be examined in reading, writing, spelling and composing the English language, and all who fail to obtain a grade of seventy-five per cent. shall be required to pursue a course of instruction to be provided, and no person shall ever receive any diploma or other certificate of merit or proficiency until he shall have passed such examination and obtained the specified credit.

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

Entrance examinations are held only at the beginning of the college year.

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

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

SYLLABUS.

For a statement of the ground expected to be covered in the study of the various subjects accepted for admission, see pages 62 to 66 of this catalogue.

COURSE OF STUDY.

FRESHMAN YEAR.

First Semester.

The same for all courses: Mathematics, 5; English, 4; Qualitative analysis, 4; Shop work, 4½; Drawing, 4; Military drill, 2.

Second Semester.

For the civil engineering course: Mathematics, 4; English, 4; Qualitative analysis, 4; Drawing, 4; Surveying and platting, 4; Military drill, 2.

For the mechanical and electrical engineering courses: Mathematics, 4; English, 4; Qualitative analysis, 4; Drawing, 4; Shop work, 4½; Military drill, 2.

SOPHOMORE YEAR.

First Semester.

<p>CIVIL ENGINEERING. Mathematics, 5. Physics, 6. Topography, 5. *Technological chemistry, 2 Drawing, 3. Military drill, 2.</p>	<p>MECHANICAL ENGINEERING. Mathematics, 5. Physics, 6. Shop work, 5. Technological chemistry, 2 Drawing, 3. Military drill, 2.</p>	<p>ELECTRICAL ENGINEERING. Mathematics, 5. Physics, 6. Shop work, 5. Technological chemistry, 2 Drawing, 3. Military drill, 2.</p>
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Second Semester.

<p>Mathematics, 5. Physics, 4. Drawing, 2. Topography, 5. Highways, 2. Practical astronomy, 2. Military drill, 2.</p>	<p>Mathematics, 5. Physics, 4. Drawing, 2. Mechanism, 3. Shop work, 5. Kinematic drawing, 2. Military drill, 2.</p>	<p>Mathematics, 5. Physics, 4. Drawing, 2. Mechanism, 3. Shop work, 5. Kinematic drawing, 2. Military drill, 2.</p>
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JUNIOR YEAR.

First Semester

<p>CIVIL ENGINEERING. Mechanics, 5. Physics, 3. Mechanical laboratory, 2. Curves and earthworks, 4. Field work, 3. Stress in framed structures 3</p>	<p>MUNICIPAL ENGINEERING Mechanics, 5. Physics, 3. Mechanical laboratory, 2. Water analysis, 2. Curves and earthworks, 4. Field work, 3. Stress in framed structures 3</p>	<p>ELECTRICAL ENGINEERING. Mechanics, 5. Physics, 3. Mechanical laboratory, 2. Machine design, 4. Industrial electricity, 3. Shop work, 4. or Shop, 2. } Stresses, 2. }</p>
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Second Semester.

<p>CIVIL ENGINEERING. Mechanics, 5. Physics, 3. Structural details, 3. Stress in framed structures 3 Railroad work, 3. Geology, 3. Hydraulic laboratory, 2.</p>	<p>MUNICIPAL ENGINEERING. Mechanics, 5. Physics, 3. Biology, 3. Stress in framed structures 3 Railroad work, 3. Geology, 3. Hydraulic laboratory, 2.</p>
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NOTE—Sophomores may elect gymnasium work in lieu of drill during the months of December, January and February.

* Students pursuing the course in municipal engineering will choose qualitative analysis [2] in lieu of this subject.

MECHANICAL ENGINEERING.

- Mechanics, 5.
- Physics, 3.
- Machine design, 4.
- Dynamos and motors, 3.
- Electrical laboratory, 3.
- Mechanical laboratory, 2.
- Steam engines, 2.

ELECTRICAL ENGINEERING.

- Mechanics, 5.
- Physics, 3.
- Machine design, 2.
- Dynamos and motors, 3.
- Electrical laboratory, 3.
- Mechanical laboratory, 2.
- Steam engines, 2.
- Electrical design, 2.

SENIOR YEAR.

First Semester.

CIVIL ENGINEERING.

- Masonry, 5.
- Experimental laboratory, 2.
- Electric power, 3.
- Structural design, 5.
- Political science, 2.
- Water supply engineering, 4.
- Thesis.

MUNICIPAL ENGINEERING.

- Masonry, 5.
- Experimental laboratory, 2.
- Electric power, 3.
- Structural design, 5.
- Political science, 2.
- Water supply engineering, 4.

MECHANICAL ENGINEERING.

- Thermodynamics, 3.
- Prime movers, 2.
- Mechanical engineering, 2½.
- Machine design, 4.
- (Steam engine.)
- Mechanical laboratory, 4.
- Political science, 2.
- Elective, 2 to 4.
- Thesis.

ELECTRICAL ENGINEERING.

- Thermodynamics, 3.
- Prime movers, 2.
- Alternating currents, 3.
- Electrical engineering, 2.
- Mechanical laboratory, 3.
- Political science, 2.
- Elective, 3.
- Electrical laboratory, 2.
- Thesis.

Second Semester.

CIVIL ENGINEERING.

- Structural design, 5.
- Least squares, 2.
- *Geodesy, 3.
- Political science, 3.
- Sanitary engineering, 3
- Contracts
- and
- Specifications, 2.
- Thesis, 4.

MUNICIPAL ENGINEERING.

- Structural design, 5.
- Public health, 1.
- Bacteriology, 3.
- Political science, 2.
- Sanitary engineering, 5.
- Contracts
- and
- Specifications, 2.
- Thesis, 3.

MECHANICAL ENGINEERING.

- Thermodynamics, 3.
- Mechanical laboratory, 4.
- Machine design, 4.
- or
- Railway design, 4.
- Political science, 2.
- Elective, 2 or 4.
- Contracts
- and
- Specifications, 2.
- Thesis, 3.

ELECTRICAL ENGINEERING.

- Alternating currents, 3.
- Electrical laboratory, 3.
- Electrical design, 3.
- Electrical engineering, 2.
- Political science, 2.
- Elective, 3.
- Contracts
- and
- Specifications, 2.
- Thesis, 3.

*Or an equivalent elective to be approved by the department.

Courses of Instruction

ENGLISH.

Course I. English. [4] Freshman I, II. MR. SANFORD AND MR. BEACH.

The work for this course is planned with special reference to the needs of engineering students. Two hours a week will be given to the study of English composition, and two hours to the study of a general survey of English literature.

Essays will be required every week. Special emphasis will be given to the subjects that an engineer must write upon when, in the line of his business, he makes specifications, estimates, description of processes or of principles, and their application to given results; or when he wishes to inform the public upon engineering work, its principles and details. While in the study of literature one object will be the general broadening of the mind by an acquaintance with the masterpieces of English prose and poetry, especial attention will be given to the work of those writers who have handled scientific subjects with clearness and power.

MATHEMATICS.

In imparting a knowledge of the mathematical subjects, special emphasis is placed upon their practical application. This gives the student a firmer grasp of the more important parts of these subjects and some appreciation of their real value, before reaching those technical studies where mathematics furnishes the only sure basis for professional knowledge and a most powerful instrument for use in original research.

Course I. Higher algebra. Freshman I. 70 hours.

Advanced work on equations containing radicals, simple and quadratic equations, proportion, variation, progressions, summation of special series, binomial theorem, indeterminate coefficients, logarithmic series, Taylor's formula and the treatment of higher equations, including Cardan's rule for cubics.

Course II. Plane trigonometry. Freshman I, II. 44 h. urs.

Trigonometric functions of acute angles, of angles in general, applications of logarithms, solution of right triangles, general properties of triangles, practical applications, including the solution of cubic equations having real and unequal roots.

Course III. Spherical trigonometry. Freshman II. 20 hours.

Review of some truths of solid and spherical geometry. Napier's rules, solution of right spherical triangles, general properties of spherical triangles and the application of spherical trigonometry to the solution of practical problems.

Course IV. Analytical geometry.

Freshman II, 24 hours; Sophomore I, 65 hours.

Co-ordinate systems, transformation of co-ordinates, algebraic equations of different degrees produced and discussed by the aid of these systems, transcendental equations and loci:—three dimensions; the point, plane, line, surfaces and solids.

Course V. Differential calculus. Sophomore I, II. 55 hours.

The differentiation of algebraic and transcendental functions, successive differentiation, series, derivatives, maxima and minima, tangents, sub-tangents, normals, subnormals, illusory forms, asymptotes, direction and rate of curvature, radius of curvature, evolutes, envelopes, singular points and curve tracing.

Course VI. Integral calculus. Sophomore II. 40 hours.

The integration of various algebraic and transcendental differentials, rectification of plane curves, quadrature of plane surfaces, areas of surfaces of revolution, cubature of volumes of revolution, and the production of the equations of loci by integrating certain conditional differentials.

Course VII. Some practical applications Sophomore II. 15 hours.

of the calculus to mechanics and physics, maxima and minima, center of gravity, center of hydrostatic pressure and moment of inertia.

The foregoing courses in mathematics are required, *in the order given*, of all under graduates in each of the engineering courses.

Course VIII. Advanced calculus and differential equations. Junior or senior I, II. 24 hours.

Preparation courses V and VI.

Course IX. Method of least squares. Senior I. 36 hours.
PROFESSOR LEAVENWORTH.

A study of the combination and adjustment of observations and the discussion of their precision, especially as applied to engineering problems.

DRAWING.

Course I. (a) Frechand. Freshman I. [2] 68 hours.

Lettering, geometric forms and engineering details in outline, including working sketches, translations and the elements of perspective.

(b) Mechanical. Freshman I, II. [2] 136 hours.

Conventional methods, lettering, machine and structural details and standard sizes and shapes.

(c) Descriptive geometry. Freshman II. [2] 34 hours.

Problems relating to points, lines, planes, solids, interpenetrations, surfaces of revolution, tangents and developments, including the constructive geometry involved. Recitations and lectures.

Course II. Descriptive geometry. Sophomore I. [4] 102 hours.

Orthographic, isometric, horizontal, topographic, oblique, and perspective projections, shades and shadows, line shading and brush tinting. Open to students who have completed course I.

(a) Civil.

(b) Mechanical and electrical.

(c) Mining.

Course III. Working drawings. Sophomore I, II. [2] 102 hours.

Engineering details, assembly drawing, mechanical movements, tracing and blue printing. Study of shop methods and drafting room systems. Details are obtained from actual machines and structures as far as possible.

(a) Civil.

(b) Mechanical and electrical.

(c) Mining.

Course IV. Instrumental. I, II. [4] 238 hours.

Problems, projections, sections, developments and interpenetrations. With conventional renderings in line and wash.

FOR GRADUATES

Course V. Advanced work in descriptive geometry and applications.

Course VI. Projective geometry.

MECHANICS.

(a) APPLIED MECHANICS.

Course I. Statics, dynamics and mechanics of materials. Junior I. 90 hours.

The laws of equilibrium, motion, work and energy as applied to rigid bodies, and a study of the strength and elastic properties of materials of construction required in the design of beams, posts, masonry arches and equilibrium polygon. Recitations and lectures. Open to students who have completed the work of the first two years in mathematics and physics.

Course II. Hydraulic and pumping machinery. Junior II. 90 hours.
 Hydraulics, including the laws of the equilibrium, pressure and flow of fluids; the theory of the action of pumps. Recitations and lectures.
 Open to those who have completed course I.

(b) THEORETICAL MECHANICS AND MATHEMATICAL PHYSICS.

For Graduates and Undergraduates who have completed calculus and physics.

Course I. The potential function and spherical harmonics.

Course II. Analytical statics and electrostatics.

Course III. Dynamics of rigid bodies.

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

FOR GRADUATES.

Open only to those who have completed advanced work in mathematics.

Course V. Directional calculus, vector analysis and determinants.

Course VI. Analytical theory of the conduction of heat.

Course VII. Theories of elasticity and sound.

Course VIII. Wave theories of light, heat and electricity.

Course IX. Kinetic theory of gases.

Course X. Hydrodynamics and fluid motion.

Course XI. Theory of functions with applications.

PHYSICS.

FOR UNDERGRADUATES.

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

Course I.

(a) Mechanics of solids and fluids.

[5] Sophomore I.

(b) Heat, electricity and magnetism.

Recitations, experimental lectures and laboratory work.

[4] Sophomore II.

Course II. Advanced mechanics, electricity and magnetism.

[4] Junior I.

Course III. Sound and Light.

Recitations, experimental lectures and laboratory work.

[3] Junior II.

Course IV. Advanced laboratory work.

Senior I, II.

Open to those who have completed course II.

FOR GRADUATES.

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

GEOLOGY.

Course I. Geology.

Junior II. 51 hours. DR. SARDESON.

A condensed course in physical and historical geology, for civil engineers, geodynamics, structural geology, physiography, stratigraphic and historical geology are treated of successively. Excursions to typical localities will supplement work done in the class room. Lectures and references.

CONTRACTS AND SPECIFICATIONS.

Course I. Contracts.

Senior II. 17 hours. DEAN PATTEE.

Lectures on the law of contracts; essential elements of a legal contract; contracts by agents; mutual assent; misrepresentation in the contract; invalidity of contract through fraud; alterations; consideration. Agreements—oral and written; enforcement of contract.

Course II. Specifications.

Senior II. 17 hours. PROFESSOR FLATHER.

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

Botany—For elective courses in this subject see page 64.

ASTRONOMY.

Course I. *Practical astronomy.*

Sophomore II. 34 hours.
PROFESSOR LEAVENWORTH.

Spherical co-ordinates; time; latitude; longitude, and other astronomical problems. Lectures.

POLITICAL SCIENCE.

Course I. *Introduction to political science.* Senior I. 34 hours. DR. SCHAPER.
A study of the state, its growth, forms and people. Lectures and reading.

Course II. *Transportation.* Senior II. 34 hours. PROFESSOR FOLWELL.
The evolution of transportation in the United States, and by railroads in particular. Economic aspects and public policy of railroads.

BIOLOGY AND BACTERIOLOGY.

Course I. *Biology.* Junior II. 54 hours.
Brief course in general biology. Microscopical examination of samples of water for small plants and animals of frequent occurrence in public water supplies. Sedgwick-Rafter method.

Course II. *Bacteriology.* Senior II. 54 hours.
Brief course in general bacteriology. Preparation of media and study of cultures, especially those of pathogenic bacteria found in water and sewage.

CHEMISTRY.

Course I. *Qualitative analysis.*

Freshman I, II. 272 hours.
ASSISTANT PROFESSOR NICHOLSON.

The course includes the general reactions of the metals and their qualitative separation; reaction and identification of acids, followed by practical problems in qualitative analysis. Lectures, and laboratory work.

Course II. *Chemical technology.*

Sophomore I. 68 hours.
ASSISTANT PROFESSOR SIDENER.

Includes technical analysis of materials of engineering, with especial reference to iron and steel, lectures and laboratory work.

Course III. *Qualitative Analysis.*

Sophomore I. 72 hours.

Volumetric and gravimetric analysis.

Course IV. *Water analysis.*

Junior I. 72 hours.

Sanitary chemical analysis of water. Samples collected by the students tested for nitrogen in its several conditions, chlorine, color, turbidity, hardness.

CIVIL ENGINEERING.

MUNICIPAL AND SANITARY ENGINEERING.

For the classes graduating in 1906 and thereafter, a course of elective studies is offered to students desiring to give special attention to the problems of city engineering, particularly those having a direct bearing upon questions of public health. The departments of chemistry, biology and bacteriology and also the State Board of Health have lent their aid to the efficiency of this course. A reduction in time given to structural work and geodesy makes it possible to devote more time to design of public works.

Course I. (a) *Hydraulic engineering.*

Senior I. 40 hours

Study of public water supplies, covering the means and methods of collection, purification and distribution of water to large and small communities. Details of construction. Turneure & Russell's Water Supply: text. Lectures on water power development, irrigation, river and harbor improvements and drainage. Required preparation, mechanics II. (Recitations and lectures.)

Course I. (b) *Hydraulic design.*

Senior 56 hours

A series of problems in calculation of quantities and design. Estimates of cost. Required preparation: mechanics II. (Drawing Room.)

- Course II. (a) Sanitary engineering.* Senior II. 56 hours.
 Sewerage systems: separate and combined, hydraulics of sewers,—relation to rainfall and run-off, determination of size and capacity. Surveys for drainage systems, design of system in detail, specifications, estimates of cost, inspection of work. Methods of disposal, irrigation, filtration, chemical precipitation, bacteriolytic methods. House drainage. Garbage disposal. Preparation required, mechanics II. Folwell's Sewerage: text. (Recitations and lectures.)
- Course II. (b) Sanitary design* Senior II. 68 hours.
 Problems illustrative of work in Course II. A complete design for collection and purification of sewage. Ogden's Sewer Design, Rideal's Sewage, Moore's Sanitary Engineering, &c.: References. Preparation, mechanics II. (Drawing room.)
- Course III. Public Health.* Senior II. 18 hours.
 Lectures upon general problems concerning public hygiene, by the professor of bacteriology.

RAILWAY AND HIGHWAY ENGINEERING.

- Course IV. Curves and earthworks.* Junior I. 36 hours.
 Problems attending final location surveys of railroads and track laying, theory of computation of volumes and preparation of preliminary estimates. Transition curve. Woodman, text book and notes.
- Course V. Execution in field of practical problems.* Junior I. 102 hours.
 Illustrating the analytical work of course IV, including the computation of earthwork of railroad grades and pits, platting profiles and construction of maps.
- Course VI. Railway location and estimates.* Junior II. 102 hours.
 Reconnoitering and preliminary surveys are made, followed by field maps and final location; profiles and cross-sectioning of a new route for a railroad, involving four or five miles of relocation. 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.
- Course VII. Railway economics.* Junior I, II. 34 hours.
 This course consists of a course of lectures once a week through the junior year. During the first semester the subject of structures of permanent way, related to course IV, is treated, also the economic consideration controlling in the final selection of a line, the fixing of the grade line and placing of contracts for construction. In the second semester the science of location is treated preparatory to course VI.
- Course VIII. Highway construction and maintenance.* Sophomore II. 36 hours.
 The economic relation of highways in transportation, with a treatment of the practical questions relating to materials and methods necessary to maintain good streets and highways. Lectures, Baker as text, with collateral reading, reports and essays. Tours of inspection of country roads and city pavements.

STRUCTURAL ENGINEERING.

- Course IX. Stresses in framed structures.* Junior I. 85 hours. Junior II. 85 hours.
 Theory of structures and determination of stresses by graphical and analytical methods in the modern types of structures, for static and for moving loads. Theory of the deflection of framed structures. Text book work, numerous problems and lectures, drawing room work in graphic statics. Text book, Merriam, Parts I and II. Open to students pursuing the course in mechanics.
- Course X. Structural details.* Junior II. 102 hours.
 Study of the method of proportioning individual members of framed structures and the designing of joints and splices in steel and wooden structures. Design and complete working drawing of a roof truss and a plate girder railway bridge. Lectures and numerous problems in

class room and drawing-room for work in designing. Hand Book of Steel Manufacturers. Reference, Merriam's Part II, Bridge Series. Open to students who have completed course IX.

Course XI. Structural designs. Senior I. 136 hours; II. 136 hours.

Theory and design of modern steel structures, including railway and highway bridges, swinging bridges, steel mill buildings, standpipes and towers, and other problems of structural interest. In this course the student becomes familiar with the method of designing important structures, and several complete designs with necessary computations, detail drawings, specifications and estimates are made. As much of the work is done in the class-room under the immediate leadership of the instructor as possible. Such drawings are made in the drawing room as may involve important principles and details, and give the student a certain facility in making structural drawings. During this year occasional shop drawings are made for the same purpose but expertness in structural draughting is not aimed at. The collection of blue prints, photographs and designs in the possession of the department is put to constant use for illustrative purposes. Reference, Johnson's Stresses in Framed Structures, Merriam's Part III and IV Bridge Series, Wright's Swing Bridges. Open to students who have completed courses IX and X.

Course XII. Masonry construction. Senior I. 119 hours.

Properties of stones, bricks, cement and concrete, and their use in engineering structures. Foundations, retaining walls, piers and abutments, dams and chimneys. Theory and design of masonry arches. Class room work and drawing room work in designing. Text book, Baker's Masonry Construction, Church's Mechanics, Howe's Retaining Walls, Wegman's Dams. Reference, Fowler's Cofferdam Process, Patton's Foundations, and current periodical literature. Open to students who have completed course IX.

Course XIII. Experimental laboratory. Senior I. 68 hours.

Experimental tests of the properties of cements, concrete, concrete-steel, and strength of joints, columns and framed structures. Laboratory work.

TOPOGRAPHICAL ENGINEERING.

Course XIV. Surveying. Freshman II. 68 hours.

Work consists of recitations, lectures and illustrative problems relating to chaining, field problems employing chain; methods of keeping field notes; determination of area—D. M. D. and rectangular co-ordinate method; compass and transit surveying; study of instruments and their adjustment; methods for overcoming obstacles, determination of heights and distances inaccessible; methods of supplying omissions of platting compass and transit surveys; discussions of the methods of laying out and dividing land, including the public land surveys of the United States. The care, proper use and adjustment of all instruments used are treated in field exercises. Chain, compass and transit surveys are made and circuits of level-lines run by each party. A meridian line is established by each party by observations on Polaris.

Course XV. Platting. Freshman II. 34 hours.

This time is given to construction of diagonal scales, protractors, circular and straight verniers. All surveys made in the field are platted and areas computed. Solution of problems and useful office reduction of all field notes.

Course XVI. Topography. Sophomore I. 96 hours.

The methods of conducting topographical surveys are taken up in the order of increasing accuracy. At first a text-book is used* to acquaint the student with the instruments employed; method of use and theory of adjustment. Lectures are given on the details of field work; parties of topographers are formed and each makes a complete topographic survey of a certain tract, employing stadia transit and rectangular methods.

Course XVII. Mapping. Sophomore I. 40 hours.

Notes taken in course XVI are reduced, areas computed and topographical maps made of land surveyed.

Course XVIII. Higher Surveying.

Sophomore II. 102 hours.

Analytical study of the aneroid and mercurial barometers and barograph is made for determining their efficiency in hypsometric surveys; of the solar compass and solar transit and various solar attachments for establishing government standard lines and the plane-table and stadia as a rapid means of prosecuting topographical surveys. Text-books, "Johnson's Theory and Practice of Surveying" and Baker's "Engineering Instruments."

Course XIX. Field work and platting.

Sophomore II. 68 hours.

Observations are made with barometers for difference of level; checked with spirit level. 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. A general map is compiled from all the maps, a tracing made and blue prints taken by each student.

Course XX. Geodesy.

Senior II. 51 hours.

Geodetic reconnaissance; base-line measurement, employing bars and steel tape; measurements of angles, horizontal and vertical; field methods for time, latitude, longitude and azimuth; theory of computing geographical position. Lectures and text.

Making and reducing observations illustrating work of course.

MECHANICAL ENGINEERING.

SHOP WORK.

Course I. Carpentry and pattern making.

Freshman I. 162 hours.

Wood working, use of tools; lathe and bench work. Patterns for moulding, core boxes. Lectures and practice.

Course II. Foundry practice and pattern making.

Freshman II. 162 hours.

Patterns and flasks. Moulding, casting, mixing metals, brass work and core making, Shop practice, recitations and lectures.

Course III. Blacksmithing.

Sophomore I or II. 90 hours.

Use of tools, forging, welding, tool dressing, tempering. Lectures and practice.

Course IV. Machine work.

Sophomore I and II. 270 hours.

Chipping, filing, machine work, gear cutting, finishing; machine construction. Lectures and practice.

Course V. Tool construction.

Junior I. 108 hours.

Tools, taps, reamers, cutters, and other special work. Lectures and practice. Preparation, course IV.

Course VI. Carpentry, joinery and wood carving.

I or II. 144 hours. (Elective.)

A course in wood working designed with special reference to the needs of teachers of manual training.

Course VII. Machine construction.

Senior I or II. 144 hours. (Elective.)

Construction of patterns and machine work for special apparatus, or machinery, designed by the student.

Course VIII. Shop economics.

Senior II. 36 hours. (Elective.)

Shop and factory organization and management; cost systems.

MACHINE DESIGN.

Course IX. Principles of mechanism.

Sophomore II. 54 hours.

The transmission of motion without consideration of the strength of parts. Gear wheels, cams, belts, screws, epicyclic trains, parallel motions, quick-return movements. Lectures and recitations. Preparation: course V in mathematics.

Course X. Kinematics.

Sophomore II. 72 hours.

Graphical diagrams of the paths, speeds and accelerations of important mechanisms; centroids; analysis of mechanisms; construction of cams; kinematic pairs. Preparation: course IX.

- Course XI. Machine design.* Junior I and II. 216 hours.
Calculation and design of such machine parts as fastenings, bearings, rotating pieces, belt and tooth gearing. Recitations, lectures and drawing-room practice. Preparation: course VIII, mathematics; and course I, physics.
- Course XII. Machine design.* Junior II. 72 hours. (Second half semester.)
Application of graphical methods to the design of valve gears and link motions; Zeuner diagrams, indicator cards. Lectures and drawing room practice. Preparation: course I applied mechanics.
- Course XIII. Machine design.* Senior I. 144 hours.
Calculations and working drawings for a high speed automatic steam engine. Theoretical diagrams and determination of details. Preparation: courses XII and XVII.
- Course XIV. Machine design.* Senior II. 144 hours.
Original designing, including machinery for changing size and form. Boiler design, cranes, pumping and transmission machinery and engineering appliances. Lectures, problems and drawing-room practice. Preparation: course XI.
- Course XV. Tool design.* Senior I or II. 72 or 144 hours.
Design of special tools for manufacturing interchangeable parts; jigs and milling fixtures. Preparation: courses V and XI.
- Course XVI. Engineering design.* Senior II. 72 or 144 hours.
Problems, designs and estimates for power plants, central stations and factory equipment. Selection of motive powers, pumps, shafting, piping and accessory plant. Preparation: courses XIV and XXI.

STEAM ENGINEERING AND PRIME MOVERS.

- Course XVII. Steam engine.* Junior II. 36 hours.
Mechanics of the steam engine. Work in the cylinder; effect of reciprocating parts; steam distribution. Mechanism of the steam engine. A study of the details of modern steam engines. Valves and valve gears. A study of the slide valve, link motions and other reversing gear; automatic cut-off gears and the Zeuner diagram. The steam engine indicator. Principles and operation of the instrument, indicator rigging; indicator cards; compounding. Preparation: course I in applied mechanics.
- Course XVIII. Thermodynamics.* Senior I. 54 hours.
The mechanical theory of heat as applied to the steam engine and other motors. Preparation: courses I and II in applied mechanics.
- Course XIX. Thermodynamics.* Senior II. 54 hours.
First half semester: Gas and oil engines, including devices for starting, igniting, and governing; gas producers; the adaptation of oils for generating power.
Second half semester: Refrigerating machinery and ice manufacture; air compressors and motors, and the transmission of power by compressed air. Preparation: course XVIII.
- Course XX. Prime movers.* Senior II. 36 hours.
Theory of turbines, hydraulic motors and wind mills. Preparation: course II in applied mechanics.
- Course XXI. Mechanical engineering.* Senior I. 45 hours.
First half semester: Measurement of power. A study of the methods employed in measuring power. Dynamometers, Prony brakes; measurement of water power; water meters, weir measurements, flow of water in pipes; measurement of electric power, efficiency of motors; power required to drive machine tools and shafting. Recitations. Preparation: course II in applied mechanics.
Second half semester: Steam boilers. Application of theory and practice in the design and construction of steam boilers, chimneys, boiler settings and accessories, smoke prevention, incrustation; methods of operating boilers with safety and economy. Preparation: course I in applied mechanics.

Course XXVII. Mechanical engineering. Senior I. 36 hours.
 Heating and ventilation. Principles of heating and ventilation. Construction and operation of heating apparatus. Steam, hot water, exhaust, vacuum and fan systems. Lectures, recitations and problems.
Journal Club—Open to the seniors and juniors. Once a week.

ENGINEERING LABORATORY.

Course XXVIII. Strength of materials. Junior I. 72 hours.
 Laboratory work investigating the strength and physical qualities of iron, steel, brass, copper, belting, chains, beams, brick, stone and cement.
 Preparation: course I applied mechanics.

Course XXIV. Mechanical laboratory. Junior II. 72 hours.
 Continuation of course XXIII; also exercises in valve setting, indicator practice, calibration of steam gauges, efficiency of screws and hoists.
 Preparation: course XXVII.

Course XXV. Mechanical laboratory. Senior I. 108 hours.
 Hydraulic measurements. Calibration of weirs, nozzles, orifices and meters. Tests of water motors, rams, pulsometers, steam pumps and other hydraulic apparatus. Calibration of dynamometers and other apparatus. Testing lubricating value of oils; calorimetry, tests of injectors, steam-engines and boilers. Preparation: course XXIV.

Course XXVI. Mechanical laboratory. Senior II. 144 hours.
 Tests of gas and hot air engines, locomotive testing, and special work.
 Preparation: course XXV.

Course XXVII. Mechanical laboratory. Senior II. 72 or 144 hours.
 Continuation of course XXVI; flue gas analysis and coal calorimetry; special research work, commercial tests.

Course XXVIII. Mechanical laboratory. Senior II. 72 hours.
 Special modification of courses XXV and XXVI, covering work in hydraulic measurements, steam engine and boiler testing for students in mining and metallurgy.

RAILWAY MECHANICAL ENGINEERING.

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

Course XXIX. Railway technology. Senior I. 72 hours.
 The object of this course is to familiarize the student with the principal details of construction of locomotives, and consists of a systematic course of shop visits carried on in the various railroad shops in the vicinity.

Course XXX. Railway design. Senior II. 144 hours.
 (a) Of link and valve motions. Continuation of course XII with special applications of the Stephenson link.
 (b) Of locomotive and car details.
 (c) Of the locomotive boiler.
 (d) Of assembled parts. Preparation: course XXIX.

Course XXXI. Locomotive construction. Senior II. 36 hours.
 Lectures, reading and recitations on design and construction of locomotives, supplementing course XXX. This treats—
 (a) Of parts not involving the boiler and use of steam; but including the carriage, as frames, springs and equalizing arrangements, running gear, brakes, trucks, lubrication.
 (b) Of locomotive boilers and connected parts. Types, proportions, grates, flues, smoke-box arrangements and stacks. Riveted joints, bracing and staying. Lagging, smoke prevention.
 (c) Of the locomotive engine. Details, heat insulation, cylinder proportions for various types, weight on drivers, special service; crank effort diagrams with inertia of reciprocating parts, cylinder and receiver ratios for compound engines, starting valves for compounds.

Course XXXII. Locomotive road testing. Senior II.

FOR GRADUATES.

Courses are offered in:

Engineering design.
Experimental investigation.
Railway engineering.

ELECTRICAL ENGINEERING.

- Course I. Industrial electricity.* Junior I. 25 hours first half of semester.
Outline of industrial uses of electricity; application of Ohm's law; methods and calculation of wiring. Text book: Shepardson, *Electrical Catechism*. Preparation required: physics, course I.
- Course II. Dynamos and motors.* Junior I. 76 hours.
Theory of electro-magnet and direct current dynamo and motor; methods of regulation, construction and operation of dynamos and motors; methods of testing. Text-book: Thompson, *Dynamo Electric Machinery*. Preparation required: electrical engineering course I; physics, courses I and II (a); differential and integral calculus.
- Course III. Electric laboratory.* Junior II. 102 hours.
Tracing circuits and locating faults; measurements of conductivity and insulation; construction and use of instruments; calibration of instruments; tests of batteries; operation and characteristic curves of dynamos and motors. Preparation required: physics, courses I and II, electrical engineering, courses I and II.
- Course IV. Electrical design.* Junior II. 68 hours.
Problems in designing circuits, electro-magnets and dynamos; complete working drawings and specifications to accompany each design. Text-book: Wiener, *Dynamo Electric Machines*. Preparation required: physics, courses I and II; electrical engineering, courses I and II; machine design, course XI.
- Course V. Electric power.* Senior I. Civil and Mining Engineers. 82 hours.
Elements of theory and practice of electrical measurements, wiring, dynamos, motors and electric lighting. Thirty-six lectures and recitations and forty-eight hours laboratory. Text-book: Shepardson, *Electrical Catechism*. Preparation required: physics, course I.
- Course VI. Alternating currents.* Senior I. II. 102 hours.
Phenomena, measurement and use of alternating currents; theory of line, transformer, generator and motor; types of apparatus. Text-book: Steinmetz, *Alternating Current Phenomena*. Preparation required: electrical engineering, courses I and II.
- Course VII. Electrical engineering. Electric lighting.* Senior I. 17 hours.
Comparison of different sources of light; photometry, physics of the arc; history, design and regulation of arc lamps; adaptation to constant currents, constant potential and A. C. circuits; carbons; history, manufacture and economy of incandescent lamps; distribution of light. Text-book: Bell, *Art of Illumination*. Preparation required: electrical engineering, course II.
- Course VIII. Electrical engineering. Batteries.* Senior I. 17 hours.
General theory of primary and secondary cells; types and methods of construction; commercial applications; operation of battery plants; construction and test of cells by students; test of a commercial plant. Text-book: Lyndon, *Storage Battery Engineering*. Preparation required: electrical engineering, course II.
- Course IX. Electrical engineering. Electric railways.* Senior I. 17 hours.
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. Text-book: Gotshall, *Electric Railway Economics*. Preparation required: electrical engineering, course II.
- Course X. Electrical engineering. Electrical transmission.* Senior II. 17 hours.
Utilization of natural forces; various methods of transmission; theory of electric motor; power distribution with constant current, constant potential and alternating systems; design of line; study of particular plants. Twenty-four lectures. Preparation required: electrical engineering, courses I, II and VI.
- Course XI. Electrical engineering. Central stations.* Senior II. 34 hours.
Preliminary surveys; choice of electrical systems; load diagrams; best units of power; comparison of steam, gas and water power; location, design and erection of station building; boilers, engines, dynamos, stor-

age batteries, switch board and lines; operation and regulation; maintenance of plant; emergencies; examination of stations in Minneapolis and St. Paul. Twenty-four lectures. Preparation required: electrical engineering, courses II and VI; mechanical engineering, courses in thermodynamics and prime movers.

Course XII. *Electrical engineering. Telegraph and telephone.* Senior II. 34 hours.

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. Twenty-four lectures with problems. Preparation required: electrical engineering, courses I and VI.

Course XIII. *Electrical laboratory.* Senior I. 68 or 136 hours.

Photometric and electrical tests of incandescent and arc lamps and regulating devices. Experimental study of alternating currents; regulation and efficiency tests of alternators, transformers, rotaries and motors.

Course XIV. *Electrical design.* Senior I. 68 hours.

Design of a dynamo or other problem as assigned. Preparation required: electrical engineering, courses II and IV.

Course XV. *Electrical design.* Senior II. 102 hours.

Designs, specifications and estimates for an electric light or power plant, or other approved problem. Preparation required: electrical engineering, courses IV and VI.

Course XVI. *Electrical laboratory.* Senior II. 102 hours.

Efficiency tests and special problems.

Course XVII. *Plant operation.* Senior I, II.

Practice in operation and care of boiler, engines, motors, dynamos and circuits of the University lighting plant. One evening a week through one or two half semesters.

Course XVIII. *Electrochemistry.* Senior II. 34 or 68 hours.

Theoretical and experimental study of electrolysis, electrodeposition and electric furnaces.

Course XIX. *Journal reading.* Senior I. 34 hours; II. 34 hours.

Discussion of current electrical periodicals.

Course XX. *Dental electricity.* Senior [Dentists.] 25 hours.

Electrical and magnetic units; electrical instruments and measurements; electro-dental apparatus. Recitations and experimental lectures. Text-books: Shepardson, Electrical Catechism, and Custer, Dental Electricity. For seniors in dentistry.

EQUIPMENT.

As an organization of the University of Minnesota, the college of engineering and of the mechanic arts has the general advantage 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 concerning methods of work and equipment, 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 on sidereal and the other on mean solar time.

Highway engineering. The department has suitable apparatus for conducting the usual tests applied to road materials.

Railroad work. The usual equipment of transits, levels, planimeters, 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 and anemometers.

Structural engineering. The department has a collection of drawings of prominent structures throughout the country; photographs of bridges, buildings and roofs, in this country and abroad.

The cement and concrete laboratory is being rapidly developed and offers excellent facilities for experimental work with cement and its products. In connection with the experimental laboratory work of this department there is a large Olsen testing machine of two hundred thousand pounds capacity, with complete attachments, including automatic and autographic recording apparatus, extension head for full sized columns ten feet long, and transverse beam for bending tests upon twenty foot beams.

Municipal and Sanitary Engineering. A special course has been planned and is now offered to students in civil engineering. Laboratory work is given a prominent place in the curriculum. A collection of drawings and blue-prints of typical structures is being collected.

Topography. For this work the department has plane-tables, telemeter rods, stradia-transits, reduction charts and slide rules, clinometers, pedometers, current-meters, compasses, a relief map, a complete topographic map of the District of Columbia, besides a large collection of topographic sheets presented by the United States coast and geodetic, and geological surveys.

Library. The civil engineering library is located on the main floor of engineering building where are to be found all the more important books relating to this line of work. There are complete sets of the leading technical journals and proceedings, and reports of a large number of state and university engineering societies.

Reading Room. Here are to be found all the leading American periodicals, and some foreign, relating to civil engineering. The files of the most important are bound and are easy of access to the student.

Methods of instruction. It is the aim of the department to secure for its students special training in the preparatory studies which form the basis of all engineering work—such as mathematics, physics, mechanics and drawing—these being the tools for the special engineering which follows.

A thorough course is then given in the theory and practice of the more important professional lines, such as railroad and structural engineering and topography. Considerable time is devoted to hydraulics, municipal engineering, higher surveying and geodesy.

While theory is at all times made prominent it is always accompanied by practice according to the methods followed in actual professional work.

Inspection tours. The professional work of the department is illustrated in a practical manner by frequent visits to the engineering works and plants in the vicinity of Minneapolis and St. Paul.

MECHANICAL ENGINEERING.

The plan of instruction in this course is intended to give the student a thorough training in mathematics and the physical sciences; and in the fundamental principles of engineering.

The work is planned to make him familiar with the various applications of these principles, and with the practical details of machine construction and design.

A new building especially designed to meet the requirements of instruction in the various lines of shop work, has recently been erected and the increased facilities thus afforded for the prosecution of this work are unexcelled.

This building consists of a two-story portion, containing the machine shop on the first floor and the wood shop on the second; beyond the machine shop and at a different level is the forge shop and foundry, both one story in height.

Slow burning mill construction is used throughout. This consists of brick walls and heavy timbers which, in case of fire, burn slowly and are safer than the ordinary iron and timber combination for this class of buildings.

A two-story extension has recently been added in which are located the mechanical engineering lecture and recitation rooms, drawing rooms, library and offices.

In the machine room a three-ton crane will cover a clear span of 12 feet, the entire length of the shop, thus giving ample space for erecting. This crane will also serve some of the larger machine tools.

The foundry has been the subject of especial study and possesses many features of interest and value. In accordance with the best modern practice for light work the floor is of concrete, and the gangways, leading from the cupola and extending lengthwise of the room, are of heavy iron plates set in cement.

A light traveling crane is also provided for the foundry. This has a span of 18 feet, and runs the entire length of the room.

The lighting, heating and ventilation of the building has received careful consideration. In the machine and pattern shops 60 per cent of the wall space above the benches is in glass. In the foundry and forge shop less light is allowed, since an abundant supply of overhead light is obtained from windows placed in the lantern or ventilator which extends over the roof. Pipe coils are employed in heating the building, and these are placed partly on the side walls under the windows and partly overhead. Electric power is used for driving the machinery. The group system has been selected as best adapted to the conditions, and a number of small motors are placed in the several departments; 220-volt continuous current motors are employed in connection with a three-wire system of distribution, which is also used in the lighting circuit.

The machine shop contains representatives of the ordinary machine tools, gauges, and small tools usually found in a well-equipped modern 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 fan, a one hundred pound drop hammer, and the necessary small tools used in blacksmithing.

The foundry contains a thirty-inch Whiting cupola, and two brass furnaces, which embody some novel features. There are two core ovens; one for ordinary work $3\frac{1}{2} \times 3\frac{1}{2} \times 5$ feet, and one $3\frac{1}{2} \times 7 \times 6$ feet for special cores which may be required. The

feature of these core ovens is that the gases and products of combustion are caused to traverse suitable conduits under a plate floor and do not come into direct contact with the cores. The usual moulding tools, ladles, crucibles, and all of the tools and material needed in moulding and casting iron, brass or white metal, are provided.

The shop work is intended, not so much to give the student skill in the manual operations of the respective crafts, as a knowledge of the methods and processes of practical construction.

The mechanical laboratory, in which the experimental research of the department is conducted, has been considerably enlarged and its equipment greatly increased. Two testing machines of 50,000 pounds and 100,000 pounds capacity, and three transverse testing machines are provided for determining the strength, ductility, resilience and other characteristics of the various materials used in engineering work under tensile, compressive, transverse and torsional stress. Several forms of absorption and transmission dynamometers are available for determining the power generated by engines or other motors, or absorbed by shafting or machinery; a Carpenter coal calorimeter for determining the heat value of coal, and apparatus for the analysis of flue gases.

The laboratory is also provided with two machines for determining the lubricating qualities of oils and the relative values of metals used for journals and bearings; a mercury column and a Crosby direct pressure-gauge tester, for use in calibrating gauges and other pressure indicators. Besides the boilers in the university heating plant, there are in the laboratory, a 35 horse-power boiler and a high pressure boiler capable of carrying a working pressure of 300 pounds, with the necessary gauges, calorimeters, tanks and pyrometer, for making complete duty trials; several automatic steam engines equipped with condensers, indicators, brakes, scales and thermometers, which are employed to determine the efficiency in the use of steam under various conditions assumed or found in actual practice, and for valve setting and indicator work.

The operation and economy of other heat engines are illustrated by an Otto gas engine of five horse-power, a White gasoline engine of eight horse-power, a Rider two-cylinder and an Ericsson single cylinder hot air engine, a pulsimeter, and several steam pumps. The equipment also contains a Pelton and

a Tuerk water motor, a water ram, injectors, weirs, nozzles, meters and other pieces of apparatus and instruments which an engineer is called upon to use in the course of his professional work.

The new engineering power plant is admirably equipped with other steam apparatus which constitutes a valuable part of the laboratory equipment.

The boiler plant contains a 130-h.p. Cahall (B. & W. type) water tube boiler designed to carry a working pressure of 250 pounds; a 60x16 foot multitubular boiler which carries 175 pounds pressure; a Sorge-Cochrane purifier of 300-h.p. capacity; and a 72-inch Sturtevant fan and direct-connected engine, to be used for experiments with mechanical draft.

In the engine room there is an Allfree automatic expansion 75-h.p. engine, connected by belting to a jack shaft equipped with roller bearings. A 150-h.p. cross-compound Corliss engine especially designed for the mechanical engineering department is now being constructed and will be installed at an early date.

This engine will be provided with a condenser and is arranged so that it may be run simple or compound, condensing or non-condensing, as desired. It will constitute a valuable part of the equipment of the experimental laboratory.

A constantly increasing quantity of commercial testing is being done in connection with the regular work of the course, which brings the student into actual contact with the engineering world and affords him valuable experience and data for his future work.

The library of the department contains a collection of historic and recent works, the best standard books being purchased as soon as issued. There are a number of complete files of the transactions of engineering societies and of the leading technical publications. The reading room is amply supplied with both the general mechanical and railway press.

Railway mechanical engineering. Courses have been arranged for students wishing to specialize in this subject. The various courses may be elected separately, subject to the requirements for previous preparation, to fill out the electives, or options in the regular senior year of any department.

Students planning to elect these courses are encouraged to work, under special arrangements, in railway shops during the summer vacations. This has proved its value as preparatory to

the special work of the senior year. In every possible way the methods of the department are intended to place the students in touch with the best railway work; keeping always in sight the limitations which railway experience has found financially and practically to exist.

The location of the University is particularly favorable, being between the cities of St. Paul and Minneapolis in proximity to the shops, yards and headquarters of the extensive railway systems of the Northwest, which offer exceptional facilities for the prosecution of this work. The Northwest Railway Club, meeting monthly for papers and discussions, is open for the attendance of students, while several are enrolled as members.

Visits of inspection. During the year numerous visits are made to the manufacturing plants of Saint Paul and Minneapolis, which have proven to be of great value in supplementing the class room work.

ELECTRICAL ENGINEERING.

The new electrical building provides permanent quarters for the electrical departments. One portion of the building, 92 feet long and 50 feet wide, contains the University electric light and power plant. The main portion of the building, which is 80 feet long and 60 feet wide with two stories and basement, is devoted to the work of the electrical engineering department of instruction. In the basement are the electrochemical laboratory, battery room, toilet and stock rooms. On the first floor are the dynamo laboratory, high tension laboratory, standardizing laboratory, office, instrument room and shop. On the second floor are laboratories for photometry, photography, meter and lamp testing and rooms for recitations, draughting, library and office.

The laboratory equipment includes about forty dynamo electric machines of various types and sizes for direct and alternating currents, such as constant current and constant potential direct current generators and motors, single phase and polyphase alternators, commutating, induction and synchronous motors and rotary converters, each furnished with suitable regulating devices. A number of these machines have been equipped with special devices for experimental purposes. Lamps, rheostats, batteries, fans and brakes afford convenient and ample means for taking up the energy of dynamos and motors. To facilitate testing, there are a number of pairs of

similar machines. A three-ton traveling crane facilitates handling the machines. Power is obtainable from a main shaft driven by the engines of the lighting plant, or by motors connected with the University power circuits, with a storage battery or with the circuits of The Minneapolis General Electric Company, which supplies direct current at 500 volts and alternating current at 2,250 volts. An excellent assortment of instruments of well-known American and foreign makers is available for laboratory use. A well equipped standardizing laboratory furnished with certified standards of current, electromotive force and resistance, allows the frequent checking of instruments, so that students may work to any desired degree of refinement. The meter and lamp testing laboratories are furnished with a wide variety of arc and incandescent lamps and meters with all necessary standards and other accessories. The electro-chemical laboratory provides facilities for the construction and testing of various cells, for electroplating and other electrolytic processes and for the formation and study of electric furnace products. Alternators, rotary converters, transformers, lamps, motors, condensers, special apparatus and suitable instruments afford facilities for the experimental study of alternating currents.

The department library contains an excellent collection of electrical and allied works, including a full set of United States Patent Office Gazettes. New books and trade publications are being added continually. Files of twenty-two 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 electrical engineering and allied interests. A journal club meets weekly for the discussion of current literature in mechanical and electrical engineering, keeping the students in touch with current progress and best modern practice and teaching them the value of the technical press.

There is a growing collection of samples furnished by various manufacturers and dealers, a great help in exhibiting best modern practice and in teaching young engineers to appreciate the merits of different products. A collection of samples from repair shops and elsewhere is of special value in illustrat-

ing the treatment received by apparatus in commercial use and the necessity of careful design and construction. Free access is given to the private libraries and collections of the professors.

Instruction. The course aims to give the students a knowledge of phenomena and principles and the various applications of electricity, the methods and instruments used in measuring and transforming it, and practice in the design and operation of electrical apparatus. Practice and theory are taken together as far as possible. During the junior and senior years students have daily work with electrical instruments and apparatus and with commercial problems. Occasional inspection tours among the extensive and varied electrical interests in Minneapolis and St. Paul furnish excellent illustration. The University electric light and power plant, which is in the same building, affords opportunity to observe commercial conditions at close range.

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 and 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.

The regular instructing force is supplemented by competent non-resident lecturers. The regular monthly meetings of the Minnesota members of the American Institute of Electrical Engineers are held in the Electrical Building at the University, and are open to the advanced students in electrical engineering.

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 students with actual practice. In putting up new lines and in setting up apparatus, the students are required to work in accordance with standard practice. Each student is given a certain amount of practice in the construction of electrical apparatus.

Design. The electrical engineers have drawing and design in common with the mechanical engineers in the first three years. A large number of numerical problems are given during the course. During the junior and senior years, electromagnets and mechanisms, dynamos and motors, lines, switches, switchboards and plants are designed. Complete working drawings and specifications for some special problems are elaborated. A file of nearly 600 blueprints and drawings in the department library in addition to those in other departments is available to the students.

LIBRARIES AND READING ROOMS.

The reference libraries of the several departments are well supplied with technical literature. In the engineering building is a library consisting chiefly of books devoted to civil and mechanical engineering, comprising over one thousand volumes; the library of the department of engineering and mechanics numbers eighteen hundred volumes of choice mathematical and scientific works; the departments of electrical engineering and physics together have an excellent collection of standard works which numbers over fourteen hundred volumes; the chemistry library contains over five hundred technical works; a choice collection of between one and two hundred volumes relating to drawing, art and design. The above number, upwards of four thousand volumes, comprising many works which are the private property of professors, yet accessible to the students.

In addition to the above are the libraries of the University, the City of Minneapolis, the City of St. Paul and others, containing many works of value to the engineering. Standard works bearing on special subjects are secured as they appear and the more important scientific and technical periodicals are secured and placed in the reading rooms maintained in connection with the several departments of the college.

Journal clubs are organized, in most of the departments, for the discussion of current technical literature, relating to the

best modern practice. Thus students are kept in touch with the developments along engineering lines and are taught how to use the technical press.

In addition to the foregoing the college has many periodicals donated by the societies publishing them, and others loaned by members of the faculty, who at all times place their periodical list and entire professional libraries at the disposition of the students.

THE SOCIETY OF ENGINEERS.

This society is an organization holding regular meetings for the purpose of discussing topics of current interest, hearing reports and lectures from members of the faculty and others. During the past year the special lecturers of the college have delivered their lectures under the auspices of this society. A Yearbook of the society is published, which presents the progress of the original work done both by instructors and students.

THE BRIGGS PRIZE.

For the encouragement of studies in foundry practice, Mr. O. P. Briggs, President of the Twin City Iron Works, offers \$75 annually in two prizes which are to be accompanied by gold medals.

The competition is open to sophomores in the college of engineering, and the prize will be awarded for the best essay relative to the above subject. Essays should contain about 3,000 words, and must be submitted to the professor of rhetoric on or before May first.

THESES.

Theses. Every member of the senior class in this college is required to prepare a thesis on some subject particularly relating to his course. The thesis must embody the results of original research made by the student himself and be creditable from a literary as well as from a technical point of view.

Theses are to be written in a clear hand, or typewritten and the paper used to be of the standard size and quality adopted by the University; all charts, maps, drawings or other illustrative matter are to be presented on tracing cloth or bond paper, and the whole shall be suitably bound and a copy deposited in the library of the University. The subject of the thesis is required to be reported to the head of the department in which the student is a candidate for a degree, and the work of preparation must be formally begun early in the senior year. During the second semester the student is expected to devote at least ten hours a week to the preparation of his thesis.

The subject of the thesis and character of the work to be done upon it will be suggested in a large measure by the course of study pursued by the student. 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 second semester.

COURSE IN SCIENCE AND TECHNOLOGY.

It is very desirable that engineering students taking one of the courses leading to the professional degree, civil engineer, mechanical engineer, or electrical engineer, should have a more liberal education than can now be obtained in the regular four years' course. This has led to the establishment of a five years' course in science and technology in which a student in the college of engineering may obtain more English and general culture studies, as well as more extended work in the technical sciences, than has been offered heretofore. This course does not diminish in any way the regular courses in engineering—the work is merely distributed over a more extended period. Every subject now included in any one of the regular engineering courses is also included in the corresponding five years' course, and in addition to these there is the equivalent of one year's work in more general subjects.

At the end of the fourth year the degree, bachelor of science in engineering, is conferred. The professional degree, civil engineer, mechanical engineer, or electrical engineer, is granted upon the completion of the fifth year, provided the choice of electives throughout the course has satisfied the requirements of the proposed engineering degree.

FRESHMAN YEAR.

Engineering mathematics [5]
 English [4]
 French or German [4]
 Chemistry or history [4]
 Military drill [2]

SOPHOMORE YEAR.

Engineering mathematics [5]
 History, chemistry, French, German or English [4]
 Physics [4]
 Engineering drawing [4]
 Rhetoric [1]
 Military drill [2]

JUNIOR YEAR.

FIRST SEMESTER.
 Mechanics [5]
 Physics [4]
 Engineering drawing [4]
 Technical work [2]
 Elective [4]

SECOND SEMESTER.
 Mechanics [5]
 Physics [3]
 Engineering drawing [2]
 Technical work [5]
 Elective [4]

SENIOR YEAR.

Technical work [4]
 Technical work [4]
 Elective [4]
 Elective [4]
 Elective [4]

Technical work [5]
 Technical work [3]
 Elective [4]
 Elective [4]
 Elective [4]

POST SENIOR YEAR.

The work of the post senior year is entirely elective and consists of twenty exercises or recitations per week, selected from the following list. The only limitation imposed is that subjects cannot be chosen unless the work leading up to and preparing for such subjects has been completed.

The following electives are offered:

In science:—Chemistry, physics, geology, mineralogy, astronomy and mathematics.

In technology:—Shop practice, engineering laboratory, drawing, design, specifications, measurement and transmission of power, steam boilers, railway engineering, shop economics, water supply engineering, sanitary and municipal engineering, bridge engineering, surveying, alternating currents, telephony and telegraphy, electric light, plant operation, central stations.

In literature and the arts:—English, French, German, history, political science and logic.

The subjects required for the completion of the five years' course will depend upon the particular professional degree desired. Thus for the course in science and technology leading to the degree bachelor of science at the end of four years, and the professional degree at the end of the fifth year, the electives would be selected as follows:

FRESHMAN YEAR.

Mathematics [5]
 English [4]
 French or German [4]
 Chemistry or history [4]
 Military drill [2]

SOPHOMORE YEAR.

Mathematics [5]
 History or chemistry [4] (one year of chemistry is required)
 Physics [4]
 Engineering drawing [4]
 Rhetoric [1]
 Military drill [2]

COURSES IN SCIENCE AND TECHNOLOGY.

JUNIOR YEAR, FIRST SEMESTER.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING
Mechanics, 5.	Mechanics, 5.	Mechanics, 5.
Physics, 4.	Physics, 4.	Physics, 4.
Engineering drawing, 4.	Engineering drawing, 4.	Engineering drawing, 4.
Technological chemistry, 2.	Technological chemistry, 2.	Technological chemistry, 2.
Topographical, 5.	Shop practice, 4.	Shop practice, 4.
	Industrial electricity, 3.	Industrial electricity, 3.
	Industrial electricity, 1.	
	or Stresses, 2.	

SECOND SEMESTER.

Mechanics, 5.	Mechanics, 5.	Mechanics, 5.
Physics, 3.	Physics, 3.	Physics, 3.
Engineering drawing, 2.	Engineering drawing, 4.	Engineering drawing, 4.
Topography, 5.	Dynamos and motors, 3.	Dynamos and motors, 3.
Highways, 2.	Electric laboratory, 3.	Electrical laboratory, 3.
Practical astronomy, 2.	Mechanism, 2.	Mechanism, 2.

SENIOR YEAR, FIRST SEMESTER.

Water supply, 2.	Thermodynamics, 3.	Thermodynamics, 3.
Curves and earthworks, 2.	Prime movers, 2.	Prime movers, 2.
Machine design, 2.	Machine design, 4.	Machine design, 4.
Stresses, 3.	Mechanical laboratory, 2.	Mechanical laboratory, 2.
Least squares, 2.	Shop practice, 10.	Shop practice, 10.
Mechanical laboratory, 2.		
Electric power, 3.		

SECOND SEMESTER.

Stresses, 3.	Steam engines, 2.	Steam engines, 2.
Structural details, 3.	Mechanical laboratory, 2.	Mechanical laboratory, 2.
Railway work, 3.	Machine design, 4.	Machine design, 2.
Sanitary engineering, 3.	Thermodynamics, 3.	Electrical design, 2.
Geology, 3.	Shop practice, 10.	Elective, 4.
Elective, 4.		Shop practice, 10.

POST SENIOR YEAR, FIRST SEMESTER.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Masonry, 3.	Machine or railway design, 4.	Alternating currents, 3.
Structural design, 5.	Mechanical engineering, 2.	Electrical engineering, 4.
Experimental laboratory, 2.	Mechanical laboratory, 2.	Electrical laboratory, 2.
Railway economics, 2.	Political science, 2.	Mechanical laboratory, 2.
Political science, 2.	Elective, 8.	Political science, 2.
Elective, 6.	Thesis.	Elective, 6.
		Thesis.

SECOND SEMESTER.

Structural design, 5.	Contracts and specifications, 2.
Arches, 2.	Machine or railway design, 4.
Geodesy, 3.	Mechanical laboratory, 4.
Political science, 2.	Political science, 2.
Elective, 2.	Elective, 4.
Contracts and specifications, 2.	Thesis, 4.
Thesis, 4.	
Contracts and specifications, 2.	
Electrical design, 3.	
Electrical laboratory, 2.	
Electrical engineering, 4.	
Political science, 2.	
Elective, 2.	
Thesis, 4.	

As the strictly professional courses offer little opportunity for specialization in the physical and technical sciences, and the liberal culture studies are necessarily very limited in such

courses, the general course in science and technology affords an opportunity for more extended work in physics, chemistry and other sciences, together with additional studies in English, history, political science and similar subjects.

While the choice of electives in the general course in science and technology is very liberal there is necessarily less freedom in the selection of subjects in those courses which lead to the engineering degrees.

For the first two years no electives are offered and the work is common to the general and the five years' professional courses.

While the student is allowed to make his own selection of electives in the general course, subject to known requirements, the following is suggested as a representative non-professional technical course leading to the degree, bachelor of science in engineering, at the end of four years:

A FOUR YEARS' GENERAL COURSE IN SCIENCE AND TECHNOLOGY.

FRESHMAN YEAR.

Mathematics [5]
 English [4]
 French or German [4]
 Chemistry or history [4]
 Military drill [2]

SOPHOMORE YEAR.

Mathematics [5]
 History, chemistry or language [4]
 Physics [4]
 Engineering drawing [4]
 Rhetoric [1]
 Military drill [2]

JUNIOR YEAR.

FIRST SEMESTER.

Mechanics [5]
 Physics [4]
 Engineering drawing [4]
 Technological chemistry [2]

Chemistry [4]

SECOND SEMESTER.

Mechanics [5]
 Physics [3]
 Engineering drawing [4]
 Mechanism [3]
 or surveying [3]
Chemistry [4]
 Mechanical laboratory [2]

SENIOR YEAR.

{ Thermodynamics [3]
 } or mineralogy [4]
 Industrial electricity [3]
 or electric power [3]
Physics [4]
 Political science [4]
 Elective [4]

{ Dynamos and motors [3]
 } Thermodynamics [3]
 } or geology [4]
 { Steam engine [2]
 } or highways [2]
Physics [4]
 Political science [4]
 Elective [4]

The required subjects are printed in Roman type; the electives, printed in italics, may be replaced by others selected from the general list.

BOTANY AND PLANT PRODUCTS.

Course I. Timbers and timber diseases.

PROFESSOR MACMILLAN AND ASST. PROFESSOR FREEMAN.

Nature, origin, structure and mechanics of timber. The important timber trees of the northern United States. Classification and description of timber. Timber production and timber manufacture. Timber diseases, their nature and prevention.

Elective. First semester. Two hours per week.

Course II. Plant Products,

PROFESSOR MACMILLAN.

This course will give a summary of the nature, production, manufacture, distribution and use of the principal plant products which are of economic and commercial importance. In general the classification of Wiesner will be followed and the material will be grouped under the captions of gums, resins, rubbers, opium, indigo, fats, oils, wax, camphor, starch, sugar, yeast, kelp, lichens, galls and ink, barks, fibres, woods, subterranean structures, leaves, flowers and inflorescences, seeds, fruits.

Elective. Second semester. Two hours per week.

THE
SCHOOL OF MINES

The School of Mines

OFFICERS

CYRUS NORTHROP, LL. D., *President*

OFFICERS OF THE DEPARTMENTS OF MINING AND METALLURGY

WILLIAM R. APPLEBY, M. A., *Dean and Professor of Metallurgy*
CHARLES E. VAN BARNEVELD, B. A., Sc., E. M., *Professor of Mining Engineering*
PETER CHRISTIANSON, B. S., E. M., *Instructor in Metallurgy*
BENJAMIN F. GROAT, B. S., *Assistant Professor of Mathematics and Mechanics*
EDWARD P. McCARTY, E. M., *Instructor in Mining*
LEVI B. PEASE, M. S., *Instructor in Assaying*

OFFICERS OF THE DEPARTMENT OF GEOLOGY AND MINERALOGY

CHRISTOPHER W. HALL, M. A., *Professor of Mineralogy and Geology*
ARTHUR L. PARSONS, B. A., *Instructor in Mineralogy*

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CHARLES F. SIDENER, B. S., *Assistant Professor of Chemistry*
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GEORGE D. SHEPARDSON, M. A., M. E., *Professor of Electrical Engineering*
FRANK W. SPRINGER, E. E., *Assistant Professor of Electrical Engineering*

OFFICERS OF THE DEPARTMENT OF MECHANICAL ENGINEERING

JOHN J. FLATHER, Ph. B., M. E., *Professor of Mechanical Engineering*
WILLIAM H. KAVANAUGH, M. E., *Assistant Professor of Mechanical Engineering*

OFFICERS OF OTHER DEPARTMENTS GIVING INSTRUCTION

FREDERICK S. JONES, M. A., *Professor of Physics*
WILLIAM H. KIRCHNER, B. S., *Assistant Professor of Drawing*
JOHN ZELENY, B. S., B. A. Res., *Associate Professor of Physics*

ADMISSION

Examinations for admission will be held at the beginning of the year. See calendar and program of examinations.

No student will be registered for first semester's work after September 19th, 1904, and second semester's work after February 6th, 1905.

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

GENERAL REGULATIONS GOVERNING ADMISSION

- I. Students will be admitted to the freshman class on **passing the regular entrance examinations.**
- II. No student will be admitted if **conditioned in more than three half-year subjects**, or their equivalent.
- III. Graduates of any Minnesota State high school will be admitted **without examination, provided—**
 - (1) That the school maintain a **full four-year course** of high school work.
 - (2) That the applicant present to the registrar the principal's certificate showing the satisfactory completion of **all the studies required for admission** to the desired University course.
- IV. Graduates of Minnesota State high schools who are deficient in **not more than three half-year subjects** or their equivalent, **may be excused** from entrance examinations in such subjects as the enrollment committee may decide; such candidates should present themselves to that committee **not later than Tuesday of examination week.**
- V. Graduates of Minnesota State high schools whose principal's certificate shows them to be deficient in **more than three half-year subjects** or their equivalent, even though they have made such additional preparation as they deem necessary, must take, nevertheless, the regular entrance examination in all subjects, as provided in sections I and II unless excused by vote of the faculty; and persons wishing to present reasons for such excuse **should report to the enrollment committee not later than Tuesday of examination week.**
- VI. Graduates of the **advanced courses of Minnesota normal schools** will be admitted upon the same terms as graduates of State high schools.
- VII. Any Minnesota high school or academy **not under supervision of the State High School Board**, but requiring for graduation a **four-year's course**, exclusive of the common school branches, conforming **essentially in distribution of time** to the entrance requirements of at least one of the University courses, will, upon application, be inspected by a committee, and, after favor-

able recommendation, may be accredited by the faculty in all respects as are the state high schools, provided—

(1) That the school be open to inspection at any time by the University;

(2) That it take such supplementary examinations as may be prescribed from time to time.

VIII. Graduates from schools in other states, whose diplomas admit to **reputable colleges** in the state in which the school is located, will be received subject to the regulations that apply to graduates of Minnesota State high schools.

IX. Applicants from schools not coming within any of the above classes must take the regular entrance examinations or present State High School Board certificates.

On and after August 30, 1904, every person admitted to the University shall be examined in reading, writing, spelling and composing the English language, and all who fail to obtain a grade of seventy-five per cent. shall be required to pursue a course of instruction to be provided, and no person shall ever receive any diploma or other certificate of merit or proficiency until he shall have passed such examination and obtained the specified credit.

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

The enrollment committee will meet every day during the week commencing Sept. 1st, in School of Mines Building at 9 o'clock a. m.

REQUIREMENTS FOR ADMISSION TO THE FRESHMAN CLASS

N. B.—Time element, as indicated with each subject, is essential

A three years' course of reading in English classics

English Composition, one year

Algebra, elementary, one year

Algebra, higher, one-half year

Geometry, plane, one year

Geometry, solid, one-half year

In addition to the above named required subjects, for which no substitutes will be accepted, the student shall present

evidence of having completed work in any of the following subjects, entitling him to eight year-credits.

Astronomy

Botany

Chemistry

Drawing

English

Latin element

Literature

French

Grammar

Literature

Geology

Greek

Grammar

Anabasis

German

Grammar

Literature

History

Greece and Rome

England

Modern

Medieval

Senior American

Latin

Grammar

Cæsar

Cicero

Vergil

Physics

Physiography

Political Economy

Shopwork

Zoology

SYLLABUS

The following statements indicate, in a general way, the ground expected to be covered in the study of the various subjects accepted for admission.

English Classics (three years averaging not less than three hours per week)

In order to secure a definite plan of study and unity of method on the part of preparatory schools, the requirements in English are outlined below somewhat in detail. Where texts are mentioned, they are merely suggestive and not arbitrary. Equivalents will be accepted in lieu of any of the texts mentioned.

English Classics—(a)

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

Shakespeare, "Macbeth;" Milton, "Paradise Lost," books I and II; Burke, "Conciliation with America;" Carlyle's essay on "Burns."

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

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

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

English Classics—(b)

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

At least two of Shakespeare's plays, besides the one studied critically.

One of Irving's works.

One of Hawthorne's novels.

Stevenson's "The Black Arrow."

One of Webster's orations.

English Composition and Rhetoric (one year)

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

A full year of work in the high school, five hours per week, should be devoted to this subject

Elementary Algebra (one year)

Addition, subtraction, multiplication, division, factoring, highest common divisor, lowest common multiple, fractions, simple equations (with one, two, and several unknown quantities), followed by problems, theory of exponents, involution (including the binomial theorem for positive integral exponents), evolution, radicals, inequalities, ratio, proportion, progression, and quadratic equations with problems.

Higher Algebra, First Part (one-half year)

While this subject does not include any topics not named under elementary algebra, a much fuller treatment of those topics is expected in this work. Principles as well as processes should be learned, theorems and rules should be rigorously demonstrated, the exercises and problems should be more difficult, and students should be drilled in short methods and rapid work. Unless candidates have a good knowledge of the fundamental topics named below, they are not prepared to pursue successfully at the University the second part of higher algebra.

The topics are addition, subtraction, multiplication, division, factoring, highest common divisor, lowest common multiple, fractions, theory of exponents, involution, evolution, surds, imaginaries, and simple equations with problems.

Plane Geometry (one year)

Any of the standard texts on this subject will furnish the necessary preparation. Isoperimetry, symmetry, and maxima and minima of figures are not required. The exercises requiring solutions and demonstrations should not be omitted.

Solid Geometry (one-half year)

Any of the standard texts on this subject will furnish the necessary preparation. The exercises requiring solutions and demonstrations should not be omitted.

Advanced Standing—The University accepts records from all reputable colleges for credit to advanced standing. Such records are accepted as far as they are equivalent to the work done in the University.

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

DAILY ROUTINE

The morning session begins at 8:30 o'clock; a general assembly of the faculty and students is held each day at 10:25 o'clock, at which there are brief and simple religious exercises.

EXAMINATIONS

Students failing to receive a yearly average of 75 per cent on any subject shall have the privilege of a supplementary examination before the opening of the following year provided their general average for the year is 60 per cent.

The faculty will exclude students from attending classes in any subject upon recommendation of the department concerned.

Students failing to pass supplementary examinations must register the next year for those subjects in which they have failed. They may take in addition certain electives in other colleges, provided such subjects do not appear in the curriculum of the school of mines, and provided suitable arrangements can be made. No advanced work in the school of mines will be allowed such students.

Each student must obtain from the Registrar his yearly average in all subjects and present himself for supplementary examinations according to the following program:

Tuesday, August 30—

8:00-10:30. Mathematics

1:00- 5:00. Mining Engineering subjects

Wednesday, August 31—

8:00-10:30. Chemistry

10:45- 1:15. Drawing

2:30- 5:00. Drawing subjects

Thursday, September 1—

- 8:00-12:00. Metallurgical subjects
- 10:45- 1:15. Mechanical Engineering subjects
- 2:30- 5:00. Physics

Friday, September 2—

- 8:00-12:00. Electrical Engineering subjects
- 2:30- 5:00. Geology and Mineralogy

All students must report in time to make suitable arrangements with departments concerned in case of conflicts in program.

No other supplementary examinations will be given. Students failing to report for supplementary examinations will be compelled to take work over in class as in case of failures.

Students failing to present themselves for final examination at the end of first or second semester will be given zero on the examinations.

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

UNCLASSED STUDENTS

No unclassified students will be admitted to the School of Mines.

GRADUATION

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

Special Statements

In the School of Mines there are two regular courses of study, viz.: Mining Engineering and Metallurgy; leading to the degree of Engineer of Mines (E. M.), and Metallurgical Engineer (Met. E.) respectively.

The degree of Met. E. may be conferred upon a candidate holding the degree of E. M., and vice versa, provided such a candidate complete an additional year's work at the school and present a suitable thesis.

All theses must be completed not later than April 1st. The accepted thesis must be bound according to the adopted style and deposited with the department offering the degree desired.

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 the standing to which their credentials or the examinations taken under the direction of the faculty of this school may entitle them.

Students in the college of science, literature and the arts, in the college of engineering and mechanic arts, and school of technical and applied chemistry, who contemplate taking a degree in this school after completing their course, are recommended to select their electives with reference to as full a preparation as possible for the technical work of the course they purpose to enter.

FEEES

A registration fee of fifteen dollars is required at the beginning of each semester from residents of the state, and thirty dollars from non-residents.

The various laboratory fees are as follows:

Chemical laboratory	Per semester	\$5.00
Mineralogical laboratory	"	3.00
Assaying laboratory	"	15.00
Physical laboratory	"	3.00
Mechanical laboratory	"	6.00
Electrical laboratory	"	5.00
Ore testing laboratory	"	10.00

The trip to the mines made by the junior class costs the student from one hundred to one hundred and twenty-five dollars.

Books cost about as follows:

Freshman year	\$12.00 to	\$15.00
Sophomore year	5.00 to	8.00
Junior year	18.00 to	25.00
Senior year	10.00 to	30.00

A number of books are recommended to the student, but the purchase of them is optional. The lower estimates given will cover the cost of books that must be purchased.

Each member of the freshman class must be provided with a set of draughting instruments. The necessary instruments will cost about eight dollars.

SUMMARY OF EXPENSES

FRESHMAN YEAR

Incidental fee	\$30.00
Chemical laboratory fee	10.00
Mineralogical laboratory fee	6.00
Assaying laboratory fee	15.00
Books	13.00
Draughting instruments	15.00
Note book and supplies.....	6.00
	<hr/>
	\$95.00

SOPHOMORE YEAR

Incidental fee	\$30.00
Chemical laboratory fee	10.00
Physical laboratory fee	6.00
Books	7.00
Note books and supplies	2.00
	<hr/>
	\$55.00

JUNIOR YEAR

Incidental fee	\$30.00
Trip to the mines.....	\$100.00 to 150.00
Books	20.00
Note books and supplies.....	2.00
	<hr/>

\$152 to \$202.00

SENIOR YEAR

Incidental fee	\$30.00
Chemical laboratory fee	10.00
Electrical laboratory fee	5.00
Ore testing laboratory fee.....	10.00
Mechanical laboratory fee	6.00
Books	20.00
Note book and supplies	2.00
	\$83.00

For non-residents the incidental fee is \$60 per year.

Good board can be obtained at a cost varying from \$2.50 to \$4.00 per week. Room rent varies from \$5.00 to \$10.00 per month. With two occupying one room, the rent per student would be considerably lower.

ORGANIZATION

The organization of the School of Mines dates back to 1889, when the general faculty of the University recommended to the Board of Regents its establishment. In 1891 the Legislature of the State of Minnesota voted an appropriation for establishing and equipping the school. Two annual appropriations have since been made for its support. The legislature of 1901 appropriated \$47,500 for a new School of Mines Building. In 1903 the legislature appropriated \$25,000 for completing and equipping the School of Mines Building.

SCHOOL OF MINES BUILDING

The School of Mines Building is now completed and equipped. The building is designed to accommodate only the technical work of the School of Mines, as adequate building accommodations have already been furnished for Chemistry, Geology, Mineralogy, Drawing and Mechanical and Electrical Engineering. The new building is 150 feet long by 65 feet wide. It is a brick building, three stories high. The lower floor is occupied by the Assaying and Metallurgical Laboratories; the second floor contains offices, two large lecture rooms, departmental library, and a museum; the third floor provides two quiz rooms, a large well lighted draughting room, thesis room and a dark room and a blue print room. This building makes possible the development of the work already begun and offers facilities for more extended work along technical lines.

LOCATION

The University of Minnesota is located in the city of Minneapolis, on the east bank of the Mississippi river. The School of Mines has its buildings and laboratories on the same ground. Students of the School of Mines have, therefore, all the opportunities afforded by a large university.

Minneapolis is surrounded by and is in direct communication with several important mining and smelting districts. As the city is a railroad center, transportation at special rates is readily obtained.

FIELD WORK

Field work is conducted at the iron mines in the northern part of this state, in the copper and iron regions of Michigan, in the mines and smelters of Montana, Colorado, Utah and California, and in the coal mines of Pennsylvania.

At least one of these districts will be visited by each class, affording splendid opportunities for study and observation.

The field work in Mining and Metallurgy consists of one trip at the close of Junior year. Not less than three weeks and not more than four weeks shall be devoted to actual work, exclusive of traveling.

Students must deposit with *Accountant*, at least *two weeks* before time set for the departure of class, a sum sufficient to cover following expense items:

- 1st. All transportation
- 2nd. Sleeping car fare
- 3rd. Board and lodging
- 4th. Necessary mine supplies

Incidental expenses are not included in the above items and must be met individually.

A statement of expenditures will be rendered at the close of the work and any balance existing will be refunded.

The amount of deposit required will vary, according to the locality visited, from \$100.00 to \$150.00, and will be announced each year when arrangements for trip are completed.

THE ELLIOT SCHOLARSHIP LOAN FUND

To fulfill the wish of the late Dr. A. F. Elliot to aid young men who find their efforts to obtain a practical education embarrassed through lack of means, the income of \$5,000, amounting to \$250 per year, is placed in the hands of the Board of

Regents to be used as a scholarship loan fund for assisting young men in the school of mines.

The conditions of granting the scholarship loans are: The financial needs of the applicant, his scholarship, moral character, enthusiasm shown in his work and promise of usefulness in his profession. When money is available it may be loaned to pay expenses of worthy students during sickness. The loans are to be repaid, without interest, at the earliest convenience of the recipients.

LIBRARY

The library consists of about twelve 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 leading periodicals are accessible to all. Constant references in lectures compel the student to keep himself well informed as to the latest methods, machinery and changes in practice going on in his special line of work.

In addition to the above, many thousand volumes on chemistry, mineralogy and geology complete a most valuable working and reference library. A card index is kept of all articles of value and interest appearing in the leading periodicals.

PHOTOGRAPHY

Photographs of surface and underground appliances, metallurgical plants, copies of drawings and other photographs are indispensable to the study of mining and metallurgy. With the report of his field work every student is expected to present photographs, as well as sketches, of various objects under consideration. There is also a very complete set of lantern slides illustrating the principal methods of underground workings and metallurgical plants, at home and abroad. Several hundred slides have been made in the department's laboratory which bear directly on the work done in Minnesota and the neighboring northwest. Many valuable photographs are constantly being made. Blue prints of these are given students as illustrations. Much time is thus saved usually spent in making sketches and diagrams.

CLASSIFICATION OF SUBJECTS

The work falls under the following subdivisions, supplemented by thorough courses in mathematics, physics, chemistry, mineralogy and geology:

- (a) *Assaying*—to determine if ore has value for treatment.
- (b) *Mining engineering*—to furnish material for treatment.
- (c) *Ore testing*—to determine best method of treatment. (d) *Ore dressing*—furnishing products for metallurgical treatment.
- (e) *Metallurgy*—smelting and refining of ores and ore dressing products; reduction to metals.

DEPARTMENT OF MINING ENGINEERING

Mining engineering extends through sophomore, junior and senior years. The subjects given, together with the sequence necessary, are stated in the accompanying outline of the course.

Until the second term of the junior year, the course consists of lectures and recitations only. In the subsequent work, text-books are used in connection with the lectures.

In the senior year, problems in hoisting, hauling, pumping, ventilation and similar subjects become an important part of the work.

Field work in Mining. At the close of the junior year the students are required to spend four weeks in some mining district studying underground work and metallurgical operations. A part of the time is devoted to the making of mine and geological surveys.

A complete type-written report must be submitted before the student may register for the following year's work.

This report must cover the work done on the trip and must be fully illustrated with sketches drawn to scale. Reports will not be accepted after September 9th.

All field work must be taken at times specified.

Designs and specifications. The student makes in connection with his thesis work working drawings of mine cars, skips and other parts of mine equipment that are usually designed and made on the ground.

Mine Surveying. The work in surveying is designed solely for mining engineers. In the sophomore year, second semester, the work consists of the elements of plane surveying with special reference to the computations necessary.

Field work in surveying—Course VIII. The month of August, preceding the opening of the junior year, is spent in

the practice of plane surveying. About an hour per day is given to lectures or recitations and the remainder of the day to field work.

The students are divided into squads of two or four, and each is required to complete the following exercises and surveys:

1. Ranging
2. Chaining
3. Compass reading
4. Determination of length of pace
5. Survey of a large area by pacing and hand compass
6. Adjustment of hand levels and practice in leveling
7. Adjustment and use of wye levels
8. Adjustment of mining transit
9. Reading angles
10. Traverse with steel tape
11. Azimuth traverse with stadia
12. Survey of mining claim according to the regulations of the U. S. Government
13. Measurement of earthwork
14. Laying out railroad tangents, curves and crossings

Each squad must provide itself with a 12-foot steel tape, graduated to tenths.

This course is open only to those who have taken Course VII, or its equivalent, and is part of the work of junior year.

During the second semester of the junior year the higher theoretical work in plane and mine surveying and mine mapping is studied. While visiting the mines in junior year a survey of a mine, or some part of a mine is actually made and the survey platted.

Surveying instruments of the latest and best makes are furnished students for this work.

Ore dressing. The lectures and recitations in ore dressing extend through the first semester of junior year, and comprise the detailed study of ore dressing and concentrating machinery, together with the study of typical combinations of dressing machines as found in the several mining districts of the United States.

In connection with the theoretical work, the ore dressing and testing plant of the school is utilized for practical illustrations.

During the coming year, experimental work in ore concentration will be conducted.

COURSE IN MINING ENGINEERING

FRESHMAN YEAR

FIRST SEMESTER

Chemistry (Chemistry I)—42 hours, Professor Nicholson
Drawing (Drawing I)—42 hours, Professor Kirchner
Mathematics (Mathematics I)—5 hours, Professor Groat
Mineralogy (Geology and Mineralogy, Mineralogy I)—42 hours, Professor Hall and Mr. Parsons

SECOND SEMESTER

Assaying (Metallurgy I)—2 hours, Professor Appleby
Assaying Laboratory (Metallurgy I)—42 hours, Professor Appleby, Mr. Christianson and Mr. Pease
Chemistry (Chemistry II)—42 hours, Professor Nicholson
Drawing (Drawing I)—22 and 2 hours, Professor Kirchner
Mathematics (Mathematics II)—4 hours, Professor Groat
Mineralogy (Geology and Mineralogy, Mineralogy II)—2 hours, Professor Hall and Mr. Parsons

SOPHOMORE YEAR

FIRST SEMESTER

Chemistry (Chemistry III)—42 hours, Professor Sidener
Drawing (Drawing II)—42 hours, Professor Kirchner
Mathematics (Mathematics III)—5 hours, Professor Groat
Metallurgy (Metallurgy III)—3 hours, Professor Appleby
Physics (Physics I)—4 hours, Professor Jones

SECOND SEMESTER

Chemistry (Chemistry V)—42 hours, Professor Sidener
Drawing (Drawing III)—22 hours, Professor Kirchner
Mathematics (Mathematics IV)—5 hours, Professor Groat
Metallurgy (Metallurgy IV)—3 hours, Professor Appleby
Mining (Mining I)—4 hours, Mr. McCarty
Plane Surveying (Mining VIII)—3 hours, Mr. McCarty
Physics (Physics I)—4 hours, Professor Jones

SUMMER WORK—MONTH OF AUGUST

Mine Surveying (Mining IX)—4 weeks, Professor van Barneveld and Mr. McCarty

JUNIOR YEAR

FIRST SEMESTER

Geology (Geology and Mineralogy, Geology I)—2 hours, Professor Hall
Mathematics (Mechanics I)—5 hours, Professor Groat
Mechanical Laboratory (Mechanical Engineering XXIII)—22 hours, Professor Kavanaugh
Metallurgy (Metallurgy V)—4 hours, Professor Appleby
Mining (Mining II)—5 hours, Professor van Barneveld
Petrography (Geology and Mineralogy, Geology III)—22 hours, Mr. Parsons
Ore Dressing (Mining V)—4 hours, Professor van Barneveld

SECOND SEMESTER

Mathematics (Mechanics II)—5 hours, Professor Groat
Mechanical Laboratory (Mechanical Engineering XXIV)—22 hours, Professor Kavanaugh
Metallurgy (Metallurgy VI)—4 hours, Professor Appleby
Mine Mapping (Mining X)—32 hours, Mr. McCarty
Mine Surveying (Mining IX)—3 hours, Professor van Barneveld
Mining (Mining II)—5 hours, Professor van Barneveld
Petrography (Geology and Mineralogy, Geology VI)—22 hours, Mr. Parsons
Steam Engines (Mechanical Engineering XVII)—2 hours, Professor Flather

FIELD WORK—MONTH OF MAY

<i>Mining</i> (Mining III)	4 weeks	} Professor van Barneveld } Professor Appleby, Mr. Christianson, } Mr. McCarty, Mr. Pease
<i>Metallurgy</i> (Metallurgy VIII)		

SENIOR YEAR

FIRST SEMESTER

Chemistry (Chemistry XVI)—42 hours, Dr. Frankforter
Electric Power (Electrical Engineering V)—32 hours, Professor Springer
Geology (Ore Deposits—Geology and Mineralogy, Geology IX)—4 hours, Professor Hall
Mathematics (Mechanics III)—4 hours, Professor Groat
Mining and Mining Engineering (Mining IV)—5 hours, Professor van Barneveld
Ore Testing (Metallurgy II)—2 hours, Professor Appleby
Ore Testing Laboratory (Metallurgy II)—42 hours, Professor Appleby, Mr. Christians and Mr. Pease
Thesis—4 hours

SECOND SEMESTER

Chemistry (Chemistry XX)—42 hours, Dr. Frankforter
Designs and Specifications (Mining VI)—42 hours, Professor van Barneveld
Geology (Special Problems—Geology and Mineralogy, Geology X)—22 hours, Professor Hall
Mechanical Laboratory (Mechanical Engineering XXVIII)—22 hours, Professor Kavanaugh
Mining and Mining Engineering (Mining IV)—5 hours, Professor van Barneveld
Thesis—4 hours

DEPARTMENT OF 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 of 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 three years.

ASSAYING

The lectures treat of and describe apparatus, reagents, assaying furnaces, fuels, etc., in connection with this subject. The principles of assaying and sampling are fully explained. A collection of representative ores of various metals with a collection of corresponding slags are shown, and instruction is given as to nature and quantity of fluxes. Special and rapid methods of testing slags and metallurgical products as employed in western smelting works are emphasized.

The laboratory 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. Assays of bullion for fineness.

Great importance is attached to the work in the laboratory. A large well ventilated furnace room in which are located muffle and crucible furnaces, and another room of similar dimension equipped with desks, pulp and bead balances, afford accommodations to a large number of students. Ores of

various metals of known value are given the students, who are required to make up the necessary charges and submit their reports in detail. This work is offered to students completing the necessary courses in mineralogy and chemistry.

The Assay Laboratories are located in the new School of Mines Building and consist of:

1st. Preparation room. This room is 62 feet long by 36 feet wide and accommodates 66 students. Here samples and reagents are weighed preparatory to assaying. Each student is furnished with a complete set of apparatus, including a pulp balance for individual use. All operations are therefore conducted with the greatest economy of time and entirely apart from the furnace room. The separation of the preparation room from the furnace room is of greatest importance. Nearly all ores are crushed and pulverized by suitable machines run by electric motors. Students are compelled to pulverize by hand a minimum number of samples, thereby saving much time for extended and advanced work in special lines.

2nd. Furnace room. This room is 60 feet long by 42 feet wide. The high ceiling and special ventilation provided for this room make it a most comfortable assay furnace room. It provides for the accommodation of twelve (12) double-decked muffle furnaces, twenty-four (24) crucible furnaces and twelve (12) gasoline furnaces. After the sample has been placed in a suitable vessel for fusion, it is taken to the furnace room, which communicates directly with the preparation room.

3rd. Balance room. This room is 31 feet long by 16 feet wide. In this room are various types of balances for accurately weighing gold and silver beads and bullion. The room is specially lighted by electric cove lights from the ceiling. The balances are placed on heavy brick piers which are independent of the walls of the building.

ORE TESTING

The lectures treat of the use and purposes of all the machinery connected with the subject, supplemented with detail drawings.

There are complete testing works connected with the department where the student may see the working of, and handle for himself, crushers, rolls, Huntington mill, concentrating machinery, such as vanners, buddles, jigs, pan 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. The first semester of senior year is devoted to instruction and laboratory work, and is 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 methods best suited to a given ore to extract the largest amount of metal with the least possible loss.

Commercial. Ore testing works are an important factor, in mining and metallurgical projects. The commercial object is to determine the best method of treating a given ore so as to yield the largest percentage of the metal it contains at the least possible cost. Samples varying from 500 pounds to car load lots can be treated by various methods.

The ore testing works are located on the east bank of the Mississippi, between the Great Northern and Northern Pacific railroads. Located at this point on the University campus, it offers the very best facilities for both educational and commercial purposes.

As the funds appropriated for the erection of such a plant were sufficient to purchase only the necessary machinery, the business men of Minneapolis generously provided a suitable building. This building, 94x66 feet, is built of brick and stone.

Machinery. The plant contains all the machinery necessary to illustrate the various processes of ore testing, viz.: a Bridgman mechanical sampler, size B; a link belt bucket elevator; a pulley feeder complete; a pair of 12½x12 geared rolls complete; a four compartment spitzkasten; a three compartment Hartz jig; a Collum jig complete with cone for driving; a three and a-half foot Huntington mill complete; a three stamp mill, 275-pound stamps; a five stamp mill, 850 pound stamps; a Challenge automatic feeder for five-stamp battery; a suspended Challenge feeder for three-stamp battery; a Tulloch feeder for Huntington mill; a single deck buddle, twelve feet in diameter; a four-foot plain belt Frue vanner; a Cammett

concentrator; a Hooper pneumatic concentrator; a Century drop motion jig; 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 trolleys, with driving arrangement and gears; a one thousand pound Reedy elevator, complete with worm gear; two overhead crawls, each with eighty foot track; 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.

COURSE IN METALLURGY

FRESHMAN YEAR

FIRST SEMESTER

Chemistry (Chemistry I)—42 hours, Professor Nicholson
Drawing (Drawing I)—42 hours, Professor Kirchner
Mathematics (Mathematics I)—5 hours, Professor Groat.
Mineralogy (Geology and Mineralogy, Mineralogy I)—42 hours, Professor Hall and Mr. Parsons

SECOND SEMESTER

Assaying (Metallurgy I)—2 hours, Professor Appleby
Assaying Laboratory (Metallurgy I)—42 hours, Professor Appleby, Mr. Christianson and Mr. Pease
Chemistry (Chemistry II)—42 hours, Professor Nicholson
Drawing (Drawing I)—22 and 2 hours, Professor Kirchner
Mathematics (Mathematics II)—4 hours, Professor Groat
Mineralogy (Geology and Mineralogy, Mineralogy II)—2 hours, Professor Hall and Mr. Parsons

SOPHOMORE YEAR

FIRST SEMESTER

Chemistry (Chemistry III)—42 hours, Professor Sidener
Drawing (Drawing II)—42 hours, Professor Kirchner
Mathematics (Mathematics III)—5 hours, Professor Groat
Metallurgy (Metallurgy III)—3 hours, Professor Appleby
Physics (Physics I)—4 hours, Professor Jones

SECOND SEMESTER

Chemistry (Chemistry V)—42 hours, Professor Sidener
Drawing (Drawing III)—22 hours, Professor Kirchner
Mathematics (Mathematics IV)—5 hours, Professor Groat
Metallurgy (Metallurgy IV)—3 hours, Professor Appleby
Mining (Mining I)—4 hours, Mr. McCarty
Plane Surveying (Mining VIII)—3 hours, Mr. McCarty
Physics (Physics I)—4 hours, Professor Jones

SUMMER WORK—MONTH OF AUGUST

Mine Surveying (Mining IX)—4 weeks, Professor van Barneveld and Mr. McCarty

JUNIOR YEAR

FIRST SEMESTER

Geology (Geology and Mineralogy, Geology I)—2 hours, Professor Hall
Mathematics (Mechanics I)—5 hours, Professor Groat
Mechanical Laboratory (Mechanical Engineering XXIII)—22 hours, Professor Kavanaugh
Metallurgy (Metallurgy V)—4 hours, Professor Appleby
Mining (Mining II)—5 hours, Professor van Barneveld
Petrography (Geology and Mineralogy, Geology III)—22 hours, Mr. Parsons
Ore Dressing (Mining VI)—4 hours, Professor van Barneveld

SECOND SEMESTER

Mathematics (Mechanics II)—5 hours, Professor Groat
Mechanical Laboratory (Mechanical Engineering XXIV)—22 hours, Professor Kavanaugh
Metallurgy (Metallurgy VI)—4 hours, Professor Appleby
Mine Mapping (Mining X)—32 hours, Mr. McCarty
Mine Surveying (Mining IX)—3 hours, Professor van Barneveld
Mining (Mining II)—5 hours, Professor van Barneveld
Petrography (Geology and Mineralogy, Geology VI)—2 hours, Mr. Parsons
Steam Engines (Mechanical Engineering XVII)—2 hours, Professor Flather

FIELD WORK—MONTH OF MAY

Metallurgy (Metallurgy VIII) }
Mining (Mining III) } 4 weeks { Professor van Barneveld
 { Professor Appleby, Mr. Christianson,
 { Mr. McCarty and Mr. Pease

SENIOR YEAR

FIRST SEMESTER

Chemistry (Chemistry XVI)—42 hours, Dr. Frankforter
Electric Power (Electrical Engineering V)—32 hours, Professor Springer
Geology (Ore Deposits—Geology and Mineralogy, Geology IX)—4 hours, Professor Hall
Mathematics (Mechanics III)—4 hours, Professor Groat
Mining and Mining Engineering (Mining IV)—5 hours, Professor van Barneveld
Ore Testing (Metallurgy II)—2 hours, Professor Appleby
Ore Testing Laboratory (Metallurgy II)—42 hours, Professor Appleby, Mr. Christianson and Mr. Pease
Thesis—4 hours

SECOND SEMESTER

Chemistry (Chemistry XX)—42 hours, Professor Nicholson
Designs and Specifications (Mining VI)—42 hours, Professor van Barneveld
Electro-Chemistry (Chemistry XVII)—32 hours, Dr. Frankforter
Electro-Metallurgy (Metallurgy VII)—3 hours, Mr. Christianson
Mechanical Laboratory (Mechanical Engineering XXVIII)—22 hours, Professor Kavanaugh
Mining and Mining Engineering (Mining IV)—5 hours, Professor van Barneveld
Thesis—4 hours

COURSES OF INSTRUCTION

COURSES IN CHEMISTRY

- Course I. Qualitative analysis* *Freshman i.* 136 hours
 Lectures and laboratory work. The course includes the reactions of the metals as applied to their separation and identification.
- Course II. Qualitative analysis* *Freshman ii.* 136 hours
 Lectures and laboratory work. The work in this course will include an examination of alloys, minerals, slags and other compounds. Open to those who have completed course i.
- Course III. Quantitative analysis* *Sophomore i.* 136 hours
 Lectures and laboratory work. The course includes an introduction to quantitative and a beginning of gravimetric analysis. Open to those who have completed course II.
- Course V. Volumetric analysis* *Sophomore ii.* 136 hours
 Lectures and laboratory work. The course includes an introduction to volumetric determinations with a discussion of standard solutions and the necessary stoichiometric calculations. Open to those who have completed course III.
- Course XVI. Special problems* *Senior i.* 136 hours
 Laboratory work. The course includes the working out of various mineralogical, technological and metallurgical problems, with work on ores of base metals, limestone, slags, etc. Open to those who have completed course v.
- Course XVII. Electro-chemical analysis* *Senior ii.* 48 hours or more
 Lectures and laboratory work. The course includes the qualitative and quantitative separation of metals by electrolysis. Open to those who have completed course XVI.

Course XX. Iron and steel analysis Senior ii, 102 hours

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 v.

COURSES IN DRAWING

Course I. (a) Frechand Freshman i [2] 68 hours

Lettering, geometric forms and engineering details in outline, including working sketches, translations and the elements of perspective.

(b) Mechanical Freshman i, ii [2] 136 hours

Conventional methods, lettering, machine and structural details and standard sizes and shapes.

(c) Descriptive geometry Freshman ii [2] 34 hours

Problems relating to points, lines, planes, solids, interpenetrations, surfaces of revolution, tangents and developments, including the constructive geometry involved. Recitations and lectures.

Course II. Descriptive geometry Sophomore i [4] 102 hours

Orthographic, isometric, horizontal, topographic, oblique and perspective projections, shades and shadows, line shading and brush tinting. Open to students who have completed course i.

*(c) Mining**Course III. Working drawings* Sophomore i, ii [2] 102 hours

Engineering details, assembly drawing, mechanical movements, tracing and blue printing. Study of shop methods and drafting room systems. Details are obtained from actual machines and structures as far as possible.

(c) Mining

COURSE IN ELECTRICAL ENGINEERING

Course V. Electric power Senior i, 3 and 6 hours per week, first semester

Elements of theory and practice of electrical measurements, wiring, dynamos, motors and electric lighting. 36 lectures and 48 hours laboratory. Preparation required: physics, course i.

COURSES IN GEOLOGY AND MINERALOGY

MINERALOGY

Course I. General mineralogy Freshman i, ii

The physical and chemical characters of minerals; a study of the native elements and the ores of the common metals; the occurrence and association of economic minerals.

Descriptive mineralogy and classification; rock-forming minerals; genetic relationships and distribution.

Laboratory work consists of tests illustrating the range of minerals and the application of chemical and blowpipe analyses to the determination of species; an introduction to the methods of quantitative blowpipe analyses; special topics; reference reading and discussions. Eight hours a week.

Course II. Physical mineralogy Freshman ii

An introduction to crystallography; physical characters of greatest service in rapid determination. Hand specimen practice preparatory to rock study. Lectures and field work. Two hours a week.

Course III. Optical mineralogy Junior ii

A study of the structure of crystals and crystal grains. An application of the methods of determination by optical properties; the use of the petrographers' microscope, embracing the elements of lithology. Lectures and laboratory work. Four hours a week.

GEOLOGY

Course I. Physical geology Junior i

1. Geodynamics, discussing the atmosphere, water, terrestrial heat, plants and animals, as geological agents. 2. Structural geology explaining stratification, displacements, dislocations, fractures, induced rock-structures and mineral veins in their relation to the arrangement of materials in the earth. 3. Physiographic geology, pointing out the more

prominent earth features and discussing their origin, significance and the agencies affecting them. Field excursions are required. Scott's Introduction. Two hours a week.

Course III. Petrographical geology *Junior 1*

General consideration of the origin and occurrence of rocks, i. e., Petrogenesis. The structure and texture of rocks. Preliminary studies of the mineral, physical and chemical constitution of the crystalline rocks with a view to their general description. Kemp's Handbook of Rocks. Reference reading and demonstrations. Four hours a week.

Course VI. Petrography *Junior ii*

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

Course IX. Ore deposits *Senior 1*

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

Course X. Special problems *Senior ii*

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

COURSES IN MATHEMATICS

Course I. Algebra and plane trigonometry *Freshman 1*

Rational integral functions, factors and roots of general quadratic, factor and remainder theorems, factors and values of $f(x)$, graphs, cube roots of unity and factors of $(a^3+b^3+c^3-3abc)$, progressions and notation, development of $f(x)$ and undetermined coefficients, convergence, divergence, equivalence, exponential theorem, logarithmic series and logarithms, summation of series, derived functions, theory of equations, trigonometric ratios, right triangles, general definitions of functions, analytic relations, trigonometric equations, oblique triangles. Five hours per week.

Course II. Algebra, analytic geometry and spherical trigonometry *Freshman ii*

Permutations and combinations, determinants, systems of coordinates, loci, straight line, transformation, equations of the conics, limits, areas and limits of sums, differentiation and integration of elementary forms, spherical formulæ and solution of spherical triangles. Four hours per week. Preparation, course I.

Course III. Analytic geometry and infinitesimal analysis *Sophomore 1*

Properties of the conics, equation of 2nd degree, higher plane curves, coordinates in space, point, plane, straight line, quadric surfaces, review of nature of differentiation and integration, elementary forms, geometric applications, successive derivatives, expansion of functions, indeterminate forms, rates, partial derivatives, maxima and minima, change of variable, applications to analytic geometry. Five hours per week. Preparation, course II.

Course IV. Differential and integral calculus *Sophomore ii*

Applications continued, rational fractions, rationalization, formulæ of reduction, multiple integration, various systems of coordinates, approximate integration, some differential equations of mechanics. Five hours per week. Preparation, course III.

COURSES IN MECHANICS

Course I. Statics and mechanics of materials *Junior 1*

Mathematical conditions of equilibrium, frames, theory of elasticity, design for beams shafts, boiler plates, etc. Five hours per week. Preparation, mathematics IV and physics.

- Course II. Kinetics and hydraulics* *Junior ii*
 Motion of rigid bodies; numerous problems in work, power, energy, friction, and hydraulics. Five hours per week. Preparation, course i.
- Course III. Thermodynamics and prime movers* *Senior i*
 Properties of steam, perfect gases, heat engines. water power, theory of turbines. Four hours. Preparation, course ii.

COURSES IN MECHANICAL ENGINEERING

- Course XVII. Steam engine* *Junior ii, 36 hours*
 Mechanics of the steam engine. Work in cylinder; effect of reciprocating parts; steam distribution. Mechanism of steam engines. A study of the details of modern steam engines. Valve and valve gears. A study of the slide valve, link motions and other reversing gear; automatic cut-off gears and the Zeuner diagram. The steam engine indicator. Principles and operation of the instruments, indicator rigging; indicator cards; compounding. Preparation, course i in applied mechanics. Two hours a week.
- Course XXIII. Strength of materials* *Junior i, 72 hours*
 Laboratory work investigating the strength and physical qualities of iron, steel, brass, copper, belting, chains, beams, brick and stone. Preparation, course i applied mechanics. Four hours a week.
- Course XXIV. Mechanical laboratory* *Junior ii, 72 hours*
 Continuation of course XXI; also exercises in valve setting, indicator practice, calibration of steam gauges, efficiency of screws and bolts. Preparation, course XVI. Four hours a week.
- Course XXVIII. Mechanical laboratory* *Senior ii, 72 hours*
 Hydraulic measurements. Calibration of weirs, nozzles, meters and other hydraulic apparatus; calimetry; tests of pumps, engines and boilers. Open to students who have completed course XXIV. Four hours a week.

COURSES IN METALLURGY

- Course I. Assaying* *Freshman ii*
 Determination of values of the ores. Lectures, recitations and laboratory work. Open to those who take courses I, II, III, chemistry, and have completed courses, I, II, mineralogy.
- Course II. Ore testing* *Senior i*
 Determination of methods of ore treatment. Lectures and practical work. Open to those who have completed course i and mining course v.
- Course III. General metallurgy and metallurgy of iron* *Sophomore i*
 Including the subjects of combustion, fuels, refractory material and furnaces. Lectures and recitations on metallurgy of iron. Open to those who have completed course i.
- Course IV. Metallurgy of wrought iron and steel* *Sophomore ii*
 Lectures and recitations. Open to those who have completed course III.
- Course V. Metallurgy of the precious metals* *Junior i*
 Gold, silver and platinum. Lectures and recitations. Open to those who have completed course iv.
- Course VI. Metallurgy of the base metals* *Junior ii*
 Associated with precious metals, including lead, copper, etc. Lectures and recitations. Open to those who have completed course v.
- Course VII. Electro-metallurgy* *Senior ii*
 Lectures and recitations. Open to those who have completed course vi.
- Course VIII. Field work in metallurgy* *Junior i*
 Conference and reports. Last four weeks of semester. Open to those who have completed course vi.
- Course IX. Designs and specifications* *Senior ii*
 Supplementing thesis.

COURSES IN MINING

- Course I. Explosives, blasting, air compressors, etc.* *Sophomore ii*
 Four hours a week.

- Course II. Mining* *Junior i, ii*
 Mode of occurrence of ore bodies; prospecting, shaft-sinking, tunneling, drifting, stoping, timbering. Methods of metal mining. Methods of coal mining. Hydraulic mining. Five hours a week.
- Course III. Field work* *Junior ii*
 Practice in mine surveying and field geology, studying in mines. Open to those who have completed courses i, ii. Last four weeks of the semester.
- Course IV. Mining and Mining Engineering* *Senior i, ii*
 Mine management. The examination of a mining property. Sampling ore reserves, etc. Mine accounts. Mine accidents. Mining law. Mining machinery, underground transportation, hoisting, pumping and ventilation. Electricity applied to mining. Open to those who have completed course III. Five hours a week.
- Course V. Ore dressing* *Junior i*
 Mechanical preparation of ore for the market, for metallurgical treatment, etc. Four hours a week.
- Course VI. Designs and specifications* *Senior ii*
 Designs of mine cars, skips, head-frames, etc., in connection with thesis work. Open to those who have completed Senior I. Eight hours a week.
- Course VII. Plane surveying* *Sophomore i*
 Computation, platting, with special reference to mine surveying. Twice a week.
- Course VIII. Field work* *Junior*
 Practice in plane surveying during the month of August, with special reference to mine surveying. Open to those who have completed course VII.
- Course IX. Mine surveying* *Junior ii*
 Computations, methods, etc. Open to those who have completed courses VII and IX. Three times a week.
- Course X. Mine mapping* *Junior ii*
 Six hours a week.

COURSE IN PHYSICS

- Course I. General physics* *Sophomore i, ii*
 Experimental lectures and laboratory work.

THE
COLLEGE OF AGRICULTURE
THE
SCHOOL OF AGRICULTURE
THE
DAIRY SCHOOL
AND THE
EXPERIMENT STATION

The Department of Agriculture

The Department of Agriculture is located on the University farm, three miles from the main campus of the University, and midway between St. Paul and Minneapolis. The campus is on a beautiful elevation overlooking the twin-cities and adjoining the State Fair grounds. The artistic buildings, and native trees, supplemented by new plantations and attractive drives, add greatly to the interest of the department.

This department consists of several sub-organizations: The College of Agriculture, the School of Agriculture, the Dairy School, the Short Course for Farmers, and the State Experiment Station.

The technical agricultural work of the college of agriculture, the experiment station, and of the shorter courses is combined under professors who are heads of divisions. These professors are responsible for both the experiment work and the instruction in their respective lines.

The dean and director is in immediate charge of the experiment station, the college of agriculture, and the short course for farmers. Under the dean, the principal is in charge of the school of agriculture, and the professor of dairy husbandry, of the dairy school.

The students in the college of agriculture and those pursuing graduate work pursue their technical agricultural studies with the professors in the college of agriculture, and have open to them a wide range of subjects in the college of science, literature and the arts.

Students in the school of agriculture pursue their studies at University farm. Special instructors are employed to teach the academic studies of the high school grade, which are necessary to supplement the agricultural work given by the various technical divisions of the department of agriculture.

Students in the intermediate course pursue all their studies at University farm, or in high school or academies nearer their homes.

Students in the short course for farmers receive their instruction in the various technical divisions.

The college of agriculture year is from August 30th to June 1st, the school of agriculture year is from Oct. 3rd to March 21st, the dairy school is in session from Nov. 21st to Dec. 17th; and the short course for farmers is in session from Jan. 10 to March 11th.

A more detailed account of the work of each division will be found under the respective headings.

EQUIPMENT.

The equipment of the Department of Agriculture of the University of Minnesota has been materially increased in recent years. The university farm contains two hundred and fifty acres of land. About forty acres are devoted to the campus, fifty acres to permanent pastures, and the remainder (mainly set aside for the experiment station), is used for instruction and experiment in field, garden, orchard and forest crops. The permanent pasture lands are rough and, in places, low and difficult to drain, but serve a very useful purpose. The one hundred and forty acres used for experiments and in giving instruction, have a good soil of mixed clay and sand, which is well adapted to its various uses.

The department of agriculture has also a farm of four hundred and eighty acres at Crookston, in the northwest portion of the state, another farm of three hundred fifty-two acres at Grand Rapids, in the pine region of northeastern Minnesota, and rents land in southwestern Minnesota at Lynd, and also has five acres devoted to raising seedling apples at Owatonna. All this land is used for the experiment and educational work by experiment station officers. These farms were selected by the University as especially representative in locality, soil, and general conditions of the whole state.

A number of useful text-books and class bulletins have been prepared and others are being written for the work in the College and school of agriculture. Special laboratories have been equipped; much of the apparatus and many of the methods of instruction have been devised by the teachers, and a considerable amount of museum material for demonstration work, for laboratory practice and for research work has been collected. The fields, gardens, orchards, barns and laboratories afford much opportunity for observations in practical work, while the experiments in progress under the experiment station afford many advanced students opportunities to pursue research work.

The buildings at University farm have all been erected since 1884 and are modern in their arrangement and equipment. The agricultural department of the University has now an investment in buildings of about \$340,000.

The agricultural library now contains 7,500 books and about six thousand pamphlets, including reports and bulletins. Aside from the large number of pamphlets and other publications of the different agricultural institutions and societies, a large number of the most important technical and agricultural magazines are kept on file, bringing together the agricultural literature of any importance.

The College of Agriculture

THE FACULTY

- CYRUS NORTHROP, LL. D., *President.*
WILLIAM LIGGETT, *Dean.*
SAMUEL B. GREEN, B. S., *Professor of Horticulture and Forestry.*
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.*
WILLETT M. HAYS, M. Agr., *Professor of Agriculture.*
ANDREW BOSS, *Associate Professor of Agriculture, in charge of Live Stock.*
FREDERICK L. WASHBURN, M. A., *Professor of Entomology.*
D. D. MAYNE, *Principal of School of Agriculture, Economics.*

INSTRUCTORS.

- WILLIAM ROBERTSON., B. S., *Agricultural Physics.*
J. A. VYE, *Penmanship, Accounts.*
J. M. DREW, *Blacksmithing, Poultry.*
JUNIATA L. SHEPPERD, M. A., *Cooking, Laundering.*
MARGARET BLAIR, *Sewing.*

ASSISTANT INSTRUCTORS.

- JOHN A. HUMMEL, B. Agr., *Agricultural Chemistry.*
C. P. BULL, B. Agr., *Agriculture.*
A. J. RUGGLES, B. S. A., *Entomology.*
M. L. ERICKSON, M. Agr., *Forestry.*

In the Collège of Agriculture three regular courses of study are offered: A course in agriculture, a course in forestry, and a course in home economics.

REQUIREMENTS FOR ADMISSION TO ALL COURSES IN THE COLLEGE OF AGRICULTURE.

Graduates of the school of agriculture, who have completed the studies prescribed in the intermediate course, or fourth year, and graduates of approved high and normal schools, as approved by the committee on entrance requirements and

course of study, are admitted to the freshman class in the courses in the college of agriculture; the former to Division "A," and the latter to Division "B."

Students who take courses in the college of science, literature and the arts, or in other colleges of the University, are required to conform to rules published in the bulletins of the respective colleges.

Students from other colleges and universities: Graduates from other colleges and universities may be admitted upon presentation of certificates, and will receive credit from the several professors for all work satisfactorily completed of similar character and grade to that given in this course.

Special students: Graduates of the school of agriculture may be admitted as special students and be allowed to pursue such studies in the course offered in the college of agriculture as are approved by the faculty.

All students in the college of agriculture must advise with the dean or the committee on college and graduate work concerning all electives. No student is allowed to enter any course until such course is properly entered upon the student's registration card by the registrar of the University, and no credit shall be given for subjects in which the student has not been previously registered.

GRADUATE WORK.

Special facilities are offered to graduate students from this and other agricultural colleges who wish to become familiar with methods employed in experiment station work, and to pursue their collegiate studies further. Courses for major and minor subjects may be arranged by consulting the professors in the different divisions. Students who enter for advanced degrees register with the committee on registration of the college of agriculture and must take their major subjects in the college of agriculture, but they may take one or both of their two minor subjects in the college of science, literature and the arts. Graduate students registered with the committee on graduate studies in the college of science, literature and the arts may take one or both of their minor subjects in the college of agriculture.

I. The degree of Master of Agriculture will be conferred on a bachelor of this or any other agricultural college of equal grade who, not sooner than one year after graduation, if a resident graduate student at this agricultural college, shall

pass an examination in certain prescribed lines of study and present a satisfactory thesis.

II. All general regulations of the college of science, literature and the arts, governing candidates for the master's degree, method of selecting work, amount of work required, degree of proficiency expected, and the time and manner of conducting the examinations, apply to candidates for master's degrees in the college of agriculture.

III. The degree of Doctor of Philosophy will be conferred by the college of agriculture on bachelors of this or any other agricultural college of equal grade within not less than three years after graduation therefrom under conditions similar to those prescribed by the faculty of the college of science, literature and the arts.

FEES.

All students in the college, who are residents of the state, are charged an incidental fee of ten dollars a semester. Non-residents are charged double the fee required of residents of the state, or twenty dollars a semester. No reduction is made for late entrance or for leaving before the end of the semester. In addition to this fee, students who take work in laboratories are charged a sum sufficient to cover the cost of material and breakage.

REQUIREMENTS FOR GRADUATION AND DEGREES.

After the completion of the prescribed course of study, including all of the required work and the requisite amount of elective work, together with such practical experience as may be required by the committee on college course, students in the courses in agriculture will be recommended for graduation with the degree of bachelor of science in agriculture; students in forestry with the degree of bachelor of science in forestry, and students in the course in home economics with the degree of bachelor of science in home economics.

The elective studies designed as academic are to be chosen from the printed semester programs of work offered in the colleges of science, literature and the arts, law, medicine and engineering; no student to take more than two semesters in either of the three last named colleges. The elective studies designated as agricultural are to be chosen from the printed program of work offered in the college of agriculture.

THE COURSE IN AGRICULTURE.

The course in agriculture is designed to give the student a broad education in the sciences and arts relating to agriculture and to fit him for the work of the agriculture specialist. The physical and biological sciences are made prominent. The work in these subjects is begun in the first or second year and may be continued throughout the course. For the first two years, the lines of study are prescribed, the subjects being chosen with a view of giving a good foundation for the work which follows. For the last two years, the work is mostly elective and gives the student an opportunity to take work along certain lines for which he has a special aptitude and liking.

In the college of agriculture a portion of the work is taken in the college of science, literature and the arts. All academic electives and the prescribed work in higher algebra, drawing, geology, German, French, rhetoric, trigonometry, botany, zoology, psychology, English literature, logic, philosophy, pedagogy and history are taken in the college of science, literature and the arts. The agricultural electives and the prescribed subjects not mentioned above are taken at University Farm.

OUTLINE OF COURSE IN AGRICULTURE.

FRESHMAN YEAR.

DIVISION "A."

Required for graduates of the School of Agriculture only.

FIRST SEMESTER.

Mathematics [4]
 Drawing [4]
 Geology [4]
 German [4]
 Military Drill [2]
 Gymnasium [2]

SECOND SEMESTER.

Mathematics [4]
 Chemistry [2]
 German [4]
 Agricultural engineering or drawing [4]
 Rhetoric [4]
 Military Drill [2]
 Gymnasium [2]
 Land surveying [2]

FRESHMAN YEAR.

DIVISION "B."

For graduates of approved high schools or others of equal standing. Students in this division take part of their work in classes of the school of agriculture. For descriptions of these courses see statement under School of Agriculture.

SEPTEMBER.

Agriculture [4]
 Forestry [4]
 Dairy chemistry [4]
 Blacksmithing [4]
 Agriculture practicums [2]

Handling grain and farm machinery [4]
 Fruit growing [4]
 Breed type of horses [4]
 Carpentry [4]

AGRICULTURAL SCHOOL YEAR.

FIRST TERM.

Dairy husbandry [2½]
 Breeding [2]
 Agricultural chemistry [5]
 Fruit growing [2]
 Veterinary [2]
 Entomology [5]
 Physics [5]
 Forestry [2]
 Military drill [2]
 Gymnasium [2]

SECOND TERM.

Dairy husbandry [2½]
 Feeding [2]
 Soils and fertilizers [5]
 Vegetable gardening [2]
 Veterinary [2]
 Field crops [2]
 Study of breeds [2]
 Plant propagation [3]
 Military drill [2]
 Gymnasium [2]
 Economics [3]

LAST HALF OF SECOND SEMESTER.

Chemistry [2]
 Poultry [3]
 Blacksmithing [4]
 Bookkeeping [3]

Dairy stock and judging [2]
 Agricultural engineering [4]
 Stock judging [2]
 Live stock practicums [2]
 Surveying [4]

SOPHOMORE YEAR.

Botany or zoology, long, a. m. [3]
 Botany or zoology, short, a. m. [3]
 Chemistry, p. m. [4]
 German or French, p. m. [3]
 Agricultural physics, p. m. [2]
 Rhetoric, p. m. [1]
 Military drill [2]

(T. & W. Laby.) (Lect. M. 11 a. m.)
 (Thurs. and F. at 3:45 p. m.)

JUNIOR YEAR.

Botany or zoology, long, a. m. [3]
 Elective, academic, a. m. [3]
 Elective academic, a. m. [3]
 Elective, agricultural, minor, p. m. [4]
 Elective, agricultural, major, p. m. [4]

SENIOR YEAR.

Elective, academic, a. m. [3]
 Elective, academic, a. m. [3]
 Elective academic, a. m. [3]
 Elective, agricultural, minor, p. m. [4]
 Elective, agricultural, major, p. m. [4]

Note.—No more than two semesters' work to be taken in any one subject for the minors in the junior and senior year.

The subject selected as the major elective is to be carried through both junior and senior years, and is to be concluded by a thesis to cover at least one year of practical work.

AGRICULTURE.

Equipment: The general equipment of University farm is available for class and special instruction and for practice work. A seed breeding laboratory furnishes facilities for special instruction in field seeds and in laboratory work in plant breeding. The plant breeding nurseries, the variety testing and the seed distribution, afford facilities for instruction and practice to students especially interested in these lines of work. The experiments and records in field management, in crop rotation and in cultivation experiments provide material and opportunities for study and for gaining experience. Instruments of precision make practical the instruction in planning farms, land drainage, road making, and fence building. The farms of the vicinity serve as a basis for de-

signing farm plans and farm business, and rural engineering problems can be worked out in nearby rural communities. Many useful samples, drawings, photographs, and references are being collected. The exhibits of machinery at the state fair grounds adjoining University farm, and those on exhibition in the warehouses of Minneapolis and St. Paul, supplement the collection in use at University farm. Students can study the merchandising of grain, the inspection and the grading of the various grain products in the twin cities. Statistics relating to the cost and profit of each staple farm crop are being gathered by special agents in three representative counties of the state.

A portion of the instruction in agriculture is in the form of lectures. The writing of papers on special subjects is made a prominent feature. Research work is arranged for in many cases, and practice work on the farm and in the laboratory is provided. The aim is to have students get experience in field agriculture, both practical and experimental, and in demonstration instruction.

Course I. Field crops and seeds. [One semester.]

In this course are considered the botany, cultivation, irrigation, use and place in the rotation of the various cereal, forage, root, fiber, sugar and miscellaneous crops. Special attention is given to the subjects of permanent, rotation, annual and shift pastures, and to soilage crops, to permanent and rotation meadows, and to the production and preservation of all kinds of dry-cured and ensilaged fodders. A thesis on one or more field crops is required of each student.

Course II. Thremmatology.

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

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

Course III. Rural engineering. [One semester.]

Subduing new prairie and timber soils, farm drainage, irrigation and irrigation works, tillage of crops, roads, their financial support, their location, construction and maintenance, farm buildings, farm fences, farm implements and machinery.

Course IV. Agricultural economics. [One semester.] '04-'05.

Farm management, systems of farming, planning farms, fields, crops, stock, labor, farm finances, sales, prices, agricultural statistics, production, exports, wages, land laws, ownership, taxes, organizations.

Agricultural practicums. Opportunities to gain practical experience, to acquire greater manual dexterity in doing farm work to secure practice in conducting experiments and to get experience in teaching agricultural subjects, are offered to college and graduate students, when practicable. Students should arrange early in their course for this work, as the opportunities in plant breeding, in rural engineering, in field crops, in agricultural statistics and in assisting instructors in the various courses are available only at irregular intervals and must be arranged for in advance.

AGRICULTURAL CHEMISTRY.

Equipment. A special laboratory with modern apparatus for the analyses of soils, foods and agricultural products is provided. The equipment contains an experimental mill for the production of wheat flour, a Berthelot-Atwater calorimeter for the determination of the caloric value of foods, vacuum ovens, apparatus for the chemical and physical analysis of soils, an electrical apparatus for determining the resistance of soils to soluble salts, and the necessary facilities for human and animal food investigations. Special facilities are offered in soil investigations and in the analysis and testing of wheat, flour and cereal products for commercial purposes. Standard reference books and journals, including *Jahresbericht der Agrikultur Chemie*, *Coptes Rendus*, *Biedermann's Centralblatt*, *Annals de la Science Agronomique* and *Versuchs-Stationen*, are provided for the advanced work in agricultural chemistry.

Fees. In all of the laboratory courses in agricultural chemistry, a fee is charged to cover the cost of material used, and breakage. The student is assigned a certain amount of apparatus and material for which he gives a receipt, and deposits \$3 with the accountant before beginning work. All apparatus returned in good condition at the close of the term is credited to the student's account upon settlement.

Two and one-half semesters of chemistry are required in the freshman and sophomore years. All other courses are elective.

Course I. (a) General agricultural chemistry. [One-half semester.] Freshman II.

Recitations, lectures and laboratory practice. Particular attention is given to the study of the elements and compounds which are of the most importance in agriculture. The laws governing the combination of the elements by weight and volume are illustrated by numerous problems. The writing of equations, chemical nomenclature, and the periodic system of classifying the elements are prominent features of the work. In the laboratory, experiments are performed illustrating the general laws of chemistry which have a bearing upon animal and plant life.

(b) A continuation of I (a). Sophomore I. semester.

Course II. Agricultural qualitative analysis. Sophomore II.

This course is arranged to meet the wants of agricultural students. Six hours per week are given to the laboratory work and one period to a lecture and recitation. The writing of equations and the study of prin-

ciples involved in the separation of the various groups and individual compounds of elements are characteristic features of this work. It is the object of this course to familiarize the student with the processes employed in qualitative analysis so that he may be able to determine the composition of all ordinary substances, particularly of those that are of the most importance in agriculture.

Course III. Agricultural quantitative analysis. Junior or senior I.

An elementary course in qualitative analysis. The principles involved in gravimetric and volumetric analysis are studied. Three periods per week are given to laboratory work and one period to a recitation and lecture. The work includes the gravimetric and volumetric determinations of iron, acidimetry and alkalimetry, the gravimetric determination of phosphorous pentoxide, the volumetric determination of calcium oxide and determination of nitrogen and potassium oxide. The object of this course is to prepare the student for special work in agricultural chemistry, and is required of all students who elect either courses VI or VII.

Course IV. The chemistry of foods. [One-half semester.]

Lectures. This course treats of the chemistry of human and animal foods, the chemistry of plant growth, the composition and food value of the various organic compounds contained in plants, the influences which soil and climate exert upon plant growth and the various factors which influence the value and composition of farm crops. The chemistry of human and animal nutrition is also considered. It is the object of this course to familiarize the student with the more recent investigations which have a bearing upon the chemistry of human and animal foods and to enable him to utilize these results to the best advantage in the production and use of foods. Ample facilities are offered in both laboratory and library for the study of this subject. (Given only in alternate years. Given in 1905-06.)

Course V. The chemistry of soils and fertilizers. [One-half semester.] II.

Lectures. The chemical changes that take place in the soil; the various sources of plant food; the power which crops possess for obtaining food from the soil; nitrification; the laws governing the increase and decrease of the soil nitrogen and the organic compounds of the soil and the part which they take in fertility—are some of the more important topics considered. The influence which various methods of farming have upon fertility of the soil and the best methods for conserving fertility are studied. The subject of judging, rating and scaling soils forms a part of the work. (Given only in alternate years. Given in 1904-05).

Course VI. Laboratory practice (a) The analysis of dairy products. I.

This course including the proximate analysis of milk, butter and cheese, the determination of volatile fatty acids, iodine absorption number, the chemical and physical properties of fatty bodies and the determination of adulterated dairy products. This work is planned to meet the wants of those who wish to become familiar with the methods employed in investigations in dairy-chemistry.

(b) The analysis of foods. II.

This work includes the determination of starch, sugar, cellulose, and the more common and important compounds found in food materials.

Particular attention is given to the analysis of wheat and flour for commercial and technical purposes. Ample facilities are offered in the laboratory for this work. The object of this course is to familiarize the student with the methods which are employed in investigations relating to the chemistry and economy of human and animal foods.

Special attention is given to the study of methods of analysis and to the determination of compounds as pentosans, and the more important products in cereal products.

Course VII. The analysis of soils and fertilizers. (a) The chemical analysis of soils. I.

Laboratory practice. This course includes practice in the chemical analysis of soils and the study of the chemical methods employed in soil investigations. The course includes the analysis of soils by the use of strong and weak acid solvents. Particular attention is given to

- the study of the organic compounds, and experimental work is applied to field investigations.

(b) The physical analysis of soils.

II.

Laboratory practice in the physical analysis of soils by means of Hilgard's eleutrotator, and the sedimentation methods as modified by the use of centrifugal apparatus.

Courses VII (a) and VII (b) are intended for students who desire to make a specialty of the subject of soils.

ANIMAL HUSBANDRY.

Equipment. Representatives of some of the leading breeds of cattle, sheep and swine are kept at University farm. Each year a number of experiments are under way in the feeding of these classes of animals, and breeding experiments are also undertaken with sheep and swine, and theoretical experiments with the smaller animals. Experiments in summer feeding cattle, sheep and swine wholly or in part on pasture are carried on each year. The new veterinary building provides a temporary live stock judging room. Herds of blooded stock near the institution, and the annual show of live stock at the state fair serve for extended observation of breeds and methods of management.

Course I. Stock breeding.

[One-half semester.]

Discussion of the principles of stock breeding as affecting breed maintenance and breed formation; standards of excellence and comparison of standards of breeds; heredity and the influences affecting it; precocity, fecundity and their relation to successful breeding; the influence of nutrition on animal growth and form and the effect of artificial conditions, early maturity, selection and pedigree.

Course II. Feeding animals.

[One-half semester.]

The principles of nutrition and digestion as applied to economical production; feeding rations and nutritive ratios, feed stuffs and methods of feeding, feeding of breeding stock and show stock, management of animals during pasture, yard and stall feeding for the block, feeding for specific production of wool or flesh, selection of animals for the feed lot, stabling suitable for the various classes of live stock.

Course III. Stock judging.

[One-half semester.]

This course is calculated to meet the needs of students desiring to become expert stock judges and of those who wish to study animal form with a view to becoming breeders of superior animals. Score card work in combination with the presence of living specimens is a feature of this course. Students are drilled in judging from the stand-points of breed, type, form, stamina, quality, breeding capacity, suitability for feeding and for general and specific production. Special opportunities are given for judging live animals fitted for the block and in judging the dressed carcasses after slaughter, thus determining by observation the quality of animals judged.

Live stock practicums: Feeding and stable management of cattle, horses, sheep and swine, recording and calculating amounts of pasturage obtained from different forage crops, keeping herd records, writing pedigrees and recording animals, calculating feeding records and cost of production, mechanical analysis of carcasses of animals to determine total amount of meat, and proportionate amounts of fat and lean, determinations of fat and lean meat with especially designed apparatus; calculating percentages of different parts of the carcasses.

DAIRY HUSBANDRY.

Equipment. Students in the college course have the advantages of the equipment of the dairy school. The feeding and breeding experiments in the dairy division of the experiment station serve a most useful purpose in the collegiate instruction. The cordial relations existing between the department of agriculture and the other state institutions are often advantageous to college students well advanced in dairy work.

Representatives of several breeds of cattle are kept for class use. Herds in the vicinity and those shown at the state fair are useful to students in this course.

Course I. Dairy stock and dairy farm management. [One semester '02-'03.]

Lectures, first semester, three hours per week. Practice work one hour per week. This course is given during the first semester of the junior year. The lectures cover the breeding, rearing and management of dairy stock, the points and characteristics essential in animals intended for the dairy, practice work in judging dairy stock, and the management of the dairy herd.

Course II. Feeds and feeding. [One semester.]

This course consists of lectures covering scientific and practical questions underlying the principles of feeding. Practice work is given in formulating rations, in estimating the comparative value of food stuffs and in other problems connected with the subject. (Given in years beginning with even numbers.)

Course III. Course in factory dairying. [One-half semester.]

This is offered during the session of the dairy school, beginning November 21. Lectures in the forenoon on dairy bacteriology, dairy chemistry, the care of milk and cream, lactic cultures, flavors, creamery milk, cream ripening and churning, working and packing butter. In the afternoon students are given two and a half periods' practice in the factory training rooms and in the dairy laboratory.

Dairy practicums: Students are offered training two semesters in compounding rations, feeding cows, rearing calves, milking and many other details in the management of the dairy herd; operating hand separators, and other modern farm dairy appliances, the manufacture of butter and cheese and work in the dairy laboratories.

ENTOMOLOGY.

Students who have completed the entomology offered in the school of agriculture, or its equivalent, may elect course I or course II.

Course I. General entomology. [One semester.]

Structure and classification of insects. The dissection of type, life history and habits of leading forms. Each student is required to make a collection of at least fifty insects.
Not given in 1903-04.

Course II. Economic entomology. [One semester.]

Lecture upon injurious insects of Minnesota and best methods of combating same. The use of insecticides and spraying machinery. Beneficial insects.
Not given in 1904-05.

Course III. Forest entomology. [One semester.]

The students in this course must have a thorough, practical training in elementary entomology and economic entomology in order to put into

practical use in field work the principles to be learned in both of these courses. He must take course I at some time during his course in forestry, which is to be followed by course II; the two, however, can be taken together if the student's time permits. The student will be directed in the special study of insects affecting the forest and will be encouraged in doing field work, in collecting, identifying, and in the life history of forest insects.

Open only to students in the forestry course.

Not given in 1904-05.

Course IV. Comparative anatomy and histology of insects. [One semester.]

A detailed study of structure of representatives of different orders of insects. Not given in 1904-05.

Six periods of laboratory work and one lecture. Must be preceded by course I or its equivalent.

HORTICULTURE.

Equipment. In the college course in horticulture students are expected to avail themselves of the excellent facilities afforded by the nurseries, orchards, gardens and forest garden of University farm and the collections in the museums of the University. They will also find that the vicinity offers many especially good lessons in nursery work, landscape gardening, fruit growing, vegetable gardening and greenhouse management.

Course I. Fruit growing. [One-half Semester.] '04-'05.

Lectures. The study of the geography of fruit growing; outlook for fruit growing, planting, tilling and fertilizing of fruit lands; diseases and insects injurious to fruits, spraying, harvesting, and marketing varieties of vegetables.

Course II. Vegetable growing. [One-fourth semester.] '04-'05.

Lectures. Geography of vegetable growing, tilling and fertilizing vegetable lands, irrigation and rotation of crops, seed growing and seed testing, vegetables under glass, pollination, diseases and insects injurious to vegetables and their prevention, harvesting and marketing varieties of vegetables.

Course III. Green houses and their management. [One-fourth semester.] '04-'05.

Lectures and laboratory work. Green house construction and management, temperature, soil, watering, benches, propagation by seeds, cuttings, layers and graftage, prevention of diseases and extermination of insects injurious to vegetables, rest and growth periods of plants, plants for greenhouse cultivation.

Course IV. Nursery work. [One-fourth semester.] '05-'06.

Lectures and laboratory work. Seedage, layerage, cuttage, graftage, planting, pruning, thinning, storage of nursery stock, tillage of nursery lands, insects, diseases injurious to the nurseries and their prevention.

Course V. Plant breeding. [One-fourth semester.] '05-'06.

Lectures and laboratory work. The fact and philosophy of variation; crossing of plants, origination of domestic varieties.

Course VI. Floriculture. [One-half semester.] '04-'05.

This course will include the work outlined in course III, but in addition instruction will be given in the growing of flowers in the open borders in summer, and practical work in this line will be required.

Course VII. Pomology. [One semester.] '04-'05.

Courses I, II and III together and courses IV, V and VI together each make one full semester.

VETERINARY MEDICINE AND SURGERY.

The new veterinary building gives ample facilities for laboratory and clinical work. The hospital furnishes a variety of cases for study and demonstration. The dissecting room affords material and opportunity for studying the digestive organs and locomotor apparatus, and museum materials are being collected.

Instruction is given by text-book, lectures, collateral reading and by practice work in the hospital. The lectures are illustrated by means of skeletons, manikins, charts and by the living animal. Anatomy of the digestive organs and the higher physiology of digestion are given prominence in this work. Theory and practice of medicine are carried further than in the school of agriculture course. Infectious diseases of domestic animals are studied with references to causes, recognition, prevention and methods of control. Certain medicines which the intelligent stockman should understand are studied with reference to uses, doses and methods of administration. The work in this department continues through two semesters.

Course I. Anatomy. [One-half semester.] '04-'05.

Comparative anatomy of the digestive organs, dissection, collateral reading and recitation.

Course II. Body nutrition. [One-half semester.] '04-'05.

This is an advanced study of the veterinary physiology of digestion, taking up the digestive fluids, nervous mechanism of digestion, absorption and digestion of grains and fodders. It also includes a study of body nutrition, body income and expenditures, sources of heat supply and heat loss, and metabolism. Veterinary physiology, by F. Smith, is used as a text and guide for this work in course II, but students are required to do collateral reading.

Course III. Anatomy. [One-half semester.] '05-'06.

Bones, articulation and muscles of the limbs by dissection, reading and recitation.

This course includes shoeing, diagnosis and treatment of common forms of lameness.

Course IV. Diseases of domestic animals. [One-half semester.] '05-'06.

Lecture and text book work on the diagnosis and treatment of common diseases; common medicines in their doses, uses, dangers and methods of administration.

THE COURSE IN FORESTRY.

The course in forestry in the college of agriculture has been established in response to urgent calls for instruction in this subject. Forestry is really a branch of general agriculture and means the cultivation of forest crops, the same as agriculture means the cultivation of food and other crops. Its

object is to produce the greatest amount of serviceable material on the soil in the shortest time. It is also a business and contemplates business methods.

EDUCATIONAL OPPORTUNITIES.

There are many and obvious reasons why instruction of this kind is especially adapted to fit in with the courses offered in a large University. It will be noted that this course offers to students not only studies which will fit them especially for forestry, but will fit them for general service. At present there is little forestry work undertaken by the state of Minnesota except that of fire protection, but the outlook seems to warrant the statement that the next few years will see much undertaken that will need the assistance and direction of properly trained foresters. Perhaps there is no situation where a forestry school has more natural advantages than here, as this state is still one of the largest lumber producing states, and the opportunities of seeing lumbering carried on in the best manner are most excellent. The establishment of the Chippewa Forest Reserve and its management by the Bureau of Forestry give opportunities which few other sections possess to study the best methods of forest management. The Minnesota Forest Reserve Board contemplates the acquisition of considerable land for forestry purposes, and its management for the production of timber crops. Opportunities are here offered to see, and in many cases to take part in the scaling and estimating of timber, and to work in lumber camps for good pay at practical lumbering operations.

In addition to these general facilities and all of the opportunities offered by the University, students in the forestry course have all the privileges of the collections in the arboretum and forest garden of University farm. The state fish hatchery is nearby and furnishes students excellent opportunities to become acquainted with this important subject, on which a short course of lectures will be given.

General C. C. Andrews, the Chief Fire Warden of Minnesota, will give a course of lectures on the prevention and suppression of forest fires—in which work he has been eminently successful.

PLAN OF INSTRUCTION.

The regular course in forestry is a four years' course intended to prepare men to take charge of independent forest

properties, or for the government forestry service, or for positions of teachers.

The first year in this course, for those who enter other than from the Minnesota School of Agriculture, deals with the elementary agricultural subjects that it is important for every manager of rural properties to be familiar with. The forester from the very nature of his surroundings will be largely thrown on his own resources and should be capable of advising as to the best way of managing the farms or grazing lands that are almost always included in large forest properties. The sophomore year and one-half of each of the junior and senior years are devoted to the study of the basal natural sciences underlying the practice of forestry, and to such academic and engineering studies as seem especially desirable here. While French is made optional with German, it is expected that German will be taken in most cases, as it is the most helpful language for those who are to study forestry literature. An opportunity will be afforded to take Spanish, as it may be especially desirable to those who contemplate entering the Philippine forestry service. One-half of each of the senior and junior years are devoted to the study of technical forestry, an important part of which consists of field work and excursions. Every student is required before graduation to take four weeks work in some approved lumber camp, so as to become familiar with common lumbering operations.

Especial emphasis is laid on the value of field work and excursions. This consists in excursions to nearby forests; to lumber camps, saw mills, wood manufacturing and paper mills; to the Boom Company's works on the Mississippi river; to nearby nurseries, and it is expected that arrangements will be made which will afford an opportunity for students to visit some of the forests of Montana, Idaho and Washington at a very low rate. Excursions are also frequently made in connection with the study of botany, geology, zoology (and nursery practice).

OUTLINE OF COURSE IN FORESTRY.

FRESHMAN YEAR.

Students entering the forestry course will be required to take the freshman year the same as other students of the college of agriculture.

SOPHOMORE YEAR.

FIRST SEMESTER.

Botany, short [4]
Chemistry [4]
German or French [4]
Agricultural physics [2]
Rhetoric [1]
Military drill [2]

SECOND SEMESTER.

Botany, short [4]
Surveying [4]
German or French [4]
Trigonometry [4]
Agricultural physics [2]
Rhetoric [1]
Military drill [2]

JUNIOR YEAR.

FIRST SEMESTER.

Botany, taxonomy [4]
Forest entomology [4]
Forest influence and utility [2]
Forest by-products [2]
Forest mensuration [2]
Lumbering [2]

SECOND SEMESTER.

Plant ecology [4]
Law, elements of contracts [1]
Zoology [4]
Wood technology and diseases of wood
[4]
Forest valuation [2]
Sylviculture [2]

SENIOR YEAR.

FIRST SEMESTER.

Geology, I, [4]
Sylviculture [4]
Elements of economics [4]
Vegetable Pathology [4]

SECOND SEMESTER.

Geology, III and IV, [4]
Forest economics [4]
European forestry [1]
Forest administration [2]
Forest protection [2]
Fish culture, game protection
(Lecture) [1]
Thesis, seminary in reading for-
estry literature [2]

Practicums in forestry: Four practicums are required in the course in forestry, viz.: In forest exploitation, forest working plans, forest mensuration, nursery practice. A thesis must be presented in each of the four subjects, giving the results of personal observation.

Forest influence and utility: Influence of forests on precipitation, surface and sub-surface run-off and on springs, on frost, on winds and wind storms.

Forest mensuration and valuation: Methods of determining the volume of felled and standing trees, of whole forest growths; timber estimating. Determining the rate of increase in single trees and forest areas, determining present and future money value of forests.

Lumbering: The harvesting of forest products, logging—including transportation, milling and preparation of the wood for market.

Sylviculture: (a) Sylviculture characteristics of trees, methods of regeneration, improvement cuttings, nursery practice. (b) Characteristics of the great typical forest areas of the world.

Forest economics. History of development of modern forestry, forest conditions here and abroad, relation of the state to forests, forest policies of foreign nations.

Forest administration. A working plan and rules of management for a specified forest area; state and national forest policy.

Wood technology and diseases of wood. Study of the characteristics of commercial woods and their uses. Impregnation of woods, fuel value of woods.

Forest by-products. Study of the products of the forests other than for timber and fuel, including such products as tan-bark, resin, charcoal, medicinal products.

Forest entomology. (This course will be found outlined on page 23.)

European forests. Lectures on the condition in European forests.

Forest protection. Protection of the forest against trespass, fire, insects and diseases; method of preventing washing of soils.

COURSE IN HOME ECONOMICS.

Purpose and scope. The course in home economics offered in the college of agriculture is open to graduates from the school of agriculture, and to graduates of approved high and normal schools. The elementary technical work in household science, household arts and home administration is taken in the school of agriculture, while advanced work in special subjects closely related to the home, as well as the usual culture studies, is given in the college course.

The course in home economics is intended to bring to the vocation of home making the same kind of help which the course in agriculture brings to the business of farming. Aside from the universal need of education of this character there is a marked and increasing demand for trained women to fill institutional positions, not only as special teachers in the several divisions of home economics, but also in administrative positions as competent supervisors of supplies and of hygiene where large numbers are cared for under the management of boards and trustees.

COURSE OF STUDY IN HOME ECONOMICS.

FRESHMAN YEAR.

Division "A" required for those who are graduates of the school of agriculture only.

FIRST SEMESTER.

Mathematics [4]
 German or French [4]
 Drawing [4]
 Geology, historical [4]
 Rhetorical work [1]
 Physical training [2]

SECOND SEMESTER.

Mathematics [4]
 German or French [4]
 Drawing [4]
 Chemistry [2]
 Rhetoric [4]
 Physical training [2]

FRESHMAN YEAR.

Division "B."

For graduates of approved high schools or others of equal standing. Students in this division take part of their work in classes of the school of agriculture. For descriptions of these courses, see statement under School of Agriculture.

SEPTEMBER.

Agriculture [4]
 Dairy chemistry [4]
 Fruit growing [4]
 Home management [2]

Cooking [4]
 Laundry work [2]
 Sewing [4]

FIRST TERM.

Dairying [2½]
 Agricultural chemistry [5]
 Fruit growing [2]
 Entomology [5]
 Physics [2]

Forestry [2]
 Physical culture [2]
 Cooking [2]
 Social culture [1]
 Sewing [2]
 Household art [1]

SECOND TERM.

Vegetable gardening [2]
 Plant propagation [3]
 Domestic chemistry [5]
 Drawing [2]
 Dairy husbandry [2]

Economics [3]
 Cooking [2]
 Home economy [1]
 Sewing [2]
 Meats [1]
 Domestic hygiene [1]

LAST HALF OF SECOND SEMESTER.

Bookkeeping [4]
 Poultry [3]
 Chemistry [4]

Cooking [4]
 Sewing [4]
 Live stock [2]

SOPHOMORE YEAR.

FIRST SEMESTER.

Chemistry [4]
 German or French [3]
 English literature [3]
 Botany or zoology, short, [3]

SECOND SEMESTER.

Chemistry [3]
 German or French [3]
 English literature [3]
 Botany or zoology, short, [3]

JUNIOR YEAR.

FIRST SEMESTER.

Home economics (course 1) [2]
 Household science (course 111) [4]
 Household art (course 1) [4]
 Psychology [4]
 Elective [4]

SECOND SEMESTER.

Home economics [2]
 Household science (course 1) [4]
 Logic [4]
 English literature, modern English
 prose [3]
 Elective [3]

SENIOR YEAR.

FIRST SEMESTER.

Home economics (course II) [2]
 Household science [course I] [4]
 Philosophy—principles of ethics [2]
 Elective [4]
 History—American biography [3]
 or
 English literature [3]

SECOND SEMESTER.

Home economics [2]
 Household art [4]
 Pedagogy, philosophy of education [3]
 Floriculture or other horticulture [2]
 Elective [3]

(1) In household science and household art only courses in cooking, sewing and laundering are offered at present.

When approved by the dean and college committee, other subjects given in the college of science, literature and the arts, or in the college of agriculture, may be substituted for the prescribed subjects in the course in home economics.

Women who are sufficiently advanced may study music or art during the junior or senior years, provided that no student may receive more than two semesters' credits in music and art together.

EQUIPMENT.

The Woman's Building contains convenient rooms for the students, with heat, light and water supplied under the best hygienic conditions, while attractive reception rooms give opportunity for a refined social life. The dining room is in a separate building and under competent supervision.

The class rooms and laboratories of the school of agriculture, also the equipment of the state experiment station, are available for purposes of instruction and research.

The courses in physical and biological sciences, in English language and literature and in philosophy and history, which are given in the college of literature, science and the arts, are open to students taking this course, as are also the college laboratories and the courses given in agriculture.

The class room devoted to instruction in sewing, garment drafting and the judging of textile fabrics is commodious, well lighted and furnished with the usual accessories, including collection of vegetable and animal fibres showing the successive stages in manufacture from the raw material to the finished fabric. The school museum of birds of Minnesota is utilized in the study of color and its combinations.

The rooms for instruction in cooking, dining room service and laundering, contain the necessary appliances for manual practice and for demonstration lectures. Specimens of manu-

factured foods, samples of cooking, and laundering utensils and materials and of dining-room and kitchen furniture, are provided. The facilities of the city markets give practice in marketing. The proximity of Minneapolis and St. Paul, in which are found large flour mills, manufactories of cereal foods, canning and pickling factories, and other establishments which prepare food stuffs, make it possible for the classes to visit many places where facts of value are learned. The large public dining-rooms with their kitchens, and the commercial laundries also offer opportunities for gaining valuable practical knowledge in these branches of household science.

The library of the college of agriculture contains a carefully selected collection of books relating to the subject of home economics.

COURSES OF INSTRUCTION.

CHEMISTRY.

Two and one-half semesters of chemistry are required in the freshman and sophomore years. This work is taken along with the classes in the course in agriculture, and includes courses I and II, outlined on page 19. Should the student desire, special facilities are offered for advanced elective work in the Chemistry of Foods, course IV, and the analysis of foods, course VI. Nutrition investigations, including the digestibility of foods, the chemical changes which take place in cooking, and the losses in the preparation of foods form a part of the Experiment Station work; this offers an opportunity for students to study methods of investigation relating to human food problems. Laboratory practice is also offered to advanced students in the study of household problems in which chemistry is involved. Special classes are also formed for the study of dietary problems.

ENGLISH LANGUAGE AND LITERATURE.

The courses in English language and literature are taken in the college of science, literature and the arts.

The scientific movement. (a) This course will take up the study of Darwin, Tyndall, Huxley, Spencer and other well known scientists, from a literary point of view. (b). Influence in the English literature of the nineteenth century.

Literary criticism. A study of development of method and view in the critical appreciation of literature.

Modern English prose. A study of the present literary vernacular in its best examples.

HOME ECONOMICS.

The lectures are intended to give breadth, strength and thoroughness to the concept of home.

Course I. The evolution of the family. Lectures twice a week during the first semester of the junior year. The evolution of the family from primitive conditions, the family as a social and economic institution, the relation of the home to civic life.

Course II. Home administration. Lectures twice a week during the first semester of the senior year. The organization of a home, generic lines of expenditure; domestic service, disposal of waste, the home as a place and an opportunity for the right development of the physical and spiritual natures.

Theses. The theses required in the junior and senior years are upon some one special branch of home economics—distribution of income, home sanitation, hygienic furnishing, household fabrics, food, et cetera, and are intended to familiarize the student with the best sources of information upon the subject; a bibliography of the subject treated is required.

HOUSEHOLD ARTS.

The instruction offered embraces courses in sewing, judging of textiles and harmony of color as related to dress, and is a continuation of the work given in the school of agriculture.

Course I. A study of textiles, animal and vegetable fibres, weaves and dyes, testing fabrics for household use and personal wear, the hygienic values of various fabrics, harmony of color, and the drafting of garments.

Course II. Designed especially to assist the teaching of sewing in graded schools. The preparation, explanation and making of models suited to grade work in the public schools.

HOUSEHOLD SCIENCE.

The work for collegiate classes is a continuation of the instruction given in the school of agriculture, but goes more into detail than in the agricultural high school course. While the home needs are first considered, attention is given to the supply and preparation of food in public institutions, boarding houses, restaurants and hotels; and to the laundry.

Course I. Food economics. [One semester.]

Selection of food materials: (1) Marketing; buying by sample; cost and value; quality as to freshness, flavor, etc. (2) Storage and care of foods, care of cupboards, cellars, refrigerators. (3) Selection, preparation and serving of foods for large numbers; equipment of large kitchen, serving rooms and dining rooms. (4) Kitchen practicums, arrangements, equipment and methods of directing practice work in cooking.

Preparation of foods: (1) Meat products, as beef tea, beef powder and beef extracts; (2) Cereal products and materials made from flours and meals, methods of aerating dough, leavening agents, etc. (3) Manufactured beverages, as cocoa and koumiss, matyoon, etc. (4) Condi-ments and spices; (5) Confections, as candies and sweetmeats; (6) Sweets, as sugars and syrups; (7) Commercial bakery products, as breads, biscuits, crackers, wafers, etc. (8) Preserving by drying, canning, refrigerating; and with preservatives, salts, sugars, spirits, fats and acids.

A thesis with bibliography on some special topic of household science is required.

Course II. Management of kitchen and dining room. [One semester.]

1. The kitchen:
 - a. Kitchen equipment.
 - b. Kitchen sanitation.
 - c. Labor saving devices.
 - d. Disposition and utilization of kitchen wastes.
2. The dining room.
 - a. Equipment, furniture, decorations, china, silver, glassware and linens.
 - b. Management; setting the table; garnishing and table decorations.
 - c. Table service; reception refreshments; formal dinners, etc.
3. Household Inventories.
4. Bills of Fare and selection of food for the dietary, in rural homes, in urban homes, in public institutions, in boarding houses, in restaurants and hotels.
5. Fancy Cookery; meat dishes, vegetable dishes, fruit dishes, pastries, iccs, candies, sweetmeats, chafing dish cookery.

Course III. Laundering. [One-half semester.]

Removing stains; dyeing; setting colors; cleaning delicate fabrics, as silks, laces and fine wools; the use of cleaning agents; as soaps, volatile oils, and other chemicals; starches and bluing.

Commercial laundering and cleaning; power washing and ironing machinery; drying apparatus, gathering, distributing, accounts, etc.

HISTORY.

The courses in history are taken at the University in the college of science, literature and the arts.

English constitutional history. The course begins with about six weeks of introductory work on the history of western Europe from the barbarian invasions to the treaty of Verdun. The remainder of the year is devoted to a study of English constitutional history from the Anglo-Saxon conquest to the accession of the House of Hanover. Continental history will be touched upon at various points where its connection with English history makes it necessary.

Studies in American biography. In this course the work will each year center about the political activity of a single

important character. In the choice of a subject two points will be especially borne in mind.

1. To select a character not only important per se but representative of some great historical movement or idea.

2. To select one who has left an abundance of material, valuable not only for his own part but throwing light upon the action of others.

PHILOSOPHY.

The courses in Philosophy are taken in the college of science, literature and the arts.

Descriptive psychology. This course is intended to serve as a general course in psychology, the work consists of the study of a text supplemented by lectures and demonstrations and by the preparation of papers on some psychological topic.

Logic. A study of the nature of knowledge and the principles of formal logic. Jevons' lessons in Logic will be used supplemented by lectures and exercises.

Principles of ethics. An introductory course, comprising a study of the distinction between moral and non-moral phenomena, an analysis of voluntary conduct, and a discussion of the nature of conscience, the meaning of right and wrong, the purpose of life, human responsibility, and the authority of moral law.

Aesthetics. A study of the nature and principles of beauty, and a discussion of the place and function of art in life.

The philosophy of education. The purpose of this course will be to define the purpose of education and the principles which govern in preparing the mind and character of youth for the duties of life. It will include topics, as the following: The influence of physical development upon the mental and the recognition of these facts in education. The order of mind development, and the bearing this has upon matter and method in teaching. The recitation, its purpose and the principles that govern in conducting it.

The School of Agriculture

FACULTY

- CYRUS NORTHROP, LL. D., *President.*
WILLIAM M. LIGGETT, *Dean.*
DEXTER D. MAYNE, *Principal, Mathematics, General History, Economics.*
SAMUEL B. GREEN, B. S., *Horticulture, Forestry.*
WILLIAM ROBERTSON, B. S., *Agricultural Physics.*
J. A. VYE, *Penmanship, Accounts.*
HARRY SNYDER, B. S., *Agricultural Chemistry.*
T. L. HAECKER, *Dairy Husbandry.*
M. H. REYNOLDS, M. D., V. M., *Comparative Physiology, Veterinary Science.*
WILLET M. HAYS, M. Agr., *Agriculture.*
THOMAS SHAW, *Lecturer, Live Stock.*
J. M. DREW, *Registrar, Blacksmithing, Poultry.*
ANDREW BOSS, *Animal Husbandry.*
WILLIAM BOSS, *Carpentry, Power Machinery.*
JUNIATA L. SHEPPERD, M. A., *Cooking, Laundering, Home Economics.*
MARGARET BLAIR, *Sewing, Household Art.*
GEORGE H. MORGAN, Major 9th Cavalry, U. S. Army, *Military Science.*
FREDERICK L. WASHBURN, M. A., *Zoology, Entomology.*
CATHERINE COMFORT, *Preceptress, English.*
CLARENCE B. RANDALL, *Drawing, Farm Buildings.*
MARY S. MCINTYRE, B. S., *Librarian, English Composition.*
JOHN W. DYE, *Director of the Gymnasium.*
EDITH SNELL, B. L., *Mathematics, Geography, History.*
L. S. CHENEY, M. S., *Agricultural Botany.*

ASSISTANT INSTRUCTORS

- JOHN A. HUMMEL, B. Agr., *Agricultural Chemistry.*
MARY L. BULL, *Cooking, Laundering.*
ARTHUR C. KOERNER, *Music.*
GRACE L. WHITRIDGE, *Physical Training.*
COATES P. BULL, B. Agr., *Agriculture, Rural Engineering.*
LEROY R. CADY, *Horticulture.*

Committees, School of Agriculture

Library: Mayne, Reynolds, Snyder, Hays, Comfort, McIntyre.

School of Agriculture:

Examinations and Registrations: Robertson, Drew, Snell, Bull, Hummel.

Catalogue: Vyc, Robertson, Snyder.

Military Drill: Morgan, Green, Haecker.

Entertainment: Mayne, Comfort.

Program: Andrew Boss, Drew.

Health: Reynolds, Mayne, Comfort, Washburn.

Dairy School: Haecker, Wm. Boss, Hays.

Short Course for Farmers: Drew, Shaw, Green.

Outside Dormitories: Mayne, Robertson, Snyder.

Co-operative Societies: Vye, A. Boss, Hays.

CLASSIFICATION OF STUDENTS.

No student with incomplete C or preparatory work will be classified as an A.

No student with incomplete preparatory work will be classified as a B.

No student with incomplete C or preparatory work will be made a commissioned military officer.

STUDENTS IN DORMITORIES.

The Principal of the School of Agriculture has charge of the boys in their dormitory and social life, and the Preceptress has charge of the girls in their dormitory and social life.

From 8:15 a. m. to 4:30 p. m. students not at recitations or chapel are expected to be in their rooms or the library studying or reading.

The rooms shall at all times be quiet, especially in the evening, so that no student may be disturbed.

The Cadet officers shall make daily inspection of the boys' dormitories, under proper supervision of the instructors.

Opening

The school year opens October 3, 1904, and closes March 22, 1905. The fall term closes Friday, December 23rd, and the winter term begins Tuesday, January 3rd. Owing to the shortness of the school year students are expected to 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 two days of the winter term, unless they present a reasonable excuse for such delay.

THE SCHOOL OF AGRICULTURE—ITS PURPOSE.

It is the aim of the school of agriculture to train its students to become useful citizens as well as good farmers and housewives.

The home life of the students at University farm is supervised by members of the faculty, and it is the aim to provide such interests outside the regular school work, as will assist in rounding out the characters of the young men and women. Literary societies afford opportunities for experience in writing, public speaking and debate. The faculty assist at the receptions and social gatherings which provide social pleasures and experience. In the work of the Young Men's Christian Association and the Young Women's Christian Association there are opportunities for training in co-operative religious activity. Student and alumni clubs and organizations, and a progressive periodical, "The Farm Students' Review," published by the alumni, aid in teaching the students how to work for the betterment of agricultural conditions.

The school of agriculture offers a practical course of study designed to fit young men and young women for successful farm life, and it serves as a preparatory school for the college of agriculture.

For the young people who cannot pursue the full college course the school supplies a training in the general branches, supplementary to the grammar school work, and a thorough

course in the leading branches of agricultural knowledge, put in practical form, by means of the constant application of lessons in the field, laboratory, or workshop. The methods employed are always practical. The teaching is so conducted as to educate the students toward the farm, and to develop in them a love for farm life, by showing them the possibilities of such a life. The school has been successful in this respect, and over eighty per cent of its graduates take up agricultural occupations upon leaving the school.

The details of this work, the division of the time for the various subjects, and the range of work required of the students, will be found outlined in the following pages.

Through the endowments and appropriations, of state and national government, the school is maintained without tuition charge, except an entrance fee of \$5 to residents and \$10 to non-residents, and the co-operative arrangements are so conducted that the students are able to secure excellent board at low rates.

The young men and women of the state, who desire to become farm home makers, are cordially invited to enter the course at the school of agriculture. They are urged to come with suitable preparation—that is, the complete mastery of the common school branches; previous farm experience; and to come with the intention to do earnest and conscientious work.

HOW TO GET TO THE SCHOOL.

Check all baggage to Minneapolis.

Monday and Tuesday, October 3d and 4th, members of the Y. M. C. A., wearing lettered badges, will be at the Union Station in St. Paul, and at the Union, Milwaukee, Great Western, Soo and St. Louis Stations in Minneapolis, to meet and direct new students. Take the Como-Harriet car from either St. Paul or Minneapolis and get off at Commonwealth avenue. A charge of 25 cents is made for transporting trunks at the opening of the school. No charge is made for the return of the baggage, at the close of school, provided it is ready to go on the days assigned.

ADMISSION.

All male students are required to have had six months farm practice before entrance.

Applicants for admission will be examined in English grammar, arithmetic, history of the United States, and geography, unless they present state certificates, or approved county diplomas, showing that they have completed the eighth grade work in these subjects. Students from city or village schools will not be admitted unless, in addition to the above requirements, they present certificates from the principals of such schools showing completion of eighth-grade work and honorable standing in department. Applicants, whose home schools do not afford complete instruction in these common branches, may be admitted with not more than two conditions, which must be removed, according to instructions given the student upon admission. State High School Board certificates are accepted for work in English, physiology, algebra, geometry and civics.

Students applying for admission, after the opening of the term, will, in addition to the regular entrance examinations, be required to show proficiency in the work done by the class up to the time of their application. Those who cannot enter by the first of November should wait until the beginning of the winter term.

FEEES.

With the exception of an entrance fee of \$5 to residents, or \$10 to non-residents, the school makes no charge. All other expenses are arranged by co-operation of the students.

EXPENSES.

The school expense for the year does not exceed \$85. This amount does not include the cost of the required military suit for boys, traveling or personal expense.

The cost to the student for board, heat, light and laundry is the actual cost of maintaining the table and caring for the house. This does not exceed \$3 per week. Each month's board is paid in advance. The culinary department is managed by an experienced person and all the buildings are under the supervision of the dean. The buildings are all lighted with electric lights and warmed by steam. The sleeping rooms are each furnished with a bedstead, mattress, dressing bureau, chair and table.

No deductions in charges are made for absence of less than four days. If students are compelled to be absent for that length of time they will be allowed half rates if they make arrangements before leaving.

Text books are furnished at a rental of \$1 to students who do not desire to purchase.

Each student is required to pay for breakage of apparatus used in practical work.

A competent nurse is kept on the ground to care for the sick. To meet this expense each student pays 75 cents per term.

A deposit of \$5 is required of each student, as a guaranty for the return of all books and other articles borrowed.

On entering school the student makes a payment of \$24: \$12 board; \$5 deposit, \$1.25 book rent, reading room and gymnasium; 75 cents maintaining nurse; \$5 entrance fee.

All male students are required to provide themselves with the prescribed uniform, which consists of navy blue blouse, trousers and cap, and is as neat and economical a dress as the student can obtain. The suit complete, to measure, is furnished under special contract for \$11.65.

Each student provides four sheets, one pair of blankets, one quilt, one bed spread, one pillow, three pillow cases, towels, napkins, comb and brushes.

An assignment of rooms will be made at 9 a. m., March 21, which will hold good until 8 p. m. the first day of the following year. Students wishing to retain their rooms, after vacation, must be on hand when the second term opens, or pay one-half the price of board and room for the time they are late. Students arriving after the dormitories are filled are compelled to find rooms elsewhere, but are allowed a rebate of \$3 per month.

REQUIREMENTS FOR GRADUATION.

First—The completion of the prescribed course of study with an honorable standing in department.

Second—An essay of not less than one thousand words upon a topic connected with agriculture or home economics.

Third—For young men, a practical experience in field work at the University farm or elsewhere, as shall appear in reports received from responsible sources.

STUDENTS' DEBATING SOCIETIES.

Societies for the purpose of improvement in elocution and debate, and for obtaining instruction in the form of lectures, give excellent opportunities for entertainment and culture.

LECTURE COURSE.

During the school year, a lecture and entertainment course, consisting of six lectures and concerts, is given in the chapel at a cost of seventy-five cents for the series. These entertainments are strictly high grade, and furnish a pleasant relaxation from school work, as well as mental stimulus.

The following program, which was provided during the past year, shows the general character of the entertainments:

Our Folk and Others—October 22, W. I. Nolan; Concert—November 23, The Royal Hungarian Court Orchestra; An Optimist's Message—December 16, Charles B. Landis; Reading—January 23, P. M. Pearson; Jean Valjean—February 17, Harvey Smith McCowan; Concert and Reading—March 10, Masonic Quartette, assisted by Mrs. Josephine Bonaparte Rice.

STUDENTS' CHRISTIAN ASSOCIATIONS.

The Young Men's and Young Women's Christian Associations have for their objects, social fellowship and moral and spiritual development. To this end two receptions are held each year, and Bible classes are held Sunday mornings at 8:30; a general religious service and mid-week prayer meetings are carried on. The associations are non-sectarian, so that all students may find in them an opportunity for Christian activity and mutual helpfulness.

ATHLETIC ASSOCIATION.

The students have a well-organized athletic association and a well-equipped gymnasium. A competent instructor is in charge. An opportunity is thus given for healthful amusement and for needed physical exercise.

COURSE OF STUDY.

FIRST (C) YEAR.

FIRST TERM.

Agricultural botany [5]

*Drawing [2]

Music

English [5]

*Blacksmithing [2½]

*Carpentry [2½]

Military drill [2]

Agriculture [3]

Gymnasium [1]

or

*Laundering [2]

Physical culture [2]

*Sewing [3]

Social culture [1]

Field agriculture [3]

SECOND TERM.

Agricultural botany [5]

*Farm accounts [2½]

Music or literary society work

Comparative physiology [5]

**Study of breeds [4]

*Carpentry [2½]

*Drawing (farm buildings) [2]

*Blacksmithing [2½]

Military drill [2]

Breeds of horses [1]

Gymnasium [1]

or

†Cooking [2]

*Drawing (farm houses) [2]

Physical culture [2]

SECOND (B) YEAR

FIRST TERM.

English [1]

Agricultural physics [5]

Dairy chemistry [2]

*Dairy husbandry [2½] { Dairy lectures
Dairy practice
Dairy breeds

Fruit growing [3]

Music

Farm mathematics [5]

*Stock judging [1]

Breeding [2]

Military drill [2]

Gymnasium [1]

or

*Cooking [2]

Household art [1]

Physical culture [2]

*Sewing [2]

SECOND TERM.

English [1]

Agricultural chemistry [5]

Dairy husbandry [2½] { Dairy stock lectures
Dairy practice
Dairy feeding

Music

Agricultural physics [5]

Vegetable gardening [3]

Field crops [5]

Military drill [2]

Gymnasium [1]

or

*Cooking [2]

Home management [1]

Physical culture [2]

*Sewing [2]

COURSE OF STUDY—Continued.

THIRD (A) YEAR

FIRST TERM.

Agricultural chemistry [7]
 Forestry [3]
 Music, Chorus and Quartettes
 Entomology and zoology [5]
 Poultry [3]
 Algebra (5) Optional

Handling grain and machinery [1]	}	or	}	*Cooking [2]
*Veterinary science [2½]				*Sewing [2]
Gymnasium [1]				

SECOND TERM.

Civics or geometry [4]
 Plant propagation [3]
 Algebra [5] Optional

Dressing and curing meats [1]	}	or	}	Meats [1]
*Stock judging [1]				Home economy [1]
Feeding [3]				*Cooking [3]
Soils and fertilizers [5]				Domestic chemistry [3]
*Veterinary science [2½]				Domestic hygiene [1]
				*Sewing [3]

Figures in brackets indicate the number of hours per week in which the subject is pursued. All work in subjects marked thus extend through double time in the daily program.

†Three periods.

**Work outside of class not required.

ASSEMBLY.

On each school day at 11:40 a. m. the students assemble in the chapel. After the opening exercises brief talks are given by the principal, members of the faculty, or invited guests.

Members of the graduating class will, at this period, discuss the best books in literature, and articles on public questions, which appear in the leading magazines.

This plan gives to the students, in the course of the year, many things which will fit them to meet the demands of citizenship in the rural communities.

SCHOOL OF AGRICULTURE—PROGRAM, FALL TERM, 1904.

INSTRUCTOR.	8:15-9:00	9:05-9:50	9:55-10:40	10:45-11:30	11:40	1:15-2:00	2:05-2:50	2:55-3:40	3:45-4:30	4:35-5:20
Blair.....		{ B House- hold Art 5				{ C Sewing 1, 3, 5 B Sewing 2, 4		C Sewing 1, 3, 5 A Sewing 2, 4		
Boss, A.....	{ C II & IV Horses 3 or 4					B Br'd'g 2, 3				
Boss, W.....		A Power Machinery o Carpentry,				B Stock Judging 4				
Bull.....	{ C II and IV Agricul. 1, 2, 3			{ C III Agricul- ture 1, 2, 3		{ X Lecture 3 CV Agriculture 1, 2, 3			Y Lecture 3	
Cheney.....	{ C I Agr. Botany	C II Agr. Botany	C III Agr. Botany	C IV Agr. Botany		CV Agr. Botany				
Comfort.....		G English		{ C II English C Soc. Cult. 5		B English 1 or 3				
Drew.....		C BP'ks'th'g 5				C Blacksmithing 1 or 2 or 4 or 5				
Dye.....	{ A Poul'y 1, 2, 3 A Gym. Work 4 or 5	C Gym. Work 3	C Gym. Work 3	C Gym. Work 3		X Lecture 3 B Gym. Work 1 or 5		X Lecture 3 B Gym. Work 1 or 5		
Green.....	{ B III Fruit Gr'w 1, 2, 3	B IV Fruit Gr'w 1, 2, 3	B I Fruit Gr'w 1, 2, 3	B II Fruit Gr'w 1, 2, 3		A Forestry 1, 2, 3		A Forestry 1, 2, 3		
Haecker.....										
Hays.....				{ C I Field Agr. 1, 3, 5		B D'ry L. 1, 5		Dairy Practice 1, 3 or 5		
Koerner.....										{ A Music 5 B Music 3 C Music 2
McIntyre..		C III English								
Mayne.....	{ B III Farm Mathematics	B IV Farm Mathematics	B I Farm Mathematics							
Morgan.....										
Randall.....			C Drawing 1, 2							
Reynolds.....		C III Comp. Physiology	C I and IV Comparative Physiology			C Drawing 1, 4 or 2, 5		C Drawing 1, 4 or 2, 5 C II Com. Physiology		
Robertson..	{ B I Agr. Physics Study of Breeds 1, 2, 4, 5	B III Agr. Physics	B II Agr. Physics	B IV Agr. Physics				A Vet. Science 2, 4		
Shaw.....						Study of Breeds 1, 2, 4, 5				
Shepperd.....						B Cooking 3 A Cooking 4, 5		C Cooking 1, 4 or 2, 5 B Cooking 5		
Snell.....	G. Geom.		A Algebra B II and IV Dairy Chemistry 4, 5	G Algebra B I III D'ry Chem'try 4, 5 A Lab. Agr. Chem. 1, 2, 3, 4						
Snyder.....		A Agricultural Chemistry					A Lab. Agr. Chem. 1, 3			
Vye.....	C Farm Accounts 1 and 2					C Farm Accounts 2, 5 or 1, 4 Lecture 3		C Farm Accounts 1, 4 or 2, 5		
Washburn.....			A Ento. and Zoology	A Ento. and Zoology						
Whitridge.....		B Physical Training 2-4	C Physical Training 2, 4	C Physical Training 2, 4						

ASSEMBLY.

SCHOOL OF AGRICULTURE—PROGRAM, WINTER TERM, 1905.

INSTRUCTOR.	8:15-9:00	9:05-9:50	9:55-10:40	10:45-11:30	11:40	1:15-2:00	2:05-2:50	2:55-3:40	3:45-4:30	4:35-5:20
Blair					ASSEMBLY.					
Boss, A.	C II, III Horses 4	C I, IV Horses 4				B Sewing 2, 4 A Feeding 2, 3, 5	A, D and C Meats 1	A Sewing 1, 3, 4 A Stock Judging 1 Meats 2		
Boss, W.		C Carpentry 4					C Carpentry 1 X Lecture 3	or 2 or 4 or 5 Y Lecture 3	Y Lecture 3	
Bull	C II, III, IV Agr. 1, 2, 3 C I Agr. Botany	C II Agr. Botany	C III Agr. Botany	C IV Agr. Botany			C Agri- culture 1, 2, 3 C Botany			
Cheney										
Comfort	G English		C I IV Eng.	C II English						
Drew		C Blacksmithing 5					C Blacksmithing 1 or 2 or 4 or 5 Y Lecture 3	X Lecture 3	Y Lecture 3	
Dye			C Gym. Work 3				C Gym Work 3	B Gym. C Gym, Work 3		
Green	B IV Vegetable Garden 2, 3, 4	B III Vegetable Garden 2, 3, 4	A I Plant Prop. 5 B II Veg. Gard. 2, 3, 4	A II Plant Prop. 5 B I Veg. Gard. 2, 3, 4					A Plant Prop. Lab. 5	
Haecker						B Dairy Stk. Feeding 1, 5		Dairy Practice 1, 3 or 5		
Hays	B II and III Field Crops	B IV Field Crops								
Koerner										B Music 1, 3 C Music 2, 4
McIntyre									B English 4	
Mayne			A Civics 1, 2, 3, 4			Economics				
Morgan										C Mil. Drill 1, 3 B Mil. Drill 2, 4
Randall			C Drawing 1 and 2				C Drawing 2, 5 or 1, 4		C Drawing 2, 5 or 1, 4	
Reynolds			C III Comp. Physics	C I, IV Comp. Phys.				A Vet. Science 2, 4 C III Comp. Phys.		
Robertson	B I Agr. Physics	B II Agr. Physics	B III Agr. Physics	B IV Agr. Physics						
Shaw	C II and III Study of B'ds 1, 2, 3, 5	C I and IV Study of B'ds 1, 2, 3, 5				Study of B. 1, 2, 3, 5				
Shepperd	A Domestic Hygiene 2		B I Home Managem't 5	A Home Economy 5			A Cooking 2, 3, 5		C Laundering 1 or 4 B Cooking 2, 3, 5	
Snell	A Algebra	G Algebra	G Geometry	A Geomet. 1, 2, 3, 4						
Snyder	A Domestic Chem. 3, 4, 5	A Soils and Fertilizers	B I and IV Agr. Chem.	B II and III Agr. Chem.						
Vye		C Farm Accounts 1 and 2				C IV Farm Accounts 2, 5 C III Farm Accounts 1, 4 Lecture 3		C I Farm Accounts 1, 4 C II Farm Accounts 2, 5		
Whitridge		B Physical Culture 2, 4	C Physical Culture 2, 4	C Physical Culture 2, 4						

Courses of Instruction

AGRICULTURAL BOTANY.

This subject is taught with special reference to its bearing upon the every day problems that present themselves to the farmer and gardener. It is profusely illustrated with flowers and plants from the greenhouses and nursery. Some instruction is given in the use of the compound microscope. Students are thus enabled to study intelligently, in an elementary way, the tissues of plants. By this means they get a clear idea of the general principles of plant structure and vegetable physiology.

AGRICULTURAL CHEMISTRY.

In agricultural chemistry one term is given to the study of the elements and compounds which are of most importance in agriculture. This work is planned to prepare the student for intelligent study of the subject of the chemistry of foods, soils and fertilizers, and at the same time to familiarize him with the more important chemical changes which take place in every day life. Laboratory practice forms a prominent feature of the work in agricultural chemistry. In the chemistry of foods, the composition of plant and animal bodies, the chemistry of the plant and of its food and growth, the chemistry of animal nutrition, digestibility and value of foods, and the laws governing the economic uses of foods, are some of the subjects considered. The composition and the utilization of farm crops for food purposes, and the application of the principles of chemistry to plant and animal life form the basis of this work.

AGRICULTURAL PHYSICS.

The general principles of the science are taught, special stress being laid upon those which to the greatest extent enter into the business of the farmer. About half the time is devoted to experimental work, which includes capillarity of soil; diffusion and osmosis of gases and liquids; heating, lighting, and ventilation; farm machinery in particular, pumps, eveners—especially three and four horse, pulleys, milk-testers, centrifugals, incubators, wind-mills, steam and gasoline engines; friction and lubricants; 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.

AGRICULTURE.

Soils; selecting and planning farms; subduing the fields; drainage; irrigation; fences; roads; buildings; water supply; groves; farm life and the relations of general science in agriculture.

Farm management: Remodeling farm plans; rotation of crops; manuring; production and management of farm manures, green manure crops, and the place of commercial fertilizers in field management in various parts of the state; farm administration, management of fields in relation to fertility, to weeds, to yields, to live stock and to profits. Keeping weeds down by helpful crop rotations, careful field work, and good methods of farming generally; study of botany and habits of the various species of harmful weeds; methods of destroying each class of weeds.

ALGEBRA.

Algebra is optional during the third year. This work covers Wells' New Higher Algebra through simple equations. Special attention is given to literal notation, negative numbers, the equation and factoring.

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.

BREEDS OF HORSES.

The aim in teaching this subject is to familiarize the students with the types of horses best representing the breeds adapted to the conditions that obtain in the state. Score cards are used, and standards of excellence made for comparative work.

BREEDING.

Students receive instruction in the principles that govern breeding; on the influences that affect heredity and in the care and management of breeding stock. Pedigree receives careful consideration, and each student is required to make out pedigrees of two or more pure bred animals. They are also required to become familiar with methods of keeping live stock records of all kinds.

CARPENTRY.

Instruction is given by means of lectures on the care and use of the common carpenter tools, such as should be found on every farm; also on methods of farm building construction, framing, laying out rafters, stairways, estimating building material, painting, etc. In the carpenter shop students are required to make such exercises as will give them some practice in using carpenter tools. They are required to make mortise joints, splices, drawing boards, hammer handles, eveners, cupboards, etc.

Each student is required to file his own saws, sharpen his planes, chisels, etc., and to lay out rafters for buildings.

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 the affairs administered; the three departments—legislative, judicial and executive—and the functions of each; the interdependence of the state and its citizens, as well as the powers and obligations of each, by due attention to which the state may be strengthened and the condition of its citizens ameliorated.

The relation of the state to the general government; the constitution, and the powers it confers; and the provisions for amendments, are taught. The more important principles of commercial law, including contracts, agency, partnership, corporations, and commercial paper, receive attention. Instruction is also given in the United States method of surveying public lands.

COMPARATIVE PHYSIOLOGY.

During the first year students take one term of applied physiology. This is an effort to connect technical physiology with the necessities of every day life. The work includes a study of the general plan and structure of the body and the various individual tissues of which it is composed; also sources of heat and energy, digestion, and the relation of food materials to the various tissues of the body. Considerable attention is given to diseased and innutritious foods, food adulterations and narcotics. The circulation is studied with especial reference to the relation of the blood and lymph to tissue nutrition and tissue waste.

Accidents, including poisoning, are studied for the purpose of giving a practical knowledge of what to do in emergencies. Considerable attention is given to the subject of clothing, the various materials in use being considered with reference to fitness for special purposes. Some time is also given to the study of

common physiology, of the organs of circulation, digestion, respiration, nervous system, and the relations of bacteria to the common diseases, especially such diseases as consumption, typhoid fever, etc. A brief study is also given to the subject of digestion in the lower animals.

The class work is illustrated by means of large charts, skeletons, manikins, and dissections. Important points of difference between human and animal physiology are pointed out in preparation for the third year's work in the veterinary class. Matters of home and personal hygiene are interwoven with the physiology work.

COOKING.

The course in cooking extends through five terms of the curriculum as given below, with the subjects covered in each term:

(C) Second term—Kitchen management; care of cooking utensils and silverware; measuring and invoicing; cooking vegetables, cereals and breads.

(B) First term—Cooking meats, preserving fruits and vegetables.

(B) Second term—Eggs, beverages, soups, salads and table service.

(A) First term—Marketing and care of foods; dairy dishes, made over dishes, invalid cooking.

(A) Second term—Desserts, food rations, dietaries, confections, bills of fare and dining room.

DAIRY CHEMISTRY.

The chemical and allied changes which take place in the handling of milk and its manufacture into butter and cheese, and the application of these principles to the production of milk and its products form the basis of this work.

DAIRY HUSBANDRY.

Farm dairy lectures.—A course of lectures is given in farm dairying, giving instruction in the care of milk and utensils, explaining the principles involved in creaming milk by the gravity and centrifugal processes and giving full instruction in regard to running farm separators and the manufacture of butter and cheese in the farm dairy.

Dairy practice.—Students receive practical training in the most advanced methods of creaming milk, ripening cream, churning, working and packing butter, the manufacture of sweet curd cheese, and measuring the value of milk by the Babcock test and lactometer. This practice work begins the third week of the first term and continues through the school year.

Dairy stock.—During the last half of the first term students receive instruction in regard to characteristics of the various breeds of dairy cattle, their origin and comparative adaptability for the dairy. Lectures are given upon the points desirable in animals intended for the dairy. The students have practice work in judging dairy stock.

Feeding.—During the second term lectures are given covering both the scientific and practical phases underlying the principles of feeding. Practice work is given in compounding rations and estimating the comparative value of food stuffs.

DOMESTIC CHEMISTRY.

The combination of human foods to form balanced rations, dietary studies of families, cost and value of foods, losses in the cooking and preparation of foods, cereal food products, animal food products, adulterations of foods and their detection, fuels, soaps, dye stuffs and colors, composition of common household utensils, the household water supply, preparation of home made baking powders, bakers' chemicals, composition, food value and characteristics of tea, coffee, chocolate, cocoa, molasses, honey, vinegar and spices, the grading and testing of wheat flour and the chemistry of bread making, form the essential parts of this work.

DOMESTIC HYGIENE.

Several lectures by a physician will be given upon maidenhood, maternity and infancy. These special lectures will be supplemented by the regular lectures which consider the health of the family as dependent upon pure food, pure water, personal cleanliness and proper habits as well as upon heredity. The aim is to impress the truth that a knowledge of and obedience to the laws of hygiene are essential to the preservation as well as the restoration of health.

DRAWING.

The student is taught the practical value of drawing for the purpose of designing and arranging buildings, machinery, etc. He makes drawings of the shop exercises, then works from his own drawings, thereby learning the application.

Designs are made for dwellings, barns, outbuildings, and machinery. As practical subjects for their designs students are requested to bring from home data for plans of buildings needed on their farms. Estimates are made of the amount of material required and cost of construction.

DRESSING AND CURING MEATS.

The instruction given the boys consists of demonstration lectures on the preparation of meat for farm use. They are required in addition to take two weeks' practice in dressing, cutting and curing such meat as is likely to be used on the farm. Work is also given them in selecting and judging fat stock, and in judging dressed meats.

ENGLISH.

(C) The first year's work in English consists of almost daily practice in the simpler forms of composition. Applicants for admission to the C class should be familiar with the inflections of nouns, pronouns and verbs, the definitions and classifications of phrases and clauses and the common case constructions.

(B) Once a week throughout the school year the members of the B class will prepare short essays, and submit them for criticism.

(A) At the option of the English Department a series of literary programs will be presented in chapel by the members of the graduating class. The numbers will include abstracts of leading magazine articles, biographical sketches, book reviews and selections from fiction; special prominence will be given to authors depicting American life.

ENTOMOLOGY AND ZOOLOGY.

The class in entomology receives instruction of a practical nature. The course is divided as follows:

Classification of insects; habits and life histories of injurious forms with special attention to insect pests found in Minnesota. The nature of different insecticides and methods of application are discussed. The student spends some time in becoming acquainted with the appearance and habits of beneficial insects. Each student must collect fifty insects representing at least twenty-five different kinds.

FARM ACCOUNTS.

The work in accounts is applied to the transactions which the student meets in the various duties on the farm. He is 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.

FARM ARITHMETIC.

Instruction in this subject consists of the application of its principles to all kinds of farm problems, where measurements of material, extension, capacity, etc., are required. The student is prepared also to handle with ease the mathematics of the technical courses in the school.

FEEDING.

The principles of feeding as applied to the production of horses, beef cattle, sheep and swine are taught. Special attention is given to the choice and preparation of food for animals during different periods of growth and during the time they are used for breeding purposes and to summer feeding and pasturage. Practice is given in compounding rations that will include in the best manner the food stuffs commonly produced on the farm. Practical lessons in feeding are given at the barns under the supervision of an experienced feeder. Each student thus learns the requirements of each class of stock.

FIELD AGRICULTURE.

Selected portions of agriculture and field crops for girls.

FIELD CROPS.

Place in the rotation; preparation of the land; planting; cultivating; harvesting; storing and marketing of grains, field roots, fiber crops, sugar crops, grasses, clovers and other forage crops; planting, care and use of pastures and meadows.

Laws of heredity and variation; possibility of increasing values; improvement and formation of varieties; general facts as to methods of breeding; specific plans of breeding leading field crops.

FORESTRY.

Includes the consideration of the formation and care of wind breaks and shelter belts; the laying out and planting of home grounds; discussion of the hardness, habits and value of our native and introduced trees; and the methods of propagating them.

FRUIT GROWING.

Fruit growing is taught with reference to raising fruit for market and in the home garden.

GEOMETRY.

Geometry is offered in the second term of the third year, as an elective in place of civics to those who wish to prepare for a college course. This work covers the first two books of Well's Essentials of Plane Geometry.

GYMNASIUM WORK.

The gymnasium is a large, well lighted, two story brick building. It is well supplied with light and heavy apparatus for general gymnastic and athletic exercises, together with such appliances as are necessary for the development of a symmetrical body. Besides being fitted up with the finest apparatus, it possesses space and equipment for sprinting, pole-vaulting, hurdling, high and broad jumping, shot putting, etc.

Class work in physical training is required of all undergraduate young men not excused on account of physical disability. Courses are offered on the heavy apparatus, in corrective work, class drills, and athletic training. In addition to the regular class drill, a certain part of which consists of training in athletic sports, the school is represented by a strong basket ball team, a track athletic team, hand ball team, and an indoor tennis team.

HANDLING GRAINS AND MACHINERY.

Practical suggestions for the best methods of harvesting, shocking, stacking and storing of cereal grains. Machinery, adaptation of the various kinds, with reference to the soil, weeds, season, etc.; adjustment with especial reference to durability, convenience in manipulation, etc.

HOME ECONOMY.

The lectures are a study not only of the just proportion between expenditure and income, but of definite proportion in the expenditures made for existence, comfort, culture and philanthropy. A study is made of the sources of income, especially of the income from the farm in the form of house, food and luxuries; the purchase of clothing, household stores and furnishings is considered from the standpoint of the suitable. The relation of cash and credit to cost is also considered. Attention is given to savings and form of investment, a bank account and the use of a check book. Students are required to submit an account setting forth in detail the use of a certain named income expended in the support of a family for one year, embracing not only every item of necessary home expense, but also an outlay made for travel, luxuries, accident, sickness, or other emergencies. The habit of keeping a household account is calculated to strengthen the judgment in the wise use of money.

HOME MANAGEMENT.

The subject includes both housekeeping and home-making, and the instruction is based on the belief that housekeeping is a business as important as it is difficult, and that home-making is the noblest form of human endeavor. The care of the house and household belongings, of the food and the clothing, as well as the ordering of family life are considered in their relation to an adequate plan for

home management. To start the student in the right way of becoming mistress of the business of housekeeping and home-making is the end sought. The practical benefit to be derived from the knowledge students gain in the cookery, sewing, dairy, laundry and other classes, is emphasized and shown in its relation to an adequate plan for the daily program for the home.

HOUSEHOLD ART.

Lectures upon house and grounds, noting the distinctive character of the country home; the sanitary conditions involved in the selection of the site of the house; also the influence of the outlook; an elementary study of architecture in connection with planning a house which will provide "a place for everything" required in housekeeping operations and family life; instruction in the fundamental value of color, form and design in embodying beauty; training the taste and emphasizing the laws of hygiene that should influence the selection of materials and styles in the finishings and the furnishings of the house.

MEATS.

The instruction given to the girls in the subject of meats pertains to the selection and value of different classes of meat, and to the best methods of curing and preserving.

LAUNDERING.

In the first term of C year several lectures are given and practice work is provided in washing, ironing, starching, polishing, cleaning and pressing clothing.

LIBRARY.

The agricultural library now contains six thousand books and about six thousand pamphlets, including reports and bulletins. Aside from the large number of pamphlets and other publications of the different agricultural institutions and societies, a large number of the most important technical and agricultural magazines are kept on file, bringing together all the agricultural literature of any importance.

The librarian of the United States Department of Agriculture having inaugurated a system of co-operation with agricultural college and experiment station libraries, sent an assistant librarian who spent two months reorganizing the agricultural library. Students and teachers can now readily find literature desired, in so far as it is collected in the library, and the thanks of the department are due to the Secretary of Agriculture for the valuable aid given. Further co-operation with the Department of Agriculture and the Congressional Library is being arranged.

LITERARY SOCIETY WORK.

Any student belonging to a recognized literary society of the school may receive credit in the course of study for the work done therein by registering at the beginning of the term, and submitting to the teacher in English all essays to be read by such student before the literary society and rehearsing to said instructor all essays, readings, or recitations with a view to correct pronunciation, expression, etc.

MILITARY DRILL.

All male students of B and C classes, not physically unfit, are required to attend military drill. The students form an infantry battalion of four companies. Students are instructed practically in the schools of the soldier and company, extended order and military calisthenics, and theoretically in the schools of the soldier and company. Officers are selected from class A, non-commissioned officers from classes A and B.

The battalion is considered a part of the Corps Cadets of the University.

MUSIC.

Instruction is given in this subject, not with the purpose of making trained musicians, but to introduce the students to the elementary principles of this art, and to develop in them a love for this most valuable factor in home and social life.

Illustrated lectures, in which music by the masters is used, are given at stated intervals.

PENMANSHIP.

In penmanship the student is taught to write a plain hand with rapidity and ease. Daily drills are given using a free forearm movement.

PHYSICAL TRAINING.

The work done in this department aims at symmetry, co-ordination and control rather than mere physical strength. It is planned to improve the functional activity of the body and to counteract and correct tendencies to incorrect development, especially those resulting from the artificial life of civilization. The work of the beginning class is free hand, based upon Swedish principles, and directed especially to deep breathing, correct carriage and posture. The work of the advanced class includes light apparatus and aesthetic movements for suppleness in action and grace. Vigorous games are given to both classes.

PLANT PROPAGATION.

In this subject the principles underlying the development of cultivated varieties of plants and seed testing are taught; also the propagation of plants by seed, cuttings, grafting, and budding. The work of the class room is illustrated by the orchards, nurseries, forest plantations, gardens and greenhouses on the grounds of the experiment station and by visits to commercial nurseries and greenhouses near by.

POULTRY.

The instruction in this subject will include the following topics: History and characteristics of the leading breeds of poultry; breeding, feeding and management of fowls for eggs and for the market; planning, building and arrangement of poultry houses; managing incubators and brooders. A model poultry house, containing pens of the most improved breeds, incubator cellar, work-room, etc., has been provided, where experimental work and practical instruction are carried on.

SEWING.

The course in sewing consists of five terms' work. During the first term the student receives instruction in the elements of sewing, including different stitches, seams, hems, darning, etc., also practical talks on the use and care of all the implements belonging to the sewing basket. The second year's work consists of cutting and making plain garments, drafting of underwear, children's clothing, shirt waists and cotton dresses, taught by a very simple method, using only the tape line and square.

The third year the more difficult work of dressmaking is taken up; drafting patterns, cutting and fitting of dresses. Lectures are given on textiles, wearing and selection of materials. The study of harmony of color is given special attention. The course is designed to make each graduate capable of doing all kinds of sewing required in the home.

SOCIAL CULTURE.

A course of lectures is given on the usages of society, including manners, behavior, the voice, conversation, forms of address, invitations, etc. Suggestions are made in reference to reading, literary taste and the choice of books. Especial stress is given to the thought that the family life ought to be the highest expression of good society, and that next to the power of thinking correctly is the power of approaching others with ease and speaking with tactful directness.

SOILS AND FERTILIZERS.

The composition of soils, and their properties, the sources of plant food, the kinds and amounts of food required by crops and the best ways of supplying these demands, the various forms in which plant food exists in the soil, farm manures, their uses and action upon the soil, the income and outgo of fertility from the farm, soil exhaustion and soil improvement, the rotation of crops, as based upon the chemistry of soils and the principles governing the conservation of the fertility of the soil form the more important features of this subject.

STOCK JUDGING.

Score cards are used to an extent sufficient to familiarize students with that method of judging, and special efforts are made to do systematic and closely

critical work in the selection of animals representative of the breeds and for breeding purposes. Living specimens are used and rings will be made up for the student contests in stock judging. In connection with the work in dressing and curing meats, the judgment passed on live animals for the block is verified by score cards, judgment of the dressed carcasses and by actual block tests. These tests are made by the students and bring out the percentage of meat in each commercial cut of the carcass. The quality of meat is passed upon in this connection by experts, and a careful report made to ascertain the type of animals best calculated for the production of the most meat of the best quality.

STUDY OF BREEDS.

This work covers a discussion of characteristics of the leading pedigreed breeds of beef cattle, sheep and swine adapted to northwestern conditions; the environments to which each breed is especially suited; and practice in the selection of animals that are representative of the various breeds.

VEGETABLE GARDENING.

Vegetable gardening embraces the study of garden tillage, irrigation, and rotation of crops; transplanting; formation and care of hotbeds; study of garden insects; and the growth of various vegetable crops.

VETERINARY SCIENCE.

During the A year the student takes up a course of study in veterinary medicine, the purpose of which is to fit him for intelligent care of his farm stock. In this course the teaching is done by means of lectures, distribution of mimeographed lecture notes after each lecture, reviews and clinical work at the hospital maintained for this purpose. Lectures are illustrated by means of charts, manikin of horse, skeleton of horse, and various other appliances.

The lectures consist of a series on each of the following subjects: Elementary anatomy; elementary pathology; cause and prevention of diseases; diagnosis and treatment of common diseases, examination for soundness; and a final short course on common medicines, studying their effects, uses and doses. At the hospital clinics students are enabled to examine and care for a variety of cases and to learn the elements of diagnosis for the more common diseases and forms of lameness.

STUDENTS' TRUST FUND.

The class of 1902 left with the school a fund of \$100 "to assist by temporary loans at a reasonable rate of interest, deserving students needing such help, who are not below the B class in the school of agriculture." This fund is in charge of a committee, consisting of the secretary, the principal, the preceptress of the ladies of the school, and the president of the A class.

THE LUDDEN TRUST.

The Honorable John D. Ludden, of St. Paul, gave the University of Minnesota \$5,000 to be held, invested and re-invested by the University, through its Board of Regents, and the income thereof to be collected, received and applied by said Board of Regents to the financial assistance of students of either sex in the school of agriculture. Mr. Ludden delivered into the hands of the regents for the principal sum one Northern Pacific registered prior lien railway land grant gold bond

of the denomination of \$5,000, payable to the University of Minnesota and its assigns in gold coin, on the first day of January, 1997, with interest at 4 per cent per annum, payable quarter-yearly in like gold coin, the fund to remain so invested until the bond matures, unless by reason of changed conditions a re-investment shall be sooner deemed judicious by the Board of Regents for the safety, conservation or continued productiveness of the fund. The premium on the purchase of this first grade security was \$212.50, and was paid by Mr. Ludden, thus enlarging his donation by that amount.

Mr. Ludden imposes the following conditions: "The beneficiaries must be youths who are residents of the state of Minnesota; they must be and continue of unblemished moral character, and of temperate and industrious habits, and they must be such as by examination and trial shall evince and maintain a taste, habit and aptitude for study and improvement; and any student who shall fail to come, or shall cease to be, within the above conditions shall forfeit all claims to the benefit of such fund. Subject to these conditions the administration of such income is entrusted to the said board of regents, which may make such rules therefor as they may deem judicious."

This fund produces \$200 a year. Those wishing to avail themselves of its benefits should apply to the executive committee of the Board of Regents of the University of Minnesota.

Intermediate Year

FOR GRADUATES OF THE SCHOOL OF AGRICULTURE WHO WISH TO ENTER THE COLLEGE COURSE.

The larger part of the studies in the school of agriculture are technical subjects in agriculture and home making, and in related sciences. Graduates of the school who continue with the college course take a part of their work in the college of science, literature and the arts, where they are in classes with students who have graduated in city high schools.

They find it necessary, therefore, to spend a year in the further study of general academic branches, that they may advantageously enter such classes. To meet the needs of those graduates who cannot better secure such instruction, in high schools near their homes, an intermediate year has been provided.

The following prescribed course, or its equivalent, taken in some other school, is required of graduates of the school of agriculture who desire to gain admission to the college of agriculture:

FIRST TERM.	SECOND TERM.
Algebra [5]	Algebra [5]
Geometry [5]	Geometry [5]
English [5]	English [5]
General history [4]	Economics [4]

The courses in mathematics for the intermediate year cover Wells' New Higher Algebra from simultaneous equations to logarithms, Downie's Higher Algebra, Part 1, and Wells' Essentials of Plane and Solid Geometry, beginning with Book III. The work preliminary to these courses is done by the student in the A year in the School of Agriculture.

The course in English extends through both terms. Two periods a week are devoted to composition, with Scott & Denny's Composition-Rhetoric as a text-book, and three to the study of literature, which will also be made the basis of considerable written work. The characteristic works of the following authors will be studied: Shakespeare, Bacon, Milton, Addison, Gray, Goldsmith, Burns, Wordsworth, Lamb, Macaulay, Ruskin, Browning and Tennyson. Individual members will be assigned readings from various other authors.

Short Course for Farmers

FACULTY

- WILLIAM M. LIGGETT, *Dean.*
SAMUEL B. GREEN, B. S., *Horticulture, Forestry.*
J. A. VYE, *Business Methods.*
HARRY SNYDER, B. S., *Agricultural Chemistry.*
T. L. HAECKER, *Dairy Husbandry.*
M. H. REYNOLDS, M. D., V. M., *Veterinary Science.*
W. M. HAYS, M. Agr., *Agriculture.*
THOMAS SHAW, *Live Stock.*
J. M. DREW, *Poultry, Workshop Hints.*
A. BOSS, *Dressing and Curing Meats.*
WM. BOSS, *Farm Mechanics.*
F. L. WASHBURN, M. A., *Insect Enemies.*
COATES P. BULL, B. Agr., *Farm Implements.*
L. S. CHENEY, M. S., *Farm Botany.*
D. D. MAYNE, *Parliamentary Practice.*

To meet the needs of men of mature years, who are busy on the farm the greater portion of the year, a special course of lectures has been prepared. Investigations and experiments by scientific men are uniting to produce great changes in the practice of agriculture and the management of live stock. In order to keep up with the times, the farmer must bring himself into close relations with recent investigations, discoveries and methods relating to his business. This course is organized to meet just this need, and to bring within reach of the busy farmer the results of the latest methods and experiments.

This course will open January 10th, 1905, and continue for eight weeks. Work in lecture room, class room and laboratories extends from 9 o'clock a. m. to 2:30 o'clock p. m. A part of the afternoon will be devoted to study and investigation. The University farm, livestock, barns, greenhouses, grounds and laboratories of the college and school of agriculture afford ample opportunity for interesting study.

There will be no lecture course on Monday, but this day will be spent in visiting places of interest, such as the stock yards, flour and flax mills, greenhouses, stock farms, etc.

For this course a fee of \$10 will be charged. Board may be secured in either of the Twin Cities at \$3.50 to \$4.50 per week.

The school is situated at St. Anthony Park, on the Como-Harriet car line, between St. Paul and Minneapolis. Get off at Commonwealth avenue.

Farmers wishing to register for course, or desiring further information, should address Jas. M. Drew, St. Anthony Park, Minn.

The course of lectures and study is outlined as follows:

Agriculture: Judging the qualities of soils, the selection of farms, planning farms; developing the fields, drainage, roads, fences; developing the farmstead and its buildings; managing fields and growing, cultivating, harvesting and preserving forage and grain crops; the rotation of grain cultivated and grass crops, the use of live stock, and general farm management.

Dairy husbandry: In this division there is a course of sixteen lectures giving an outline of the origin and history of the various breeds of dairy cattle, the characteristics of each and conditions to which each breed is especially adapted; the conformation and type of cow specially adapted to economical dairy work; an outline of the fundamental principles of feeding, the composition and character of the various feed stuffs with plain and practical instruction in rearing young stock and feeding dairy cows. Practice work will be given in judging dairy stock.

Animal husbandry: The course will embrace forty-eight lectures to be given in three series. The first will include twenty lectures, the second, eight and the third, twenty.

The first series will treat of such breeds of cattle, sheep and swine as are now popular in the Northwest, or are likely to become more so. They will dwell upon such features as approved form, the uses for which they ought to be kept, the soil and climate best suited to growing them in the best manner, and differences that obtain between them in form, function and adaptation.

The second series will discuss certain of the more practical phases of animal breeding. They will consider the chief laws that govern breeding and how to turn them to practical account on the farm or on the range, and also the selection of prepotent sires and dams. The place for cross breeding and grading up and the best methods of doing the work will be discussed, and also the nature and value of pedigrees. The value of in-an-in breeding will be dwelt upon and also its danger.

The third series will discuss the feeding and management of beef cattle, sheep and swine on the farm. Foods suitable to each of these classes of animals will be discussed, and the methods of preparing and feeding them to the best advantage. Pastures will also be discussed, and outbuildings, and indeed all the more important features of managing animals from birth to maturity.

A portion of the period allotted to each lecture will be spent in judging animals brought into the class room. Hence forty-eight exercises will be given in the work of judging live stock.

Agricultural chemistry: Soils and foods are made prominent features of the work in agricultural chemistry. Four lectures are given on the chemistry of fertilizers, including the conservation of the fertility of the soil, the composition and use of farm manures, the draft of different farm crops upon the soil and the methods of making the fertility of the soil available as food by the rotation of crops and by other means so as to secure the necessary chemical changes in the soil to produce the highest degree of fertility. Four lectures are also given on the chemistry of foods.

Farm mechanics: The instruction given in this subject will consist of lectures on farm mechanics, taking up such subjects as pumps, farm water systems, windmills, the general principles of steam and gasoline engines, placing shafting,

pulleys and belts; pipe fitting, soldering, etc. Some instruction will also be given on sharpening and using hand tools, such as saws, planes, chisels, and other tools necessary in farm practice.

Farm implements: The lectures on farm implements will be illustrated, as far as possible, by samples. Stereopticon views will be made use of in illustrating machines that cannot well be taken to the class room. It is the aim in these lectures to bring out the lines covering the draft of implements and the objects attained by their use. Suggestions will be made on selection of implements adapted to various kinds of work. The care of implements when not in use will also be discussed, and an attempt made to give as fully as possible all information that will be beneficial in the care and handling of farm machinery.

Dressing and curing meats: The work in dressing and curing meats will be given in a course of demonstration lectures. In demonstrating these lectures the animals will be dressed before the class and the reason for each operation fully explained. The method of cutting up the dressed carcass for different purposes will also be shown before the class and the use and value of each cut explained. Sausage making, lard rendering, and the "working up" of all parts of the animals will be taught in a simple and direct way.

Farm accounts: A series of lectures will be given on business forms, business arithmetic and the keeping of simple farm accounts and records.

Farm botany: Eight lectures will be given on the phases of botany, of special interest to farmers; for example, the pollination of flowers; weeds and weed seeds; poisonous plants, fungus diseases of plants and how to deal with them.

Farm horticulture: Lectures will be given on the care and management of the apple and plum in this climate, including such subjects as location of the orchard, selection of the trees, planting, cultivation, green manuring; preparation for winter; advantages and disadvantages of root grafting, budding, and top working; insects and diseases injurious to orchards.

Lectures on the care and management of small fruits will consider the subjects of selection of varieties, planting and cultivation, origin of new varieties, propagation, marketing, winter protection, also the insects and diseases injurious to raspberries, blackberries, currants, gooseberries, strawberries and grapes.

Under vegetable gardening will be considered the growing of potatoes, tomatoes, celery, onions, squash and cucumbers.

Veterinary science: This work includes a series of lectures on elementary anatomy, animal foods and digestion; and causes, prevention and treatment of common diseases of farm stock. An especial effort is made to have this work practical and helpful to men who are actually handling farm stock.

Poultry: Twenty lectures will be given on this subject with special reference to the needs of the Minnesota farmer. The following subjects will be considered: Location and construction of poultry buildings and yards; a study of the breeds best adapted to the farmer's use; the hatching, rearing and management of the farmer's flock; feeding for eggs and for fattening; killing and dressing fowls, and packing for market; marketing eggs.

In addition to the above, four lecture periods will be devoted to farm workshop hints, such as splicing rope, making rope halters and rope belting, and tempering simple tools.

Economic entomology: The entomologist will give a course of lectures on injurious and beneficial insects and will discuss the various insecticides and methods of application.

If there be sufficient demand to warrant, and time permits, a few lectures will be given on birds and their relation to agriculture.

Parliamentary practice: A debating club is made up of the members of the short course class and weekly meetings are held which give opportunity for learning how to conduct public meetings and practice in public speaking.

Dairy School

THE FACULTY

- CYRUS NORTHROP, I L. D., *President.*
WILLIAM M LIGGETT, *Dean.*
T. L. HAECKER, *Professor of Dairy Husbandry.*
J. A. VYE, *Creamery Records and Accounts.*
HARRY SNYDER, B. S., *Dairy Chemistry.*
M. H. REYNOLDS, M. D., V. M., *Diseases of the Dairy Cow.*
W. M. HAYS, M. Agr., *Forage and Pastures.*
J. M. DREW, *Buildings and Stable Conveniences.*
WILLIAM BOSS, *Instructor in Practical Engineering.*
B. D. WHITE, *Instructor in Creamery Management.*
M. SONDERGAARD, *Instructor in Cultures and Starters.*
H. L. RUSSELL, Ph. D., *Dairy Bacteriology.*
A. W. PARKIN, *Instructor in Cheese Making.*
ED. K. SLATER, *Assist. Instructor in Creamery Work.*
H. J. CREDICOTT, *Assist. Instructor in Cultures and Starters.*
HENRY SANDHOLT, *Assistant in Creamery Work.*
C. B. MOAK, *Instructor in Dairy Laboratory.*
MISS JULIA BRUDE, *Instructor in Sweet Cured Cheese Work.*

The next session of the Dairy School will open Monday, November 21st, 1904, and continue four weeks.

This course is designed to furnish persons, who are actually engaged in the manufacture of butter and cheese, in creameries and cheese factories, 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 in the creamery training room every hour of every working day of the term.

The rapid growth of the dairy industry in the Northwest calls for constant enlargement in equipments for dairy hall. With each succeeding year as dairy products manufactured in our creameries, take higher rank in quality and finish, the character of the instruction given must be of a higher order. To meet these requirements the training rooms are each year equipped with the best apparatus, and the corps of instructors is composed of the most skillful workmen and best instructors.

No pains will be spared to maintain the high standard which the school has attained. Each member of the faculty has special qualifications for the duties to which he has been assigned. The lecture course and practical instruction are arranged with special reference to giving the greatest amount of training and practice possible in a four weeks' session. Large additions have been made to the equipment of the dairy hall in both butter and cheese departments; in fact, it has everything needed for conducting the work by the most approved methods.

Instruction is divided into seven 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 milk, making daily composite tests, and the pasteurization of milk and cream.
- 5th. Practical engineering, steam fitting and plumbing.
- 6th. Practical work in factory bookkeeping.
- 7th. Practice work with cultures and starters.

I.—LECTURES.

The course of sixty lectures furnishes in a plain and concise form the most valuable information for those who are interested in any branch of agriculture, covering, as it does, the most important points in the breeding, rearing, feeding and general management of dairy stock, the economical production of milk, growing and preserving of forage and grain crops, the management of meadows and pastures, management of barns, stables and yards, construction of silos, co-operative dairying, creamery and cheese factory management, judging and marketing dairy products, the chemistry of milk, dairy bacteriology, engineering, animal hygiene and treatment of the common diseases of the dairy cow.

II.—BUTTER MAKING.

The running of separators; ripening and churning of cream; the proper acidity of cream to secure best flavor; how to churn, wash and salt butter so as to avoid specks and mottles; to secure good grain and best methods of preparing for market—are some of the points which receive special attention. As all creamery men should be able to judge butter from a commercial standpoint, students are trained daily in the art of scoring butter by the score card.

III.—CHEESE MAKING.

The work in the cheese room is conducted on a large scale, including the manufacture of several brands of fancy cheese. The fact that there is a demand for these at highly remunerative prices has induced the Regents to provide the necessary means for carrying on this work.

A complete record of every step taken is required of each student. Here is a good opportunity for cheese makers to meet, investigate new methods, make experiments on doubtful points, compare notes, and thus gather in a few weeks knowledge that otherwise would take years to acquire.

IV.—MILK TESTING.

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 our factories and creameries now base the payment for milk on the fat content. 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 thorough training in milk testing daily exercise is given. Steam, turbine and hand power machines and other apparatus are provided and operated in the laboratory.

The pure and wholesome milk and cream supply for our cities is a matter of vital importance, and there is great need for improved methods of handling milk intended for this purpose. To meet this, milk and cream pasteurizing apparatus of the latest and most improved makes has been provided for the dairy school, and a few advanced students will be given instruction in this work.

V.—MOTIVE POWER.

The work in engineering consists of practical talks on the construction, care and management of creamery engines and boilers, pumps, injectors, heaters, etc., and work in the practice room.

In the practice room is provided an eight horse power simple, slide-valve engine, three types of boiler feed pumps, two types of deep well pumps, one injector, two milk pumps and a steam gauge, which the students have the privilege of examining and operating. Instruction is also given in pipe fitting, placing shafting, babbitting bearings, soldering, etc.

It is the aim to make this work as practical as possible. Questions of interest on the subject are freely discussed.

VI.—FACTORY BOOKKEEPING.

All the essential features of factory accounting from the receipt of the milk to the returns in net proceeds are thoroughly considered. Paying for the milk according to the fat content, or otherwise, is fully explained. The students do, in books provided, the actual one month's accounting of a creamery.

VII.—STARTERS AND CULTURES.

Since all students who are admitted to the school have had some experience in the routine work of running separators, and since the most important part in butter making is the art of uniformly making a product having a fine flavor and good keeping qualities special attention is given to cultures, starters and pasteurization. Constant additions will be made to the equipment needed to make this course inviting to those who wish to fit themselves for masters of the art of creamery butter making.

REQUIREMENTS FOR ADMISSION.

Experience has shown that students who have had some practical training in the creamery or cheese factory before coming to the dairy school are, as a rule, the ones who are able to make the most of the course; it is therefore required that persons who intend to take this course shall have had at least one season's experience before coming to the school. No entrance examination is required.

EXPENSE.

A registration fee of \$15 is required of each student. Students can board in either city and reach the school by street car, or board can be secured near the school for from \$3.50 to \$4.00 per week. Each student is required to supply himself with two white suits, including caps, to be worn during working hours in the creamery and cheese rooms. The suits may be procured for about \$1 each.

DAIRY CERTIFICATES.

The Regents will grant dairy certificates to students who have taken the course and passed a satisfactory examination and in addition have demonstrated by at least one year's work in a factory that they have acquired special skill in the art of butter and cheese making, and are thoroughly qualified to take charge of a creamery or cheese factory.

To reach the school from either St. Paul or Minneapolis, take the Como-Harriet street car and get off at Commonwealth avenue.

Address applications for admission to T. L. Haecker, St. Anthony Park, Minn.

Rural School Agriculture

Wm. M. Liggett, Dean of Department.
Willet M. Hays, In Charge.

As provided by law, this department is co-operating with the State Department of Education in introducing the study of Agriculture and Home Economics into the rural schools of the state.

The progress already made, is, on the whole, very encouraging. A general national movement in progress to make our system of rural schools efficient in industrial education, and more efficient in general education, is giving impetus to the betterment of education for country people. Each of numerous states is experimenting, and some of the experiments are developing successful lines of instruction in agriculture and home economics in the rural schools. The difficulties are also being analyzed. The great benefits to be secured by instruction relating to the farm and the home, are being emphasized. The body of thought suitable to use in giving this instruction in the rural schools, is being separated and arranged in pedagogical form. Some of this material is found suitable to use in reading lessons; some will serve the teacher to use in talks; and some forms the basis of practical work, using simple laboratory methods.

During the past year, this department published "Rural School Agriculture, Bulletin No. 1," a bound book of two hundred pages, and containing 237 exercises. These exercises were prepared by the instructors in the College of Agriculture in a form for the rural school-teacher to have the pupils carry them out. A sufficiently large edition was published so that each county superintendent was supplied with a sufficient number of copies so that he could place one in each rural school in his county. The State Department of Public Instruction has sent instructors into many of the teacher's state summer schools, during the past two years to prepare the teachers of rural schools to use this book. Reports as to the success met by the teachers in using this book have been re-

ceived from county superintendents and others. The concensus of opinion in the state is that the book is very useful in the hands of the rural teachers. Some county superintendents who are taking an interest, are securing teachers better qualified to give instruction in these industrial matters, and are inducing all of their teachers to do the best they can with this book. On the whole, it has met with as much success as could be well expected. Much rests with the county superintendents and others in authority; but most depends upon the teachers. Those teachers who have successfully used these exercises, have increased the interest of their patrons as well as the pupils in the school.

Some county superintendents have found in the difficulties in the use of this book, reasons for the consolidation of rural schools. Each consolidated rural school could afford one teacher trained in agriculture, and another trained in home economics. Instead of 7000 small rural schools, requiring 7000 teachers trained in these subjects, 1000 consolidated rural schools with 4000 teachers would require only 1000 teachers in each of the two subjects. The department is interested in rural school consolidation, because better instruction could be given in industrial work, and because the state can more easily provide special training in agriculture and home economics for two thousand teachers than for seven thousand.

Owing to the fact that the last legislature did not make further special provision for this work, no further publications have been prepared for free distribution to the schools.

Many addresses have been made by Professor Robertson and others, and this department is in thorough co-operation with those in the state, and nation, who are promoting the introduction of agriculture into rural schools. The most important lines for advancement seem to be: the preparation of books and other helps to be used by rural school teachers; the training of a large number of teachers in agriculture and home economics, and the consolidation of rural schools with pupils conveyed to schools in districts four to five miles square.

A county option law under which counties may consolidate all their rural schools, has been framed by this department and as it meets with well nigh universal approval, it is hoped that it will be enacted into a law by the next legislature. It passed the house unanimously during the last legislature and failed because it did not reach the senate in time for proper consideration.

The Agricultural Experiment Station

WM. M. LIGGETT, *Director.*

WILLET M. HAYS, M. Agr., *Agriculturist.*

SAMUEL B. GREEN, B. S., *Horticulturist.*

HARRY SNYDER, B. S., *Chemist.*

T. L. HAECKER, *Dairy Husbandry.*

M. H. REYNOLDS, M. D. V. M., *Veterinarian.*

ANDREW BOSS, *Associate in Agriculture, in charge of Live Stock.*

FREDERICK L. WASHBURN, M. A., *Entomologist.*

T. A. HOVERSTAD, B. Agr., *Superintendent Sub-station, Crookston.*

HERMAN H. CHAPMAN, B. S., B. Agr., *Superintendent Sub-station, Grand Rapids.*

J. A. HUMMEL, B. Agr., *Assistant Chemist.*

COATES P. BULL, B. Agr., *Assistant in Agriculture, Rural Engineering.*

J. A. VYE, *Secretary.*

The Agricultural Experiment Station of the University of Minnesota is devoted to the discovery of facts and processes useful to the farmers of the state, and to disseminate knowledge of improvements in agriculture and home making. This station was established in 1887, under laws enacted by the state and national governments. It is supported in part by funds supplied through the University by the national congress, and in part by funds appropriated by the state legislature. It has also a small income from sales of products. It has published annual reports since 1892, eighty-two general bulletins, sixteen press bulletins; fourteen class bulletins; and twenty-four press bulletins have been published by its sub-station at Grand Rapids.

The work of experiment stations embraces a wide range of agricultural subjects included under the headings of agriculture, horticulture, forestry, animal husbandry, dairying, agricultural chemistry, entomology and veterinary science.

Bulletins giving the results of experiments are published in editions of 15,000 copies. These are sent free to all farmers

in the state who ask to have their names placed on the station mailing list, and the postoffice department carries them free under the director's franking privilege.

The experiment station is located at University farm, St. Anthony Park, where most of its officers also teach in the college and school of agriculture. It uses the larger part of the University farm, containing 250 acres.

The officers of the experiment station are ever ready to advise by letter or by personal interview, and the correspondence of the station increases annually.

The experiment station is in co-operation with the U. S. Department of Agriculture and with several experiment stations in other states. Besides the sub-stations mentioned above it is assisted by nearly a score of trial stations, associated with the State Horticultural Society. It has also enlisted several hundred farmers and seed growers as seed co-operators who are aiding the station in disseminating its newly originated and tested varieties of field seeds. Nearly fifty farmers are serving as statistical co-operators and are assisting joint agents of the station and of the U. S. Department of Agriculture in securing data as to the cost of growing crops, and of producing livestock products.

PUBLICATIONS OF THE DEPARTMENT OF AGRICULTURE.

BULLETINS OF THE EXPERIMENT STATION FOR 1902.

Annual Report for 1902.

General Bulletins:

- No. 77. Insects notably injurious in 1902.
- No. 78. Experiments in sheep husbandry.
- No. 79. Investigations in milk production.
- No. 80. Alfalfa.
- No. 81. Review of the work of the Northeast Experiment Farm.
- No. 82. Haemorrhagic Septicaemia.

Press Bulletin:

- No. 16. The Criddle mixture.

THE FARM STUDENTS' REVIEW.

The Alumni Association of the School of Agriculture, with some aid by officers of the department, publishes a monthly agricultural paper. This paper aims to keep the graduates in

touch with each other, and with the department, and provides a medium through which they may relate their experiences in various lines of farming, and home making. It publishes articles by graduates, students, members of the faculty and by others especially qualified to discuss agriculture, live stock, dairying, horticulture, agricultural chemistry, home economics, the rural school and other subjects relating to country life. It serves also as a semi-official organ of the Alumni Association and of the Farmers' Club of Minnesota (an organization made up of students and ex-students of all the courses of the department of agriculture).

THE
COLLEGE OF LAW

The College of Law.

FACULTY.

- CYRUS NORTHROP, LL. D., President.
WILLIAM S. PATTEE, LL. D., Dean and Professor of Law.
Equity and International Law.
A. C. HICKMAN, LL. D., Professor of Law.
Pleading and Practice.
JAMES PAIGE, A. M., LL. M., Professor of Law.
Torts and Criminal Law.
HENRY J. FLETCHER, ESQ., Professor of Law.
Contracts and Real Property.
EDWIN A. JAGGARD, A. M., LL. B., of the Ramsey County
Bench.
Taxation.
HOWARD S. ABBOTT, B. L., of the Hennepin County Bar.
Corporations.
ROBERT S. KOLLINER, LL. B., of the Hennepin County Bar.
Personal Property.

LECTURERS.

GEORGE B. YOUNG, LL. B., St. Paul, Minn.
 (Ex-Associate Justice of the State of Minnesota.)
Conflict of Laws.

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.

HON. JOHN DAY SMITH, LL. M., Minneapolis, Minn.
American Constitutional Law.

HON. HERBERT R. SPENCER, Duluth, Minn.
Admiralty Law.

JOHN COCHRANE SWEET, LL. M., Minneapolis, Minn.
Mortgage Foreclosure.

JARED HOW, LL. B., St. Paul, Minn.
Landlord and Tenant.

FRED E. HOBBS, B. S., LL. B.
Instructor in Justice and Moot Court Practice.

HUGH E. WILLIS, A. M., LL. M.
Quiz Master and Instructor in Law.

SPECIAL LECTURERS UPON GENERAL TOPICS
 FOR 1904-5.

C. W. BUNN, St. Paul, Minn.
 (General Counsel of the Northern Pacific Ry. Co.)

FRANK B. KELLOGG.
 (General Counsel for the Chicago Great Western Ry. Co.)

M. B. KOON.
 (Ex. Judge of District Court.)
 Hennepin County, Minn.

WILLIAM LOUIS KELLEY.
 (Judge of District Court.)
 Ramsey County, Minn.

The College of Law.

OBJECT.

It is the object of the College of Law of the University of Minnesota to educate its students by means of the study of jurisprudence, and at the same time so familiarize them with the fundamental principles of positive law that they will be able, at the end of their course, to safely enter upon the duties of the legal profession. Education, and not simply information, is the prime object. The power to think clearly, to reason cogently, to perceive distinctions quickly, to investigate thoroughly, to generalize carefully and to express his thoughts accurately are the basal qualifications of the safe counsellor. To secure for the students these habits of thought and expression should be the aim of both the student himself and his instructor.

The method of work generally pursued in the college is threefold. **First.** The reported cases, being the original repositories of the principles of law and equity, are read by the student and considered in the class-room. To facilitate the work and save expense for the student, volumes of these cases are reprinted and put, free of charge, into the hands of the student during the continuance of the subject, and each subject is pursued daily until its completion. **Second.** Besides reading the cases, the student in most subjects is required to prepare a written analysis of each case, stating in his own words, the issue upon which the case turns, the law which governs it, a brief statement of the facts, and the conclusion which the law and facts logically necessitate. This practice has proved helpful in securing a greater thoroughness in reading, greater carefulness in reasoning and greater accuracy on the part of the student in the art of expression. **Third.** In addition to the student's investigation of the cases, and his presentation of them to his instructor, a systematic and orderly arrangement of each subject in the form of a summary, and much additional information regarding the details of the law's application in particular instances, and a consideration of the exceptions, limitations and statutory modifications of general principles, and especially information regarding the art of practice, are indispensable, and are in most instances supplied by printed lectures prepared for that purpose, or by well written text-books upon the subject under consideration. **Information**, as well as **education**, is necessary

to prepare a student to begin the practice of law. So far as possible he should, at the end of his course, grasp the various subjects of law in the unity of a system, and to do this he must, in many instances, take the generalizations of his instructor, or take them from some text-book, until he shall find time to investigate the subject for himself.

NEW BUILDING.

During the last year a large, convenient and beautiful addition has been made to the Law building; and the original building has been largely reconstructed, greatly improved and thoroughly adapted to the uses of the college.

A new library room, eighty-one feet in length by forty-two feet in width, has been provided and furnished with all the modern conveniences. It has a perfect system of ventilation, is lighted with both gas and electricity, has the best possible facilities for consulting the authorities and is supplied with those text-books and reports especially necessary for students of law. Probably no more beautiful and convenient reading room can be found in any university in America.

A large and convenient auditorium has also been supplied by the new addition, and also two large rooms for the literary societies of the college.

By the reconstruction of the older part a court-room, with clerk's office, jury room and all the conveniences of a modern court house, is provided; so that there is now all the room necessary for the efficient work of the college, and all that will probably be required for years to come.

CALENDAR.

August	30	to September 5	Entrance examinations and registration.
September	6		Classes called for regular work.
November	23		End of first term.
	29		Second term opens, classes called for regular work.
December	17		Holiday recess begins—no classes.
January	3		Work resumed.
March	4		End of second term.
	7		Third term opens, classes called for regular work.
May	28	to June 1	Commencement week.
June	1		Commencement day, graduating exercises.

REQUIREMENTS FOR ADMISSION.

Graduates of universities or colleges, and students who have graduated from any normal school or State high school of Minnesota, or from similar institutions of equal grade in other states, are admitted without examination upon presentation of their diplomas.

All other applicants must pass an examination in the studies required for admission to the freshman class of the college of science, literature and the arts, which are as follows:

N. B.—**Time element, as indicated with each subject, is essential.**

A three year's course of reading in the English classics.

English Composition, one year.

Algebra, elementary, one year.

Algebra, higher, one-half year.

Geometry, plane, one year.

Geometry, solid, one-half year.

In addition to the above named subjects, which are required for all courses, and for which substitutes cannot be accepted, applicants shall present evidence of preparation in **eight** year-credits, or their equivalent, to be chosen from the following list:

Latin,

Grammar (one year-credit).

Caesar, four books (one year-credit).

Cicero, six orations (one year-credit).

Vergil, six books (one year-credit).

Greek,

Grammar (one year-credit).

Anabasis, four books (one year-credit).

German,

Grammar (one year-credit).

Literature (one year-credit).

French,

Grammar (one year-credit).

Literature (one year-credit).

English,

Latin element (one year-credit).

Literature (one year-credit).

History, Greece and Rome (one-half year-credit).

England (one-half year-credit).

Modern (one-half year-credit).

Medieval (one-half year-credit).

Senior American (one-half year-credit).

Civics (one-half year-credit).**Political economy (one-half year-credit).****Physics (one year-credit).****Chemistry (one year-credit).****Botany (one-half or one year-credit).****Zoology (one-half or one year-credit).****Astronomy (one-half year-credit).****Geology (one-half year-credit).****Physiography (one-half year-credit).**

N. B.—By a **year-credit** is meant, a full year's work upon one subject, five recitations per week, as given in an ordinary high school course.

Substantial equivalents may be substituted, and a business education, as well as experience in teaching, may be accepted in lieu of some of the less important subjects.

Applicants who have diplomas entitling them to admission without examination should present them to the dean of the college, and those who are to take examinations or enter as special students should present themselves to the dean, who will, upon proof of their qualification for admission, refer them to the registrar and accountant to whom they pay their matriculation fee and the first term's tuition.

SPECIAL STUDENTS.

Persons who are not candidates for a degree may enter the college as special students by special permission of the faculty; but any undergraduate from a high school will be required be-

fore admission to present to the faculty a satisfactory record of his high school work and an honorable discharge from such high school. And all such students will be entitled to a certificate upon satisfactory examination in the subjects pursued by them, stating the time they have been members of the college and the subjects in which they have passed a creditable examination.

Such students, however, if they elect studies in both the day and evening courses, pursuing both at the same time, will be charged ten dollars per term additional tuition.

Students in the day or evening classes will not be permitted to attend more than two courses of lectures daily, unless in exceptional cases, and then a card of admission must be procured from the faculty and ten dollars per term additional tuition must be paid.

Students who are regular members of one class, either day or evening, will not be permitted to pursue studies in any class in advance of that to which they belong, unless there are special circumstances requiring it, and only upon special permission granted by the faculty.

SENIOR ELECTIVES.

Students in the senior class of the college of science, literature and the arts, are permitted to elect as one subject throughout the senior year work in the college of law, including the elements of contracts, domestic relations, torts and criminal law. The satisfactory completion of the above named subjects will give the student a senior credit, and will entitle him to admission to the middle class of the college of law. No such student will be permitted to take more than one lecture each day in the college of law, without special permission of the faculty of the college of science, literature and the arts.

ADVANCED STANDING.

Should any person desire to enter the middle or senior class for a degree he must be at least nineteen years of age, must pass the required preliminary examination upon the subjects of

the preceding year or years, or their equivalents, but no person will be allowed to receive his degree who has not spent one full year in this department. Attorneys at law, however, who have been admitted to practice in the state of Minnesota and have a high school education or its equivalent, 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 upon the entire work of the three years.

FOUR COURSES OF STUDY.

First.

THREE YEARS' DAY COURSE.

FIRST YEAR—JUNIOR.

First Term.

Contracts (including Statute of Frauds). Twelve weeks, six lectures a week.

Second Term.

Domestic Relations. Four weeks, six lectures a week.
Common Law Pleading. Three weeks, six lectures a week.
Torts. Eight weeks, six lectures a week.

Third Term.

Blackstone (Second Book). Four weeks, six lectures a week.
Criminal Law. Five weeks, six lectures a week.
Agency. Three weeks, six lectures a week.
Commercial Paper. Four weeks, six lectures a week.

SECOND YEAR MIDDLE.

First Term.

Wills and Administration. Four weeks, six lectures a week.
Partnership. Four weeks, six lectures a week.
Code Pleading. Eight weeks, six lectures a week.

Second Term.

Carriers. Two weeks, six lectures a week.
Insurance. Three weeks, six lectures a week.

Private Corporations. Five weeks, six lectures a week.
Public Corporations. Three weeks, six lectures a week.
Bailments. Three weeks, six lectures a week.
Liens. Two weeks, six lectures a week.
Bankruptcy. Two weeks, six lectures a week.
Equity. (Jurisdiction and Maxims.) Four weeks, six lectures a week.

Third Term.

Real Property. Twelve weeks, six lectures a week.
Easements. Two weeks, six lectures a week.
Covenants. Two weeks, six lectures a week.
Taxation. Two weeks, six lectures a week.
Landlord and Tenant. Two weeks, six lectures a week.

THIRD YEAR—SENIOR.

First Term.

Evidence. Six weeks, five lectures a week.
Personal Property and Sales. Six weeks, five lectures a week.
Minnesota Real Property. Four weeks, five lectures a week.
College Court. Eight weeks.

Second Term.

Equity. (Doctrines.) Seven weeks, five lectures a week.
Constitutional Law. Five weeks, five lectures a week.
College Court. Twelve weeks.

Third Term.

Mortgages and Mortgage Foreclosure. Four weeks, five lectures a week.
Criminal Procedure. Two weeks, five lectures a week.
Conflict of Laws. Six lectures.
International Law. Three weeks, five lectures a week.
College Court. Twelve weeks.

Second.**THREE YEARS' EVENING COURSE.**

To accommodate those who cannot attend the lectures during the day, there is offered an evening course comprising the same subjects as those above enumerated, extending over a period of three years, of nine months each. The students in this course pursue the same subjects as those in the day courses, and in the same order, except that the senior and middle classes are united, and the work of the two years is arranged to meet the demands of such a union.

FIRST YEAR—JUNIOR.**First Term.**

Contracts (including Statute of Frauds). Twelve weeks, five lectures a week.

Second Term.

Domestic Relations. Four weeks, five lectures a week.
Criminal Law. Five weeks, five lectures a week.
Agency. Three weeks, five lectures a week.

Third Term.

Torts. Eight weeks, five lectures a week.
Commercial Paper. Four weeks, five lectures a week.

SECOND AND THIRD YEARS—SENIOR AND MIDDLE.**1904-1905.****First Term.**

Evidence. Five weeks, five lectures a week.
Blackstone (Second Book). Four weeks, five lectures a week.
Code Pleading. Three weeks, five lectures a week.
College Court, seniors. Eight weeks.

Second Term.

Code Pleading. Four weeks, five lectures a week.
Real Property. Eight weeks, five lectures a week.
College Court, seniors. Twelve weeks.

Third Term.

Real Property. One week, five lectures a week.
Equity Jurisprudence. Eight weeks, five lectures a week.
Insurance. Three weeks, five lectures a week.
College Court, seniors. Twelve weeks.

Third.

SPECIAL COURSE.

For the benefit of those who do not care to pursue an extended course of legal instruction leading to the degree of bachelor of 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; bailments; master and servant; insurance; sales.

The subjects in this course may be varied upon consultation with the faculty, and other subjects in place may be substituted by those whose business life or whose preference render it desirable.

Those who complete the course and pass a satisfactory examination receive a certificate of proficiency.

Fourth.

GRADUATE COURSE.

First.

For the benefit of those students who wish to pursue their legal studies further than they are able to do in the undergraduate years, two graduate courses are offered, the first leading to the degree of master of laws (LL. M.), the second to the degree of doctor of civil law (D. C. L.).

The courses of lectures offered in the first year of graduate work are as follows:

Philosophic basis of jurisprudence.

Roman law.

Political science.

Constitutional jurisprudence and history.

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 college having a three years' course of study. Those who spend the entire year in the work prescribed for this course, and pass a satisfactory examination upon the subjects taken, will be entitled to the degree of master of laws.

But no graduate of another law school, who has not been admitted to the Bar in Minnesota, will be matriculated in this course as a regular student for the degree of LL. M.; but any person who possesses the requisite legal learning may enter the course as a special student and pursue any or all of the studies offered.

Second.

Students who have received the degree of LL. B., from this or some other law school requiring three years study of law for said degree, and who have also received the degree of LL. M., from this or some other school after not less than one year of graduate study, and who have taken high rank in all the studies leading to these degrees, may apply to the faculty for the degree of Doctor of Civil Law. A knowledge of French or German, as well as of Latin is required, and special proficiency in Roman history is necessary to entitle a student to entrance for such degree.

There is no prescribed time within which students are required to do their work in this course, but they must make themselves proficient in the subjects of Roman law, political science, comparative constitutional law, and the philosophy of jurisprudence before any thesis will be accepted from them.

None of the aforementioned degrees will be conferred until a satisfactory thesis is presented to the faculty by the student, and the thesis for the doctor's degree must be one evincing original investigation and special excellence.

Whether a class will be organized in this course during the academic year of 1904 and 1905 will depend upon the number of applicants for admission.

TUITION.

Undergraduate Students.

A matriculation fee of ten dollars must be paid by every student entering the college. The tuition fee is sixty dollars a year, or twenty dollars per term payable in advance at the beginning of each term.

Graduate Students.

The tuition fee for graduate students is thirty dollars, payable in advance, as follows: Ten dollars each term. In addition a matriculation fee of ten dollars is due from each student entering upon the course who has not previously matriculated in this college. A diploma fee of ten dollars is due from each student upon receiving his diploma.

FREE CASE BOOKS.

In order to protect the College, Bar Association and State Libraries from the special injury incident to continual use and to facilitate the class work of the college, free case books are furnished the students by the University.

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 all books which a student would have occasion to consult is located at the capitol, in St. Paul, and is thus within easy reach of the students.

The general library at the University contains about seventy-five thousand bound volumes, besides many thousand volumes of pamphlets, magazines, reports, etc. About one hundred and twenty periodicals are received regularly by the library, not inclusive of technical magazines and newspapers in English and other languages.

Besides the general library of the University, there are several special libraries, consisting mainly of books of reference and current periodicals relating to technical subjects in connection with the several departments of engineering, biology, and botany. These libraries are open during the entire day, and the University library is open also in the evening.

METHODS OF INSTRUCTION.

The sessions of the junior, middle and senior day classes will begin respectively at 9:00 and 10:00 o'clock a. m., and 2:00 p. m.; and those of the evening classes will begin at 7:20 o'clock p. m.

Each subject is continued daily until its completion; and when a class carries two subjects daily, one recitation or lecture follows the other immediately in order to save the student the expense and time required in going to and returning from the University.

EXAMINATIONS FOR PROMOTION.

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, except upon special permission of the faculty; and no such permission will be granted to any student who has failed in more than two subjects; but if he has not failed in more than two subjects he may be admitted to the next higher class provided he makes up those studies in which

he is deficient by taking them in the regular classes where they are taught.

At the end of the middle year an examination will be held upon the work of both the junior and middle years; and if any student fails to pass this examination satisfactorily to the faculty, he will be denied admission to the senior class.

COLLEGE COURTS.

As fast as the student becomes acquainted with the primary rights of persons, cases are prepared for his consideration, whereby he may apply the principles of law with which he has become familiar.

There is also established in the senior year a system of college courts corresponding to the justice, the district and the supreme courts of Minnesota, wherein the student may become familiar with the practice and the rules of the courts respectively.

It is the aim of the department to acquaint the student with the practice as well as the theory of law, and to this end the subjects of pleading, evidence, rules of practice adopted by our state courts, methods of securing provisional remedies, appeals from one court to another, the writs of habeas corpus, certiorari, and others of frequent use, conveyancing, drawing contracts and other like practices which comprise the daily work of the general practitioner, will, during the senior year, receive special and careful attention.

Some member of the faculty will preside over each of these courts, and the student is required to prepare appeal papers, bonds, paper books and to furnish the courts with his points and authorities according to requirements of law applicable to the various courts of the state.

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.

THE LECTURERS.

All the lecturers in the college are lawyers actively engaged in the practice of their profession. They come to the classroom 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 legal requirements, and to respond in earnestness and with fidelity to the faithful efforts of his instructors in his behalf.

THE LITERARY SOCIETIES.

The students of the college have joined in organizing three literary societies for the purpose of general improvement and for cultivation in the practice of extemporaneous speaking. They hold weekly meetings and derive great benefit from their exercises.

PRIZES.

The Pillsbury Prize.

Three prizes of \$100, \$50 and \$25, offered by the heirs of the Hon. John S. Pillsbury, are awarded for the best work in the rhetorical department, as evidenced finally by an oration in public.

The Dunwoody Prize.

Mr. Wm. H. Dunwoody, president of the St. Anthony and Dakota Elevator Co., offers \$100 to that student who shall earn the right to represent Minnesota in the Northern Oratorical League. This league is composed of the seven largest universities of the central states, viz.: Minnesota, Iowa, Wisconsin and Michigan State Universities, and Oberlin, Chicago and Northwestern.

The Lowden Prize.

Mr. Frank O. Lowden, of Chicago, offers as a prize to be competed for by the Northern Oratorical League, an endowment of \$3,000, which will yield an annual income of about \$175. A prize of \$100 will be given to the winner of the first place, \$50 to the orator who gets second place, and the remainder will be set aside each year for an interest fund to accumulate, and, in time, produce another endowment.

Electives from Other Departments.

Students of this college will be admitted, under proper regulations, to work in other departments or colleges of this University, without extra charge and, so far as it does not interfere with their law studies, they are urged to avail themselves of this opportunity to attend lectures and recitations in the other departments. Such elections should be made only after consultation with the faculty. The following subjects are suggested as being particularly suitable: international law, constitutional history and political science. Students who elect such work must complete it in a satisfactory manner before they shall be entitled to receive their law degree.

DEGREE OF BACHELOR OF LAWS.

The degree of bachelor of laws will be conferred upon students of good moral character who pursue the full course in this college and pass an approved examination, and the degree will also be conferred upon those who, having attended another law school for the period of two years, shall also attend one year in this college and pass a like examination upon the three years' work.

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 \$4.00 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.

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 Section No. 7, whereby students graduating therefrom are entitled to admission to the Bar of the State without examination, upon presentation of their diplomas:

Section 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 whatever, 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.

THE
DEPARTMENT OF MEDICINE

The Department of Medicine

The Department of Medicine includes the following named Colleges:

The College of Medicine and Surgery.

The College of Homeopathic Medicine and Surgery.

The College of Dentistry.

The College of Pharmacy.

Each college is distinct in the government of its internal affairs, has its own faculty and an independent curriculum, excepting in the studies of anatomy, physiology, chemistry, histology and embryology. These studies, so far as they are required in each course, are pursued by all the students of the department in common.

BUILDINGS AND EQUIPMENT.

The department is resident in four buildings situated upon the University campus, viz: Medical hall, the laboratory of medical science, the laboratory of chemistry and the laboratory of anatomy.

Medical hall contains the offices of the deans of the college of medicine and surgery, of the college of homeopathic medicine and surgery and of the college of dentistry; the large amphitheatre and lecture rooms of the several colleges, the library and reading room of the department, the laboratory of materia medica, the operating rooms and laboratories of dentistry and the dental infirmary.

The laboratory of medical sciences is a building especially designed for laboratory uses. One wing of the building is occupied by the college of pharmacy and the department of physiology. It contains the office and private laboratory of the dean of the college of pharmacy, the pharmaceutical and botanical laboratories, the laboratory of organic chemistry, with preparation and stock rooms. The office of the secretary of the college of medicine and surgery, a large lecture amphitheatre

theatre, especially arranged for demonstrative work, the laboratories of physiology, physiologic chemistry and practical dietetics, and operative surgery are also situated in this wing.

The center and opposite wing are occupied by the departments of histology and embryology, pathology and bacteriology. Each of these branches has its well-lighted laboratories, preparation rooms and private study rooms.

Upon the basement floor are laboratory stock rooms and the animal rooms devoted to physiologic and bacteriologic 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 use of this department. It is equipped with amphitheatre, laboratories, preparation rooms, store rooms, and private offices of the professor and assistant professor of chemistry.

The laboratory of anatomy is a new two-story and basement building, 35x60 feet. In the basement are the morgue, injecting room, cold storage vaults, and engine and apparatus for the carbon dioxide freezing plant. On the first floor are an amphitheatre seating one hundred and seventy-five students, the private offices of the professors and instructors, a private dissecting room and a small laboratory for research work. The entire second floor is devoted to laboratories for practical work in anatomy.

The legislature has provided for the erection of a new building for the laboratories of bacteriology and pathology, which will be built within the next year. The retirement of these laboratories from the present medical science building will leave enlarged room for the accommodation of the remaining chairs.

The University Clinical Building is situated in a part of the city most favorable to the development of an out-door service and, at the same time, accessible to the students. It is of two stories and covers 40x150 feet. It affords ample floor space for amphitheatres, waiting rooms, dispensary and class rooms for each of the clinical branches. Wards and laboratories, in which section work in medical and surgical diagnosis can be conducted, have been equipped.

The department of medicine is in intimate relationship, through its several faculties, with the hospitals, infirmaries and

dispensaries of the cities of Minneapolis and St. Paul. Through these agencies it utilizes, for the benefit of its students, the clinical material of these two large centers of population. The location of the University near the interurban car line enhances the value and convenience of these clinical opportunities.

A medical library, containing over three thousand volumes and supplied with current periodicals, is open to all the students of the department. The collection has been chosen with special regard to the need for reference work and collateral reading. The general library of the University and the public and medical libraries of Minneapolis and St. Paul are also open to the students of this department.

RULES AND REGULATIONS OF THE COLLEGE.

COLLEGE YEAR.

The seventeenth annual course of study in this department will begin on August 30th, 1904, and will continue nine months, closing upon the first Thursday in June, 1905.

The college year is divided into semesters; the first semester ending January 21st, 1905. The last week is devoted mainly to mid-year examinations, which will be conducted in many of the departments. The second semester will begin January 24th, 1905, and will close May 26th, 1905. Many of the courses of study occupy the half semesters which terminate on November 5th and March 25th. Commencement exercises will occur in common with the other departments of the University, during the week ending June 1st, 1905.

ENROLLMENT.

It is desirable that students matriculate on or before August 30th.

Students will be assigned seats in 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, having matriculated, will present tuition receipts and entrance credentials to the dean of their college, who will pass upon their preliminary qualifications. If such credentials prove unsatisfactory, they will be required to take the necessary entrance examinations before a committee of the college of science, literature and the arts.

Students wishing to take advanced standing will apply to their dean. Upon admission and classification, students will report to the professors in charge of their respective studies.

CONDITIONS.

Examinations of conditioned students and of applicants for advanced standing, in the studies of the first, second and third years, will be held during the first week of the semester. In the primary branches they occur upon the following dates:

September 1, 9 a. m. Anatomy, first year; Physiology, second year.

September 1, 2 p. m. Histology, first and second year; Chemistry, second year.

September 2, 9 a. m. Physiology, first year; Anatomy, second year.

September 2, 2 p. m. Chemistry, first year; Histology, first and second year.

Conditions may also be removed at the close of each semester.

No student will be eligible to final examinations in any branch who carries conditions of a previous year of that branch unremoved.

No student will be admitted to the fourth year who is conditioned in any of the studies of the first and second years.

Students who carry conditions into a succeeding year may find a resultant conflict of study hours. In that event they will give preference to the unfinished studies of the lower conflicting course.

CLASSIFICATION.

September 5th and 6th will be devoted to the classification of students. The opening lecture of the course will be delivered at 8 p. m., September 6th.

STANDING.

The standing of students is determined by the results of recitations, written examinations and laboratory work. It is indicated by the terms "passed" or "conditioned." Conditions may be removed as indicated above. Incomplete work must be made up before the final examinations of the following year.

Students must pass a majority of the studies of their year in order to classify in the next succeeding year.

Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension.

ADVANCED STANDING.

Applicants for advanced standing must pass the entrance examinations or present the usual equivalents. They must furnish satisfactory evidence of time spent and subjects covered in previous professional studies and must present themselves at the above dates and pass the examinations in all branches in which they wish to be exempt.

No conditions of advanced standing will entitle the student to take the two years of any graded study coincidently.

Students will not be permitted to substitute private work in any branch for the regular college course work, excepting in the case of actual laboratory exercises done under the direct supervision of an instructor appointed by the chair and approved by the faculty. Examinations in such private laboratory work will be conducted by the chair. This rule does not apply to conditioned students.

Seniors in the college of science, literature and the arts, who contemplate entering the department of medicine, are permitted to elect courses in anatomy, histology and embryology, physiology and chemistry in this department in lieu of similar science courses in the college of science, literature and the arts. Since the medical practice act of this State requires four full years of medical study, these students must elect this work in the department of medicine, in order that it may be contributive toward the degrees given in both colleges.

SIX YEARS COURSE.

In the year 1903-04, the University established a six years course of study, arranged especially for students of medicine. This course is conducted in the colleges of science, literature and the arts, and of medicine and surgery. It leads to the degree of bachelor of science at the end of the first four

years and to the degree of doctor of medicine at the end of the six years course. The work of the first two years is adapted to the needs of the student of medicine and all who expect to take the professional degree are urged to enter this course.

The outline of the course is as follows:

FIRST YEAR.

1. **German.*
2. *Botany.*
3. *Chemistry.*
4. *Zoology.*
5. *Higher Algebra and Plane Trigonometry.*

SECOND YEAR.

1. *Rhetoric.*
2. *German or French.*
3. *Chemistry.*
4. *Comparative Anatomy of Vertebrates.*
5. *Physics, (special course.)*

THIRD YEAR.

1. *Human Anatomy*, as outlined in courses I, II, III and IV, department of anatomy, college of medicine and surgery.
2. *Histology and Embryology*, as outlined in courses I, II, III, department of histology and embryology, college of medicine and surgery.
3. *Medical Chemistry*, including organic chemistry, toxicology, urinalysis and sanitary chemistry, etc.
4. *Physiology*, as outlined in courses I and II, department of physiology, college of medicine and surgery.
5. *Materia Medica*, as outlined in present courses in the college of medicine and surgery.

FOURTH YEAR

1. *Human Anatomy*, as outlined in courses V and VI, department of anatomy.
2. *Histology and Embryology*, as outlined in courses IV and V, department of college of medicine and surgery.
2. *Histology and Embryology*, as outlined in courses III and IV, department of histology and embryology, college of medicine and surgery.
3. *Medical Chemistry*, courses continued as outlined in third year.
4. *Physiology*, as outlined in courses III, IV and V, department of physiology, college of medicine and surgery.
5. *Therapeutics*, as outlined in present courses in the college of medicine and surgery.
6. *Bacteriology and General Pathology*, as outlined in courses I and II, department of pathology and bacteriology, college of medicine and surgery.

FIFTH AND SIXTH YEARS.

The work of the fifth and sixth years will be essentially the same as is given in the third and fourth years in the college of medicine and surgery.

*Note—Students who enter with two years of German may elect French in its stead in the first or second years.

COURSES OF INSTRUCTION.

Students of the college of medicine and surgery and the college of homeopathic medicine and surgery will pursue work, as outlined for the following departments, together.

HISTOLOGY AND EMBRYOLOGY.

The laboratory of histology and embryology occupies most of the first floor and portions of the third floor and basement of the laboratory of medical sciences.

The general laboratory, 44x72 feet, extends across the north wing and is abundantly lighted by large windows on three sides and part of the fourth. Study tables accommodating seventy students are placed directly under the windows. A second tier of desks provides for twenty other students. Each student is provided with a separate locker for the storage of apparatus and material. The special laboratory, 24x35 feet, for research work by advanced students, adjoins the general laboratory. The next apartment, the library of the laboratory, contains a reference library consisting of a small but carefully selected collection of related literature, both standard and periodical. In addition to the laboratory library, the other libraries of the University, together with the public libraries of Minneapolis and St. Paul, afford the student access to the best publications among current periodicals and monographs. The rooms across the hall are devoted to the office and private laboratories of the professor and his assistant. On the third floor are located a preparation room, a small laboratory for special students, a dark room, a room for copying and enlarging, and a laboratory for photomicrography and projection. In the museum on this floor, are several cases containing series of embryos and histologic specimens. In the well-lighted basement are found a preparation room, 20x35 feet, for the hardening of tissues, etc., and an experimental laboratory and store room, 26x36 feet.

These laboratories are equipped with ninety Leitz' microscopes, each fitted with nose-piece and Abbe condenser; various forms of microtomes, such as freezing, Thoma, Minot, Schanze, etc., injection apparatus, aquaria, thermostats, incubators, water baths, chemical hoods, a great variety of technical glassware, Grubler's stains, a set of His' wax models, photomicrographic and reconstruction apparatus, charts, reference cabinets containing carefully selected slides, a large collection of hardened histological and embryological material with an abundant supply of fresh tissues.

The courses are made as practical as possible, beginning with the technique of the microscope, followed by the preparation of permanent specimens. Collections of typical specimens, also, will be loaned to the students for study. During the two years' course the student will acquire a valuable collection of slides of his own preparation illustrating the structure and development of the human body.

The course is illustrated by charts and lantern-slides of histological and embryological specimens. Demonstrations are given under the microscope of typical sections of tissues and organs, accompanied by camera lucida drawings, or photomicrographs, with explanatory text.

All students are recommended to purchase a microscope at the beginning of their medical course. This instrument is an indispensable part of the outfit of a well-trained physician. Suitable microscopes can be purchased at from \$50 to \$60, which may be fitted at any time with such other parts as may be desired.

Students not owning microscopes will be furnished with instruments at a rental.

Course I. General morphology and histology.

Lectures, demonstrations and laboratory work. The course includes the structure and manipulation of the microscope; the structure and properties of protoplasm; the cell, its structure; cell division and reproduction leading to the consideration of the elements of structure in the vertebrata. A comparative study of the histology of the blood, of the epithelial, connective, muscular and nervous tissues and of the vascular and lymphatic systems of man and the vertebrata. Lectures, etc., 6 hours a week. Laboratory work, 18 hours a week, first half, first semester, first year.

PROFESSORS LEE AND NICKERSON AND DR. M. L. NICKERSON.

Course II. Elements of vertebrate embryology and histogenesis.

Lectures, demonstrations and laboratory work. A comparative study of reproduction; the ovum, the spermatozoon, fertilization, cleavage, for-

mation of blastodermic layers, the formation of the embryo, foetal envelopes, etc., with practical work on chick and frog embryos. The differentiation and histogenesis of the tissues, etc. Lectures, etc., 6 hours a week; laboratory work, 18 hours a week, first semester, first year. Open to those who have completed course I.

PROFESSORS LEE AND NICKERSON AND DR. M. L. NICKERSON.

Course III. Microscopic anatomy of man and vertebrates.

Lectures, demonstrations and laboratory work. Advanced methods of histological technique, with practical laboratory work. The comparative study of the morphology, microscopic anatomy, origin and development of the various organs of the integumentary, alimentary, respiratory and uro-genital systems, etc. Lectures, etc., 6 hours a week; laboratory work, 18 hours a week. First semester, first year. Open to those who have completed course I in histology and embryology.

PROFESSORS LEE AND NICKERSON AND DR. M. L. NICKERSON.

Course IV. Vertebrate neurology and neurogenesis.

Lectures, demonstrations and laboratory work. The comparative study of the morphology, microscopic anatomy, origin and development of the central, peripheral and sympathetic nervous systems and the organs of special sense. Lectures, etc., 4 hours a week; laboratory, 18 hours a week. First half, second semester, second year.

PROFESSORS LEE AND NICKERSON AND DR. M. L. NICKERSON.

Course V. Human embryology and organogenesis.

A comparative study of human and mammalian embryos, including impregnation, segmentation, and implantation of the ovum; the formation, structure and relationships of the placenta and foetal envelopes; the details of organogenesis, etc., studied in a practical manner upon a very large collection of serial sections of human and mammalian embryos, cut in various planes and representing all phases of development. First half, second semester, second year.

PROFESSORS LEE AND NICKERSON AND DR. M. L. NICKERSON.

The following elective courses are open to a limited number of properly qualified third and fourth-year students, and to graduates. These courses will consist of laboratory work, lectures, demonstrations and prescribed courses of reading, and will be made as practical as possible, being planned with special reference to their application to internal medicine, surgery, obstetrics and the specialities.

For dates see schedule and for details of courses consult Professor Lee.

Course VI. Methods of microscopical technique.

The preparation and use of the various solutions employed in fixing, hardening and staining. Methods of embedding, sectioning, reconstruction, etc.

PROFESSOR LEE.

Course VII. Comparative histology and histogenesis of the tissues of man and vertebrates.

(a) The cell, spermatogenesis and ovogenesis. DR. M. L. NICKERSON.

(b) The epithelial, connective and muscular tissues.

ASST. PROFESSOR NICKERSON.

(c) The nervous tissues.

DR. M. L. NICKERSON.

(d) Blood and lymph.

PROFESSOR LEE.

Course VIII. Microscopic anatomy and organogenesis of man and vertebrates.

(a) The digestive system.

PROFESSOR LEE.

(b) The respiratory system.

DR. M. L. NICKERSON.

(c) The cutaneous system.

ASST. PROFESSOR NICKERSON.

(d) The uro-genital system.

PROFESSOR LEE.

Course IX. Comparative histology and development of central nervous system and special sense organs.

PROFESSOR LEE.

Course X. The animal parasites of man.

The classification, morphology, and life history of the animal parasites of man.

ASST. PROFESSOR NICKERSON.

Course XI. Comparative embryology of man and vertebrates.

A study of special problems in vertebrate development.

PROFESSOR LEE.

Course XII. Research work in histology and embryology.

Opportunity will be offered for those desiring to pursue original research and investigation.

Course I. General bacteriology.

The following text and reference books should be consulted:

Histology. Wilson's, The Cell; Bohm-Davidoff-Huber's Histology; Piersol's Histology; Szymonowicz-MacCullum's Histology; Stohr's Histology; Hertwig's The Cell; Kolliker's Gewebelehre; Opper's Mikroskopischen Anatomie; Duval's Histologie; Ranvier's Histologie; Klein's Histology; Weyesses' Histology; Sobotta-Huber's Atlas; Lee's Vade Mecum; Mann's Histology.

Embryology. Minot's Human Embryology; Minot's Laboratory text books; Hertwig's Handbuch; Hertwig-Mark's Embryology; McMurrich's Embryology; Kolliker's Embryologie; Kollman's Embryologie; Marshall's Embryology; Heisler's Embryologie; Schenk's Embryologie; Schultze's Embryologie.

Neurology. Barker's Nervous System; Gordinier's Nervous System; Van Gehuchten's System Nerveux; Kolliker's Gewebelehre II; Obersteiner; Edinger's Vorlesungen; Sabin's Atlas.

ANATOMY.

The department of anatomy occupies a separate building, adapted to its work and equipped with the best modern appliances. It includes two large students' dissecting rooms, the general laboratories of anatomy, a bone laboratory for bone research work, the offices of the professor and demonstrator of anatomy, preparation rooms and morgue. An ample supply of dissecting material is provided.

In the first year the subjects of osteology and syndesmology are pursued by means of lectures, laboratory demonstrations and recitations from the specimen.

The bones of a human skeleton are loaned to the student for purposes of study and recitation.

Myology, angiology and splanchnology are studied in connection with the dissection and laboratory demonstrations of the thoracic, abdominal and pelvic viscera upon the lower animal. This is followed by the dissection of one-half of the human body.

In the second year the alimentary canal, respiratory tract, genito-urinary system, organs of special sense and the cerebro-spinal nervous system are pursued by means of lectures, recitations and laboratory demonstrations. The dissection of the human body is completed and followed by a series of lectures and demonstrations on descriptive and surgical anatomy.

The student dissects in the first semester of the first year and in the first half of the second semester of the second year, recites upon the subject and observes demonstrations made by a corps of assistants under the direction of the demonstrator of anatomy.

Dissection is supplemented by drawings from dissections, made upon outlines of the human skeleton, which are furnished to the student.

In the third year the student takes up the study of the human body from a topographical and surgical standpoint and is given a thorough review of the surgical regions, emphasizing the practical points in the relations, structure and distribution of the nervous system.

Course I. Osteology.

Lectures and recitations upon the human skeleton and supplementary work on the osteology of domestic mammals; 4 hours each week, for 5 weeks of first semester. Practical study of the skeleton, followed by recitations from the specimen, taken by the class, in sections; first semester. Required of all first year students.

Course II. Syndesmology.

Lectures, recitations and laboratory demonstrations, 4 hours each week, for 3 weeks first semester, first year. Open to those who have taken course I.

Course III. Myology and Angiology.

Lectures and recitations, covering the entire muscular and arterial systems of the human body, with a supplementary study of comparative myology. Laboratory work consists in the dissection and identification of the muscles of the human body and the study of their nerve and blood supply, as well as their action.

Course IV. Splanchnology.

Lectures and laboratory work in dissecting and demonstrating the thor-

acic, abdominal and pelvic viscera. First semester of the first year and first half of second semester of the second year.

PROFESSOR ERDMANN AND DR. READ.

Recitations upon the subjects of the first year's work, conducted in sections by

DRS. H. K. READ AND E. R. HARE.

Course V. The nervous system.

Cerebro-spinal axis and its membranes; the cranial and spinal nerves; the sympathetic nervous system, and the special-sense organs. Lectures, recitations and dissections of the brain, 5 hours each week, for 4 weeks, first half, second semester, second year.

PROFESSOR ERDMANN.

Course VI. Dissections.

This work extends over a period of 9 weeks, in the first semester of the first year, and 9 weeks in the first half of the second semester of the second year, occupying with the lecture course the half days of this period each week. The method of work follows that laid down in Holden's Manual of Dissections.

DRS. H. K. READ AND E. R. HARE.

The second year lecture and dissecting courses are open to those having completed the first year's work in anatomy and histology.

Daily recitations, upon the subjects of the second year's course, conducted in the laboratory.

PROFESSOR ERDMANN, DRs. H. K. READ AND E. R. HARE.

Course VII. 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; 3 hours a week, second half, second semester. Required of third year students.

PROFESSOR ERDMANN.

Course VIII. Applied anatomy of the nervous system.

Elective.

Opportunity is afforded for advanced work in practical anatomy at any time during the college year.

The following text-books should be consulted:

Anatomy.

First year—

Gray's Descriptive and Surgical Anatomy, revised American edition.

Morris' Text-book of Human Anatomy.

Quain's Anatomy, 10th edition, Vol. II, Pts. I and II.

Gerrish's Anatomy.

Cunningham's Anatomy.

Second and third years—

Gray's Anatomy, revised American edition.

Quain's Anatomy, 10th edition.

Morris' Text-Book of Anatomy.

Gerrish's Anatomy.

Cunningham's Anatomy

Spaltcholtz' Atlas of Human Anatomy.

Holden's Practical Anatomy.

Erdmann's Manual of Dissections of the Human Body.

Owen's Manual of Anatomy.

Treves' Applied Anatomy.

Collateral reading—Flower's Osteology of Mammals; Gegenbauer's Elements of Comparative Anatomy; Chauveau's Comparative Anatomy; Wiedersheim's Elements of Comparative Anatomy; McClellan's Regional Anatomy; Meynert's Psychiatry, Part I; anatomy, physiology and chemistry of the brain; Deaver's Surgical Anatomy; Edinger's Anatomy of the Nervous System; Hildebrand's Chirurgisch Topographise Anatomie.

PHYSIOLOGY.

The department of physiology occupies a suite of rooms in the laboratory of medical sciences, including the laboratory of experimental physiology, the laboratory of physiologic chemistry and practical dietetics, a demonstration and reci-

tation room, the laboratory library and the office of the professor in this branch. A large amphitheatre, adapted to the demonstration of major experiments, immediately adjoins the physiologic laboratories and is used, also, for lecture purposes by this and other chairs.

In the basement of the laboratory of medical sciences, the chair maintains large and well-equipped animal-rooms, which are furnished with a large aquarium, frog tanks, animal enclosures and breeding cages. From this animal room are furnished supplies of material and animals for the work in experimental physiology, physiologic chemistry, histology, embryology, pathology and bacteriology. The hygienic conditions of the room are studied carefully, with a view to maintaining the physiologic and structural integrity of its animal occupants as perfectly as possible.

The physiologic laboratories are equipped with a full supply of apparatus, instruments, etc., for experimental purposes, and with materials, glassware, digesters, water baths, ventilating hoods, etc., for the work in physiologic chemistry. Their outfit includes sets of vivisection instruments, an artificial respiratory machine, batteries, Du Bois-Reymond coils, galvanometers, rheostats, moist muscle chambers, recording drums, Ludwig's kymograph, spring myograph, Burdon-Sanderson's stethometer, stethoscopes, phonendoscopes, Dudgeon's and Marey's sphygmographs, cardiographs, Runne's chronograph, Roy's tonometer, Gaskell's clamp, oncometers, haemometers, haemoglobinometers, haematocrits, plethysmograph, etc., etc. They are furnished with motor power for the operation of recording apparatus and for the manufacture of apparatus in the laboratory workshop.

The course in physiology is graded in the first and second years. In the first year, the student hears lectures, recites and attends demonstrations and practical exercises in general physiology. These embrace the discussion, and, so far as possible, the observation of the physiologic ingredients of the animal body; the study of the physiology of cell-life, of the fundamental properties of the cell, of the nutritive media, blood, lymph and chyle; of the elementary functions of the nervous system; of the muscular tissues, the connective tissues and the epithelial tissues; of the vascular mechanism; of the alimentary canal; of the organs of secretion, respiration, excretion, and metabolism.

In the second year, the work is made as practical as possible and includes the study of such advanced topics as reproduction, the physiology of foetal life, of infancy, of maturity and of old age; and the functions of the brain, spinal cord, ganglionic and peripheral nerve systems. Twelve hours each week, during the first half of the first semester, are occupied in laboratory work in physiologic 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 half of the first semester are devoted to experimental physiology. For this work the class is divided into sections and the instruction is individualized so far as possible. The student is familiarized with physiologic apparatus and its uses, with forms of electrical stimulation and with methods of experimentation, while his knowledge of physiologic principles is strengthened by the observation of functional facts. Demonstrative work is combined with the individual experiments performed by the pupil.

In the fourth year, an elective course in practical dietetics is conducted during the second half of the first semester. It deals with the analysis of foods, with the general principles of food preparation and with the selection of a suitable dietary for the several periods of life.

Practical talks upon the principles and means of food preparation, the serving of food, food selection, invalid and infant dietary, etc., are associated with this course. A trained instructor conducts the exercises in hygienic cooking.

A laboratory reference library is accessible to the students for collateral reading.

Course I. General physiology.

Lectures, recitations and demonstrations, dealing with the physiologic chemistry of the human body; the physiologic properties of the cell; the nutritive media; the nervous mechanisms in general; the muscular tissues, the connective tissues and the epithelial tissues, as the structural bases of the animal body. Twelve hours a week, first half second semester, first year.

PROFESSOR BEARD.

Course II. Systemic physiology.

Lectures, recitations, demonstrations and practical exercises. This course includes the physiology of the vascular system; the digestive system;

the respiratory system; the secretory and excretory systems; and metabolism. Twelve hours a week, second half second semester, first year. Open to those who have completed course I.

PROFESSOR BEARD.

Recitations upon the subject of the first year are conducted in sections of the class.

DRS. M. R. WILCOX AND G. D. HAGGARD AND MISS WILKINSON.

Course III. Advanced physiology.

Lectures, recitations and demonstrations. The course includes the discussion of the statistics of nutrition; of reproduction; of the physiologic changes incident to successive periods of life, and of the functions of the nervous system, six hours a week, first semester, second year. Open to those who have completed the courses in physiology of the first year.

PROFESSOR BEARD.

Recitations upon the subjects of this course are conducted in sections of the class.

PROFESSOR BEARD AND DR. WILCOX.

Course IV. Physiologic chemistry and microscopy.

Laboratory work and demonstrations. A practical study of the several classes of proteids; of carbohydrates, fats, muscle and bone; of gastric juice, saliva, pancreatic juice and bile in their respective digestions; of glycogen, and of blood, lymph, chyle and milk. Microscopic study of the carbohydrates in vegetable and animal forms; of the physiologic emulsions of fat; of the crystalline waste products, and of the physiologic conditions of the blood cells and of blood crystals. Practical instruction is given during this course in the enumeration of the blood cells, in the estimation of haemoglobin and of the corpuscles in mass, in the spectroscopic examination of the blood in the determination of blood tests, and in the use of the polariscope. Twelve hours a week, first half of first semester, second year. Open to those who have completed courses I and II.

PROFESSOR BEARD, DRS. M. R. WILCOX AND G. D. HAGGARD AND MISS WILKINSON.

Course V. Experimental physiology.

Laboratory work and demonstrations. A study of physiologic apparatus, electrical stimuli and methods of experimentation; the demonstration and performance of experiments which illustrate physiologic function in the muscular, nervous, vascular, respiratory and glandular systems; and the study of the cardiac areas, the heart and respiratory sounds, and of pulse tracings, including training in the use of the sphygmograph, the stethoscope, phonendoscope, etc. Six hours a week, second half of first semester, second year. Open to those who have completed course IV.

PROFESSOR BEARD, DRS. M. R. WILCOX AND G. D. HAGGARD AND MISS WILKINSON.

Course VI. Practical dietetics. (Elective.)

Lectures and laboratory exercises. A study of food analysis, food preparation and of the general principles of food selection, including a discussion of invalid and infant dietary. Six hours a week, second half of first semester, fourth year.

PROFESSOR BEARD AND MISS WILKINSON.

Text-Books:

First and second years—

Foster's Physiology, sixth edition.

Howell's American Text-Book of Physiology.

Simon's Physiologic Chemistry.

Waller's Human Physiology.

Collateral reading—Landois and Stirling's Handbook of Physiology; Chapman's Physiology; Stewart's Practical Physiology; Blyth's Foods; Raymond's Physiology; Kirk's Physiology; Hutchinson's Dietetics.

MEDICAL CHEMISTRY.

The department of medical chemistry occupies a building especially arranged and equipped for this work. It contains two laboratories with a combined floor space of 3,800 sq. ft., a lecture room with seating capacity of 200; a preparation room, a balance room, store rooms, and the private offices of the instructors.

Both laboratories are simultaneously used for instruction in various branches of medical chemistry as outlined below.

Course I. The chemistry of the elements, with especial reference to inorganic materia medica.

Lectures and recitations, second semester, first year. Laboratory work in the chemistry of metallic and non-metallic elements. Second semester first year.

PROFESSOR CAREL AND MR. DERBY.

Course II. Qualitative analysis.

Lectures and recitations, second semester, first year. Laboratory work, in the qualitative determination of the metals and the acids. Second semester, first year.

PROFESSOR CAREL AND MR. DERBY.

Course III. Chemistry of the compounds of carbon.

A condensed course dealing with those features of organic chemistry which are of special interest to the physician and serving as a general introduction to sequent courses in medical chemistry.

Lectures and recitation, first semester, second year. Laboratory preparation of important organic bodies used in medicine.

PROFESSOR CAREL.

Course IV. Qualitative and quantitative analysis of the urine.

Lectures and recitations, first semester, second year. Laboratory work, including the qualitative analysis of twenty specimens of normal and abnormal urine, the quantitative determination of sugar, albumen, chlorides, phosphates and urea, and the standardization of reagents. First semester, second year.

PROFESSOR CAREL AND MR. DERBY.

Course V. Toxicology, organic and inorganic.

The chemistry of the poisons and of their antidotes and a study of symptoms, treatment and post-mortem appearances, including the simulation of symptoms of certain diseases, animal parasites, and animal and vegetable products, and the symptoms of certain mineral and alkaloidal poisons, etc.

Lectures and recitations, first semester, second year. The laboratory course includes the chemical reactions of the poisons and of their antidotes, the physiological action of important poisons, the effect of antidotes and the antagonistic action of certain poisons. Post-mortems, followed by a toxicological examination of the blood, urine and various organs. First semester, second year.

PROFESSOR CAREL AND MR. DERBY.

Course VI. Chemistry of hygiene.

The chemistry of air, soil and water. Lectures and recitations first semester, second year. Laboratory course in the sanitary examination of air and water. First semester, second year.

PROFESSOR CAREL.

Course VII. Quantitative analysis of U. S. P. preparations. (Optional.)

Course consists of twelve weeks laboratory work in the first half of second semester as regularly given to students of Pharmacy.

The following text-books will be recommended in the above courses:

Carel's Inorganic Chemistry Syllabus.

Bell's Notes on General Chemistry and Qualitative Analysis.

Carel's Chemical Urinalysis.

Reese, Medical Jurisprudence and Toxicology.

Remsen's Organic Chemistry.

Orndorff's Laboratory Manual of Organic Chemistry.

Cohen's Practical Organic Chemistry.

Schimpf, Volumetric Analysis.

Collateral reading—Remsen's College Chemistry; Witthaus' Manual of Chemistry; Richter's Inorganic Chemistry; Roscoe and Schorlemmer, Treatise on Chemistry, Vols. I and II; Dammer, Anorganische Chemie; Graham-Otto, Anorganische Chemie; Purdy's Urinalysis; Ogden's Clinical Examination of Urine; Tyson's Urinalysis; Neubauer and Vogel, Analyse des Harns; Woodman and Tidy, Forensic Medicine and Toxicology; Taylor, Treatise on Poisons; Dragendorff, Die Ermittlung von Giften; Witthaus and Becker, Medical Jurisprudence and Toxicology; Vaughn and Novy, Cellular Toxins; Husemann and Hilger, Die Pflanzenstoffe; Wormley, Micro-Chemistry of Poisons; Park's Hygiene; Rideal's Sewage; Lefman or Simon, Examination of Water; LeConte's Geology; Hill, or Turneure and Russell, Public Water Supplies; Bernthsen, Organische Chemie; Richter's Organic Chemistry; Beilstein Organische Chemie; Perkin & Kipping, Organic Chemistry; Levy, or Fisher, Organischer Preparete.

PATHOLOGY AND BACTERIOLOGY.

The laboratories of pathology and bacteriology occupy spacious quarters in the laboratory of medical sciences. A general laboratory, 44x70 feet, is well lighted by windows on three sides and a part of the fourth. Electric light for microscopic and general illuminating purposes is also provided. The arrangement is such that four students are grouped so as to have a sink, with gas and electric light, distilled and city water and waste connection, and ample desk space next the windows. Eight lockers, arranged beneath the table and on the walls, provide for apparatus, microscopes, etc., and are given at the beginning of the course to each quartette. Immediately behind and accessible to each student, are sterilizers, incubators, blow-pipes, etc. Cupboards, drawers, a large incubator, sinks, fume chambers, demonstration and distribution tables, complete the arrangement of the room.

Two private rooms of the demonstrators flank on either side. Adjoining one of these are the department library and the office and private laboratory of the professor of pathology and bacteriology. Adjoining this is the private laboratory of the professor of surgical and clinical pathology. Specimens illustrative of surgical pathology are here prepared and diagnostic work done.

In the basement of the building the department has store rooms and a room where pathological animals are housed. Here, too, are equipped laboratories for research in bacteriology and experimental pathology, as well as a room in which all the culture media are made.

In the third story, immediately above and of the same size as the large laboratory, is a museum for the storage and exhibition of pathological specimens. A preparation room for their reception and assorting adjoins it.

The hospitals of Minneapolis and St. Paul afford a large supply of material and frequent opportunities for post-mortem examinations.

From many institutions and physicians throughout the state, valuable and interesting gross and microscopic materials are frequently received.

An adequate equipment of microscopes with attachments, immersion lenses, etc., permits of the rental of an instrument to each student, whenever he is unprovided with one suitable for his purposes.

Course I. General bacteriology.

Lectures and demonstrations. The general scope of bacteriology, the history of its development and the biological and chemical problems involved in the life history of bacteria will be dealt with. The classification of the various bacterial forms, the methods of isolation and culture and the composition and manufacture of culture media will be studied until a thorough knowledge of technique is acquired. General and special study of the various antiseptics, disinfectants and bactericidal substances and conditions will be undertaken.

Laboratory work, involving the making of their own culture media by the students, the study of bacteria in cultures and under the microscope, technique of staining and other methods, including observations of chemical and biological peculiarities, will be thoroughly carried out. Testing of various germicides—chemical and physical—and the use of bacteriological methods in the examination of drinking water will form an important part of the work. Eighteen hours per week during the last eight weeks of the second semester, second year.

PROFESSOR WESBROOK, DR CHOWNING.

Course II. General pathology.

Lectures, demonstrations and laboratory work on the general processes involved in disease, to include the study of inflammation, the degenerations and tumors. Eighteen hours per week during the last eight weeks of the second semester, second year.

PROFESSOR WESBROOK, DR WILSON.

Course III. Pathology of special diseases (includes bacteriology).

Disease processes will be grouped, so far as practicable, according to their etiology. Instruction will be afforded by means of lectures, demonstrations of museum specimens and preparations, and laboratory work on materials secured from clinical cases and at autopsy.

The course will consist of instruction in

1. Pathology of infectious diseases.

(a) Special bacteriology of the infectious diseases with the cultivation on the various media of all the important pathogenic bacteria, sown and kept under observation by each student. Fluids and tissues from clinical cases (human and animal) will be supplied for microscopic

and cultural examination and an intimate relationship with clinical and pathological work maintained.

- (b) Special pathology of the infectious diseases. Concurrently with the bacteriology and parasitology of each of the diseases, the pathology of each infection will be studied.

The important gross and microscopic lesions in all the organs will be illustrated from clinical and autopsy material, fresh and preserved, and supplemented by experiment work. Each student will be required to prepare and examine under the microscope selected fresh and stained specimens of morbid tissues, fluids, etc.

PROFESSOR WESBROOK, ASST. PROFESSOR WHITE, DR. CHOWNING.

- 2 Pathological diseases of toxic and obscure origin. Under this are included the special degenerations, inflammations and other pathological conditions not already included under infectious diseases.

ASST. PROFESSOR WHITE, DR. CHOWNING.

Fifteen hours per week throughout the first semester of the third year.

Course IV.

Autopsies and post-mortem technique. Students will have an opportunity of personally taking part in this work, under the direction of the pathologists in charge, in the hospitals of Minneapolis and St. Paul. A knowledge of the technique of post-mortem work and of morbid anatomy will be thus afforded. Throughout the third and fourth years.

ASST. PROFESSOR WHITE AND DR. ROTHROCK.

Course V. Special pathology of the nervous system.

An elective course, limited to twenty-five students.

So far as possible, the clinical history, autopsy notes, gross specimens and sections stained by various special methods will be presented of individual cases representing the principal organic diseases of the nervous system. Twelve hours per week, first four weeks, second semester, fourth year.

DR. WILSON.

Course VI.

Laboratory course on the microscopic study and diagnosis of tumors. (Elective for a limited number of students in fourth year.) This course includes the comprehensive study of tumors, with the view of giving the student a knowledge of the methods employed in the laboratory diagnosis of this class of pathological conditions and familiarizing him with the characters of the commoner as well as the rarer types, special attention, however, being given to the latter. It is intended to supplement the course on the surgical pathology of tumors by Professor Stewart. Twelve hours per week, four weeks, second semester, fourth year.

ASST. PROFESSOR WHITE.

Course VII. Research work in one of the following lines:

- (a) General pathology.

PROFESSOR WESBROOK.

- (b) Special pathology and bacteriology and technique.

ASST. PROFESSOR WHITE.

Second semester of third and throughout the fourth year, hours assigned.

Course VIII. Surgical pathology.

(See principles of surgery). This course will consist of lectures and laboratory demonstrations and will cover the general subject of the pathological and bacteriological 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 processes 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 a week, first semester, third year, and 3 hours a week, part of second semester, fourth year

PROFESSOR STEWART.

Text-Books:

Pathology--

American Text-Book of Pathology.

Ziegler's General and Special Pathology.

Schmaus-Ewing: Pathology and Pathological Anatomy.

Coplin's Manual of Pathology.

Durck-Hektoen: Special Pathologic Histology.

Jakob: Nervous System.

Coat's Manual of Pathology.

Mallory and Wright's Pathological Technique.

Collateral reading—Hamilton's Text-Book of Pathology; Delafield and Prudden's Handbook of Pathological Anatomy and Histology; Woodhead's Practical Pathology; von Kahlden's Pathological Histology; Thoma's Text-Book of General Pathology; Lubarsch Ostertag, Ergebnisse der Pathologie u Anatomie; Orth, Pathologische Anatomie; Birch-Hirschfeld, Pathologische Anatomie; Clifford Allbutt's System of Medicine; Leukhart's die Thierische Parasiten des Menschen; Bouchard, Traite de Pathologie Generale; Eichorst, Pathologie u Therapie; Gaylord and Aschoff, Pathological Histology; Nothnagel, Encyclopedia of Practical Medicine.

Surgical pathology—

Bland Sutton, Tumors, Innocent and Malignant.

Collateral reading—Park's Surgery, Vol. 1; Warren's Surgical Pathology; Senn on Tumors; Bowlby's Surgical Pathology; Nancrede's Lectures upon the Principles of Surgery; Watson Cheyne's Tuberculosis of Bones and Joints.

Bacteriology—

Muir and Ritchie's Manual of Bacteriology.

Park, Bacteriology in Medicine and Surgery.

Levy-Klemperer-Eshner Clinical Bacteriology.

Lehmann-Neumann-Weaver, Atlas and Textbook of Bacteriology.

Abbott, The Hygiene of Transmissible Diseases.

Collateral reading—Sternberg's Manual of Bacteriology; Woodhead's Bacteria and their products; Duflocq, Lecons sur les Bacteries Pathogenes; Flugge, die Mikroorganismen; Migula, System de Bakterien; Duclaux, Traite de Microbiologie; Hueppe (Jordan), Principles of Bacteriology; Novy, Laboratory Work in Bacteriology.

College of Medicine and Surgery

THE FACULTY

- CYRUS NORTHROP, LL. D., *President.*
PARKS RITCHIE, M. D., *Dean and Professor of Obstetrics.*
CHARLES A. WHEATON, M. D., *Emeritus Professor of Surgery.*
THOMAS G. LEE, B. S., M. D., *Professor of Histology and Embryology and Librarian.*
CHARLES A. ERDMANN, M. D., *Professor of Anatomy.*
RICHARD OLDING BEARD, M. D., *Secretary and Professor of Physiology.*
HENRY MARTYN BRACKEN, M. D., L. R. C. S., Edin., *Professor of Materia Medica and Therapeutics.*
FRANK FAIRCHILD WESBROOK, M. A., M. D., C. M., *Professor of Pathology and Bacteriology.*
J. W. BELL, M. D., *Professor of Physical Diagnosis and Clinical Medicine.*
CHARLES LYMAN GREENE, M. D., *Professor of Theory and Practice of Medicine.*
CHARLES H. HUNTER, A. M., M. D., *Clinical Professor of Medicine and Chief of Medical Clinic.*
EVERTON J. ABBOTT, A. B., M. D., *Clinical Professor of Medicine and Chief of Medical Clinic.*
HENRY L. STAPLES, A. M., M. D., *Clinical Professor of Medicine.*
JAMES H. DUNN, M. D., *Professor of Surgery.*
FREDERICK A. DUNSMOOR, M. D., *Professor of Operative and Clinical Surgery.*
JAMES E. MOORE, M. D., *Professor of Clinical Surgery.*
J. CLARK STEWART, B. S., M. D., *Professor of Principles of Surgery.*
JUSTUS OHAGE, M. D., *Professor of Clinical Surgery.*
JOHN T. ROGERS, M. D., *Professor of Clinical Surgery.*
ARTHUR J. GILLETTE, M. D., *Professor of Orthopedic Surgery.*
A. B. CATES, A. M., M. D., *Professor of Obstetrics.*
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.*
FRANK C. TODD, M. D., *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.*
THOS. S. ROBERTS, M. D., *Professor of Diseases of Children.*
MAX P. VANDER HORCK, M. D., *Professor of Diseases of the Skin and of the Genito-Urinary System.*
W. S. LATON, M. D., *Professor of Diseases of the Nose and Throat.*
ARTHUR SWEENEY, M. D., *Professor of Medical Jurisprudence.*
J. E. SCHADLE, M. D., *Clinical Professor of Laryngology, Rhinology and Otology.*

CORPS OF CLINICAL PROFESSORS AND INSTRUCTORS

- BURNSIDE FOSTER, M. A., M. D., *Clinical Professor of Diseases of the Skin and Lecturer upon History of Medicine.*
- JAMES T. CHRISTISON, M. D., *Clinical Professor of Diseases of Children.*
- C. NOOTNAGEL, M. D., *Clinical Professor of Medicine.*
- L. A. NIPPERT, M. D., *Clinical Professor of Medicine.*
- H. J. O'BRIEN, M. D., *Clinical Professor of Surgery.*
- J. WARREN LITTLE, M. D., *Clinical Professor of Surgery.*
- ANDREW HENDERSON, M. D., *Clinical Professor of Medicine.*
- GEORGE D. HEAD, B. S., M. D., *Professor of Clinical Microscopy and Medicine.*
- HERBERT W. DAVIS, M. D., *Clinical Instructor in Obstetrics.*
- GEORGE M. COON, M. D., *Clinical Instructor in Genito-Urinary Diseases.*
- J. L. ROTHROCK, M. D., *Clinical Instructor in Pathology and Gynecology.*
- L. B. WILSON, M. D., *Senior Demonstrator in Pathology.*
- S. M. WHITE, B. S., M. D., *Assistant Professor of Pathology and Bacteriology.*
- WM. M. CHOWNING, B. A., M. D., *Junior Demonstrator of Pathology and Bacteriology.*
- H. C. CAREL, B. S., *Assistant Professor of Chemistry.*
- WINFIELD S. NICKERSON, Sc. D., *Assistant Professor of Histology.*
- MARGARET L. NICKERSON, M. A., *Instructor in Histology.*
- M. RUSSELL WILCOX, M. D., *Demonstrator in Physiology.*
- ELEANOR M. WILKINSON, *Instructor in Physiology and Dietetics.*
- H. K. READ, M. D., *Demonstrator of Anatomy.*
- GEO. E. SENKLER, M. D., *Clinical Instructor in Medicine.*
- A. W. DUNNING, M. D., *Clinical Instructor in Nervous and Mental Diseases.*
- FREDERICK LEAVITT, M. D., *Clinical Instructor in Obstetrics.*
- J. C. LITZENBERG, B. S., M. D., *Clinical Instructor in Obstetrics.*
- F. R. WRIGHT, M. D., *Clinical Instructor in Dermatology and Genito-Urinary Diseases.*
- A. E. BENJAMIN, M. D., *Clinical Instructor in Gynecology.*
- H. P. RITCHIE, Ph. B., M. D., *Clinical Instructor in Gynecology.*
- H. L. WILLIAMS, M. D., *Clinical Instructor in Gynecology.*
- S. P. REES, B. S., M. D., *Instructor in Physical Diagnosis and Clinical Medicine.*
- A. T. MANN, B. S., M. D., *Clinical Instructor in Surgery.*
- JUDD GOODRICH, M. D., *Clinical Instructor in Surgery.*
- WARREN A. DENNIS, M. D., *Clinical Instructor in Surgery.*
- A. R. COLVIN, M. D., *Clinical Instructor in Surgery.*
- E. V. APPLEBY, M. D., *Clinical Instructor in Ophthalmology.*
- WM. R. MURRAY, B. A., M. D., *Clinical Instructor in Ophthalmology and Otolology.*
- JOHN B. BRIMHALL, M. D., *Clinical Instructor in Orthopedic Surgery.*
- ARTHUR A. LAW, M. D., *Instructor in Operative Surgery.*
- ALFRED LIND, B. S., M. D., *Lecturer in Mechano-therapy.*
- IRA HARRIS DERBY, B. S., *Instructor in Medical Chemistry.*

CLINICAL AND LABORATORY ASSISTANTS

- R. A. CAMPBELL, M. D., *Assistant in Diseases of the Nose and Throat.*
- CHARLES R. BALL, M. D., *Assistant in Nervous and Mental Diseases.*
- WALTER RAMSEY, M. D., *Assistant in Pediatrics.*
- DAVID LANDO, M. D., *Assistant in Medicine.*
- E. R. HARE, M. D., *Prosector in Anatomy.*
- W. H. CONDIT, B. S., M. D., *Assistant in Materia Medica and Surgery.*

GEO. D. HAGGARD, M. D., *Assistant in Physiology.*
P. A. HOFF, M. D., *Assistant in Clinical Medicine.*
LESTER W. DAY, M. D., *Assistant in Clinical Medicine.*
JAS. T. GILFILLAN, M. D., *Assistant in Clinical Medicine.*
MARION A. MEAD, M. D., *Assistant in Laryngology.*
L. O. DART, M. D., *Assistant in Pediatrics.*
H. L. ULRICH, M. D., *Assistant in Clinical Microscopy.*
R. E. FARR, M. D., *Assistant in Surgery.*
J. G. CROSS, M. D., *Assistant in Clinical Medicine.*
JEANETTE McLAREN, M. D., *Assistant in Obstetrics.*
VAN H. WILCOX, M. D., *Assistant in Operative Surgery.*
A. M. WEBSTER, B. A., *Instructor in Latin.*

UNIVERSITY SCHOLARS

GIVING INSTRUCTION AND ASSISTING IN LABORATORIES

In Anatomy—Karl Klemer, C. C. Tyrrell.
In Histology and Embryology—E. E. Olander, C. W. Wilkowski, J. E. Hynes,
Charles McMahon.
In Bacteriology and Pathology—Chelsea Pratt, Robert L. Tebbitt, S. E.
Williams, Geo. C. Dittman, Geo. E. Dix, John L. Devine, Geo. E. Thomas.
In Surgical Pathology—Hugh S. Willson.
In Chemistry—A. E. Carr, E. A. Loomis.

REQUIREMENTS FOR ADMISSION.**HIGH SCHOOL REQUIREMENT.**

Applicants for admission to the College of Medicine and Surgery of the University of Minnesota must present, to the dean and secretary of this college, credentials, properly signed, showing that the applicant has satisfactorily completed the branches of study, covered in a full four years' high school course and, in addition, the branches covered in the freshman year of an approved college or university, according to the conditions herein stated.

The applicant who cannot present such credentials must submit to an examination on the subjects, given in the schedule, herewith submitted.

English Language. (a). English composition and rhetoric.

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

Four years of work in the high school, four hours per week, should be devoted to this subject; at least one-fourth of the work being devoted to practice in written expression.

Mathematics (a). Algebra, elementary (one year).

Addition, subtraction, multiplication, division, factoring, highest common divisor, lowest common multiple, fractions, simple equations (with one, two, and several unknown quantities) followed by problems, theory of exponents, involution (including the binomial theorem for positive integral exponents), evolution, radical inequalities, ratio, proportion, progression, and quadratic equations with problems.

Geometry (b). Plane (one year).

Any of the standard texts on this subject will furnish the necessary preparation. Isoperimetry, symmetry, and maxima and minima of figures are not required. The exercises requiring solutions and demonstrations should not be omitted.

Latin (a) Grammar (one year).

Will include the subjects of orthography, etymology and syntax. Proficiency is particularly desired in the following subjects: the analysis of the verb forms, the rules of syntax, and the principal parts of the irregular verbs.

(b) Caesar, 4 books (one year).

First four books, or selections from the seven books equivalent to four; or three books, with thirty pages of Cornelius Nepos, or two books with sixty pages of Cornelius Nepos. 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 the text. The student is expected to be familiar with the life of Caesar and an account of his wars.

In addition to the above named subjects, which are required, and for which substitutes can not be accepted, appli-

cants shall present evidence of preparation in *seven year-credits*, or their equivalent, to be chosen from the following list:

Latin—Cicero, four orations, one year; Vergil, six books, one year.

Greek, two years—Grammar, one year; Anabasis, four books, one year.

German, two years—Grammar, one year; Literature, one year.

French, two years—Grammar, one year; Literature, one year.

Spanish, two years—Grammar, one year; Literature, one year.

English—Literature, one year.

History—Greece and Rome, one-half year; England, one-half year; Modern, one-half year; Medieval, one-half year; Senior American, one-half year; Ancient, to 800 A. D., one year; Modern, from 800 A. D., one year.

Civics—One-half year.

Political Economy—One-half year.

Physics—One year.

Chemistry—One year or one-half year.

Botany—One-half year or one year.

Zoology—One-half year or one year.

Astronomy—One-half year.

Geology—One-half year.

Physiography—One-half year.

Solid Geometry—One-half year.

Higher Algebra—One-half year.

ADDITIONAL COLLEGE WORK REQUIRED.

In addition to the foregoing high school requirement for admission to the University of Minnesota, applicants for entrance to the College of Medicine and Surgery shall present evidence of having completed one year's work in a recognized college or university course. The following schedule presents the work of the first year in the college of science, literature and the arts. Applicants who have credit for one year of college work but whose credits do not evidence such a full course or its fair equivalent, will be permitted to enter, but

must make up such deficiencies, during the first year, in the college of science, literature and the arts.

1. *Mathematics*—A full year of college work, four recitation periods per week, including the subjects of higher algebra and plane trigonometry.

Higher algebra, including simple equations, inequalities, proportion, variation, progression, quadratic equations, simultaneous equations of the second degree, maxima and minima of functions, differentiation of algebraic functions, development of functions, logarithms, theory of equations and solution of numerical higher equations.

Plane trigonometry with numerous applications.

2. *Language*—One full year of college work, four recitation periods per week, in *one* of the following:—English, early English, including Chaucer and Spenser, Rhetoric, including some Shakespere and practice in writing; Latin, one year of college work, in advance of four years' work required for admission.

ENGLISH LANGUAGE AND LITERATURE.

Course I. (a) Chaucer, (b) Spenser.

Course II. Rhetoric.

This course includes two hours a week of rhetoric, the writing of compositions, the study of prose masterpieces and two hours a week of the study of Shakespeare's plays.

LATIN.

Course I. Cicero de Amicitia and de Senectute.

Exercises in Latin composition and a review of the syntax.

Course II. Livy.

Selections from Livy and one play of Plautus or Terence; rise and development of Roman institutions.

3. *Language*—One full year of college work, four recitation periods per week, in *one* of the following:—

German, 1st or 3rd year's work in the subject.

French, 1st or 3rd year's work in the subject.

Greek, 1st or 3rd year's work in the subject.

GERMAN.

Course I. German begun.

(a) Whitney's Brief German Grammar, Bernhardt's German composition and Buchheim's German Poetry.

(b) German prose selections. Leander's Traumerein, Heyse's L'Arrabbiata, von Hillern's Hoher als die Kirche; grammar and composition completed.

(c) Scientific prose. Hodge's German Science Reader; grammar and composition completed.

Or Course III. Advanced classic prose and poetry.

(a) Goethe's Prosa and Gedichte, author's life and works, Spanhoofd's Deutsche Grammatik. Oral and written exercises based on text

(b) Schiller's Belagarung von Antwerpen, Heine's Prosa and Buch der Lieder, life and works of the author.

(c) Brandt & Day's German Scientific Reading, Spanhoofd's Deutsche Grammatik completed, original letters and essays.

FRENCH.

Course I. French begun.

De Borde's Elements of French; Kuhn's French Reader; modern plays.

Or Course II. Advanced grammar and composition.

Fasnacht's Progressive French Course.

Paul Bercy's Selections for Translating English into French. The classical authors of the XVII and XVIII centuries will be read. Fortier's *Histoire de la Littérature Française*.

GREEK.

Course I. Greek begun.

Brook's Introduction to Attic Greek.

Course II. Anabasis.

Prose composition based on the text.

Course III. Xenophon's *Memorabilia*.

Prose composition based on the text; collateral readings in history.

Course IV. Lysias and Demosthenes.

Prose composition based on the text; collateral readings in history antiquities.

4. *Science*—One full year of college work, four recitation periods per week, and four hours of laboratory work, in *one* of the following:

Botany.

Chemistry.

Zoology.

BOTANY.

Course I. General Botany.

This course comprises a general survey of the plant kingdom with laboratory work on the cell, on the algae, lichens, fungi, mosses and ferns, gymnosperms and flowering plants. Lectures and laboratory work.

Or Course II. General plant morphology. First year.

This course comprises a thorough laboratory discipline in algae, fungi and lichens, and is the introductory course for students specializing in botany. Lectures, laboratory work and collateral reading throughout the year.

CHEMISTRY.

Course I. (a) General chemistry.

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

(b)

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

ANIMAL BIOLOGY.

Course I. General zoology. "Short course" or first year of the "long course."

Text-book, lectures, quizzes and laboratory work.

The course includes the elements of entomology, a general survey of the phyla of the animal kingdom and the elements of embryology. A collection of identified insects is required of each student.

A student may enter with two conditions in the foregoing entrance requirements, but must remove these conditions by the close of the first year. Blanks for certificates of credentials may be had upon application at the Dean's office.

TERMS OF TUITION.

The college of medicine and surgery has adopted a system of annual fees, in which are included all charges for matriculation, lecture courses, laboratory courses, dissections and grad-

uation, except a rental fee for microscopes.* These fees are \$100 per annum for the full course.

One-half of the annual fee will be payable when the student matriculates. The accountant'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, January 24, 1905. Failure to register within the dates assigned for registration will subject the delinquent to an increase in the registration fee, amounting to twenty-five cents for each day of such delinquency. If the applicant fails to pass the entrance examination, his fees will be returned by the accountant. Absence or failure to continue study will not entitle the student to return of fees, excepting in cases of special hardship, when application may be made to the executive committee of the Board of Regents.

A student who takes advanced standing will not receive any credit therefor upon his annual fees.

Students who are conditioned and fail to remove their conditions within one year shall be charged an extra examination fee.

Senior conditioned students who re-enter for work in any succeeding year will be charged a matriculation fee of ten dollars.

CURRICULUM.

The course in the college of medicine and surgery leads to the degree of doctor of medicine. It covers a period of four years of collegiate study, each year representing nine 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.

*In each semester a fee of \$1.00 to \$5.00 will be charged for the rental of a microscope in the courses in which its use is required, provided the student is not supplied with a satisfactory instrument of his own. It is an advantage for the student to possess a microscope.

GRADED SYSTEM OF STUDY.

FIRST YEAR.

Histology and embryology, anatomy, physiology, chemistry, materia medica.

SECOND YEAR.

Histology and embryology, anatomy, physiology, chemistry, general bacteriology and pathology, therapeutics.

THIRD YEAR.

Surgical anatomy, special pathology and bacteriology, surgical pathology, operative surgery, practice of surgery, practice of medicine, diseases of children, obstetrics, physical diagnosis.

FOURTH YEAR.

Practice of surgery, practice of medicine, clinical obstetrics, surgical pathology, practical physical diagnosis, nervous and mental diseases, gynecology, ophthalmology and otology, genito-urinary diseases, orthopaedia, diseases of the skin, diseases of the nose and throat, hygiene.

ELECTIVE COURSES.

The elective system, which has been, for some years, in process of adaptation to the course in medicine and surgery in the fourth year, will be extended to the work of the third year and further systematized. The following electives are offered. The courses in italics are open to both third and fourth year students, the remainder only to students of the fourth year. The hours occupied in each course are cited and thirty-six hours are counted as an elective unit. Students of the third year are required to elect two units of elective work; those of the fourth year to elect four units. Courses elected will become subjects of continued study and examination. Other electives may be taken at the choice of the student, but will not be a matter of compulsory study.

Electro-therapy (half-unit).....	18 hours
Mechano-therapy (half-unit).....	18 hours
<i>History of Medicine</i> (half-unit).....	18 hours
<i>Medical Jurisprudence</i> (half-unit).....	18 hours
Ophthalmoscopy (half-unit).....	18 hours
Radio-diagnosis and therapy (half-unit).....	18 hours
<i>Therapeutics</i> (unit).....	36 hours
Clinical Microscopy (unit).....	36 hours
Operative Surgery (one and one-half units).....	54 hours
<i>Pathology of Nervous System</i> (one and one-half units).....	54 hours
<i>Special Pathology of Tumors</i> (one and one-half units).....	54 hours
Practical Dietetics (one and one-half units).....	54 hours
<i>Methods of Microscopical Technique</i> (one and one-half units).....	54 hours
<i>Comparative Histology and Histogenesis of Tissues</i> (one and one-half units).....	54 hours
<i>Comparative Embryology of Man and Vertebrates</i> (one and one-half units).....	54 hours
<i>Microscopic Anatomy and Organogenesis</i> (one and one-half units).....	54 hours
<i>Comparative Histology and Development of Central Nervous System</i> (one and one-half units).....	54 hours
<i>Practical Pathology</i> (unit).....	36 hours
<i>Applied Anatomy of Nervous System</i> (unit).....	36 hours
<i>Animal Parasites of Man</i> (half-unit).....	18 hours
Dispensary Out-door service (half-unit).....	18 hours

These elective courses are open to post-graduate students who can occupy in their study brief periods of time, since several courses will be concentrated in each half-semester.

COURSES OF INSTRUCTION.

MATERIA MEDICA AND THERAPEUTICS.

The work in materia medica and therapeutics is graded to cover a period of three years. It consists of lectures, recitations and demonstrations, conducted in the laboratory of materia medica. This laboratory is in Medical Hall. Pharmaceutical preparations are placed before the student and he is taught the method of their preparation in their most eligible forms.

Course I. Pharmacology.

This course includes the study of the general characteristics of drugs and of their physiologic actions. Lectures, recitations and laboratory work. Five hours a week, second semester, first year.

PROFESSOR BRACKEN

Course II. Therapeutics.

In this course drugs are studied in groups, as governed by their physiologic action, and the therapeutic features of such groups are described. Other remedial measures than those depending upon drugs, are fully considered. Lectures and recitations, four hours a week, first semester, third year.

PROFESSOR BRACKEN.

Course III. Therapeutics.

In this course the treatment of individual diseases is studied and the application of therapeutic agents to them is discussed. Lectures. Two hours a week, first semester, fourth year.

PROFESSOR BRACKEN.

Text-Books:

Bracken's Outlines of Materia Medica and Pharmacology.

Collateral reading—The Pharmacopœia of the U. S.; The National Dispensatory; Sayre's Organic Materia Medica and Pharmacognosy; Culbreth's Materia Medica and Pharmacology; Foster's Practical Therapeutics; Hare's System of Practical Therapeutics.

PRACTICE OF MEDICINE.

The course in the principles and practice of medicine is graded in the third and fourth years. It consists of lectures and frequent and systematic "quizzes" by the head of the chair and of out-patient and bedside clinics given by the professor of medicine and a large corps of clinical professors and instructors.

Examinations are required at the close of each year and the students are carefully and systematically marked on their recitations throughout the course.

Exceptional proficiency, as shown by a high term average, may exempt students from final examinations.

COURSES.

Course I. (a) Case-taking, general symptomatology

Course II. (b) The infectious diseases.

Course III. (c) Diseases of the heart and blood vessels

Course IV. (d) Diseases of the Pleuræ and Lungs.

Course V. (e). Diseases of the Kidneys.

Lectures, two hours a week, first semester; three hours a week, second semester, third year.

PROF. GREENE.

Course VI. Diseases of the stomach, liver and intestines.

Course VII. Diseases of nutrition. (Haematology, diabetes, gout, scurvy, etc.)

Course VIII. Tropical diseases.

Course IX. Life insurance examinations (supplementing case-taking of 3rd year). Lectures, two hours a week, fourth year. PROF. GREENE.

Course VIII. Clinical lectures and exercises in general medicine, consisting of clinical instruction to sections of the third and fourth year classes, in the dispensaries, by the bedside and in the amphitheatres of the several hospitals in St. Paul and Minneapolis, as follows:

(a) City Hospital, Minneapolis, two hours a week, both years. Professors J. W. Bell, H. L. Staples and C. Nootnagel, Dr. L. A. Nippert and Dr. S. P. Rees.

(b) St. Barnabas' Hospital, Minneapolis, two hours a week, both years. Professor C. H. Hunter and Dr. Geo. D. Head.

(c) City and County Hospital, St. Paul, and St. Joseph's Hospital, St. Paul, four hours a week, for part both years. Professor E. J. Abbott and Dr. Henderson.

(d) City and County Hospital, St. Paul, two hours a week, both years. Professor C. L. Greene and Dr. Senkler.

(e) Free Dispensary, St. Paul, two hours a week, both years. Professor C. L. Greene and Drs. Senkler, Ramsey, and Hoff.

(f) University Free Dispensary, Minneapolis, four hours a week, both years. Dr. L. A. Nippert.

Text-Books:

Practice of medicine

Osler's Practice of Medicine. Tyson's Practice. Thompson's Practical Medicine.

Collateral reading—Allbutt's System of Medicine; Eichhorst's Internal Medicine; Cabot, The Blood; Da Costa, The Blood; Simons, Clinical Diagnosis; Hutchinson and Rainey, Clinical Methods; Hemmeter, Diseases of the Stomach; Gibson, Diseases of the Heart; Broadbent, The Pulse; Yeo, Handbook of Medical Treatment; Gibson's Practice.

Case-taking and life insurance.

Greene: The Examination for Life Insurance and Its Associated Clinical Methods.

PHYSICAL DIAGNOSIS.

Course I. The thorax: its topography, methods of examination, applied to the normal and abnormal chest; disease of the respiratory organs; their physical signs and differential diagnosis.

PROFESSOR J. W. BELL.

Course II. The precordial region: its topography, methods of examination, applied to the normal and abnormal heart; diseases of circulatory organs; their physical signs and differential diagnosis.

PROFESSOR J. W. BELL.

Course III. The abdomen: its topography, methods of examination under normal and abnormal conditions; diseases of this region; their physical signs and differential diagnosis. Lectures and recitations. Three hours a week, first semester, third year.

PROFESSOR J. W. BELL.

Course IV. Clinical physical diagnosis.

Practical clinical instruction given to small sections of the class. For this purpose the clinical material of the several hospitals and dispensaries in Minneapolis is utilized. Four hours a week, first semester, third year.

PROFESSORS NOOTNAGEL AND NIPPERT AND DR. REES.

Course V. Clinical physical diagnosis.

Practical clinical instruction given to small sections of the classes. For this purpose the clinical material of the several hospitals and dispensaries in Minneapolis is utilized. Two hours a week, fourth year.

PROFESSORS NOOTNAGEL AND NIPPERT.

Course VI. Clinical physical diagnosis, continued.

The clinical material of the hospitals and dispensaries of the city of St. Paul is utilized in the form of clinics. Two hours a week, fourth year.

DR. G. E. SENKLER.

Text-Books:

Le Fevres' Physical Diagnosis.

Butler's Medical Diagnosis.

Collateral reading—Bramwell's Heart and Thoracic Aorta; Fox on the Lungs; Sansom's Heart and Aorta; Roger's Introduction to Study of Medicine; Musser's Medical Diagnosis.

SURGERY.

The course in surgery is graded in the third and fourth years. Examinations are held at the close of each of these years. Lectures and recitations are given by the teaching staff in surgery and clinics at the dispensaries and hospitals of Minneapolis and St. Paul by a large corps of instructors.

Course I. The principles of surgery.

Inflammation; traumatic fevers; suppurations; acute inflammations of joints; ulceration; gangrene; thrombosis and embolism; septicaemia; pyaemia; erysipelas; tetanus; surgical tuberculosis; actinomycosis, an-thrax and glanders. Lectures and recitations, two hours a week, first semester, third year.

PROFESSOR STEWART.

Course II. Operative surgery.

Lectures upon the principles of operative procedure; the preparation of patient, operator and operating rooms; the principles of asepsis, anti-sepsis and sterilization; anaesthesia and anaesthetics; haemostasis, ligatures and sutures; dressings, bandages and the treatment of wounds. Two hours a week, first half, second semester, third year.

PROFESSOR DUNSMOOR.

Course III. The practice of surgery.

Fractures and dislocations; injuries of joints; injuries and surgical diseases of the skin; of the lymphatics, blood vessels and nerves; of the tendons, fasciae and bursae; of the face, mouth, tongue, jaws (excepting the study of tumors). Lectures and recitations. Four hours a week, first half, second semester, third year.

PROFESSOR DUNN.

Course IV. The practice of surgery.

Surgery of the head, neck, chest, back, breast, abdomen, including hernia, anus, rectum and urinary tract. Lectures and recitations. Four hours a week, second half, first semester, fourth year.

PROFESSOR DUNN.

Course V. Operative surgery.

An elective laboratory work, consisting of operations, performed by sections of the class, under the supervision of the instructors, upon the cadaver and upon animals. Six hours a week, first half of first semester, fourth year.

PROFESSOR DUNSMOOR AND DR. LAW.

Course VI. Orthopedic surgery: including diseases of bones, joints, synoviae and bursae, congenital and acquired deformities; dystrophies, with the principles of treatment. Lectures and recitations. Three hours a week, second half, second semester, fourth year.

PROFESSOR GILLETTE.

Course VII. Surgical pathology: Tumors.

A special course upon tumors, taking up the general pathology and the general principles of the treatment of tumors. Each variety of tumor is then discussed, together with its histology, life-history, diagnosis and treatment. The course is illustrated by charts and museum specimens. Lectures and recitations, three hours a week, two thirds of second semester, fourth year.

PROFESSOR STEWART.

Course VIII. Bandaging and dressings.

A practical course of instruction, by means of demonstrations and drill upon animals and cadaver by the student in person, under the supervision of the chair of operative surgery. Eight hours, first half, first semester, fourth year.

PROFESSOR DUNSMOOR AND DR. LAW.

Course IX. 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 Thursdays and Saturdays throughout the year. The classess alternate at the two cities in their attendance upon these clinics. They are conducted personally, throughout the year, by the clinical chiefs and their associates as follows:

At the City and County Hospital, St. Joseph's Hospital or St. Luke's Hospital in St. Paul, weekly, by Professor John T. Rogers.

At the City and County Hospital, St. Joseph's Hospital, St. Luke's Hospital, or Free Dispensary, at St. Paul, with sections of class weekly, by Professor John T. Rogers, Dr. G. M. Coon, Professor A. J. Gillette, Dr. W. A. Dennis, Dr. Judd Goodrich and Dr. A. Colvin.

At the City and County Hospital, or at St. Joseph's Hospital, or at St. Luke's Hospital, St. Paul, weekly, by Professor Justus Ohage.

At the Northwestern Hospital, Minneapolis weekly, by Professors J. E. Moore and J. Clark Stewart.

At the Asbury Hospital, Swedish Hospital or the City Hospital, Minneapolis, weekly, by Professor F. A. Dunsmoor and Dr. J. Warren Little.

At St. Mary's Hospital, or the City Hospital, Minneapolis, weekly, by Professor J. H. Dunn.

At the City Hospital, Minneapolis, weekly, by Dr. A. T. Mann. At the University Free Dispensary, by Drs. Law, Mann and Condit.

Text-Books:

Rose and Carless' Manual of Surgery.

Park's Surgery

Tillman's Principles of Surgery and Surgical Pathology.

Kocher's Operative Surgery.

Warren's Surgical Pathology and Therapeutics.

Senn's Principles of Surgery.

American Text-Book of Surgery.

Wharton and Curtis' Practice of Surgery.

Nancrede's Principles of Surgery.

Jacobson's or Zuckerhandl's Operative Surgery.

Moore's Orthopaedic Surgery.

Bradford's and Lovett's Orthopaedic Surgery.

Witman's Orthopaedic Surgery.

Beckham's Operative Surgery.

Collateral reading—International Text-Book of Surgery; Agnew's Practice of Surgery; Dennis' Practice of Surgery; Stimson's Fractures and Dislocations; Hamilton's Fractures and Dislocations; McGrath's Surgical Anatomy and Operative Surgery.

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. A large part of the obstetric service of the City Hospital in St. Paul and of the Minneapolis City Hospital is at the disposal of the chair of obstetrics. Clinics are also held at other hospitals in St. Paul and Minneapolis.

Course I. The anatomy and physiology of the pelvic organs: the development of the embryo and appendages; pregnancy; symptoms and diseases; operative obstetrics; the complications of labor and its sequelae. Lectures and recitations two hours a week in October and January, and three hours a week, second semester, third year.

PROFESSOR CATES.

Course II. The theory and practice of obstetrics.

The mechanism and conduct of normal labor, with its complications; abortions. Lectures and recitations. Two hours a week. November and December, third year.

PROFESSOR RITCHIE.

Course III. Hospital ward work.

Twice a week, from January 1st to May 1st, Dr. Frederick Leavitt will conduct sections of students through the maternity wards of the St. Paul City and County Hospital. A similar service will be conducted in the wards of the Minneapolis City Hospital, from October 10th, to February 10th, by Dr. Jennings C. Litzenberg. This course will be in the nature of an ante-partum clinic, in which will be studied the signs of pregnancy, pelvimetry, palpation, obstetric diagnosis, etc. This work is in the nature of a conference, each student viewing the subject from the standpoint of a practitioner.

DRS. LEAVITT AND LITZENBERG.

Course IV. Clinical obstetrics.

The study of and the participation in the conduct of two or more hospital deliveries in the fourth year, under the direction of Professors Ritchie and Cates and personally conducted by Drs. H. W. Davis, Frederick Leavitt, Harry P. Ritchie, and J. C. Litzenberg. A limited number of out-patients is assigned to members of the senior class who are authorized to attend these cases, under the supervision of the instructors, before, during and after labor.

Text-Books:

Edgar Williams, Jewett, Lusk, Hirst and the American Text-Book of Obstetrics.

GYNECOLOGY.

The course in the diseases of women consists of lectures, recitations, clinical instruction and the witness of operations, upon the human subject, as they may offer.

Course I. Lectures and recitations.

Two hours a week, first semester, fourth year.

PROFESSOR STONE.

Course II. Clinical courses at the City and other hospitals in Minneapolis and St. Paul. Observations and examinations of patients, methods of examination, diagnosis and treatment.

Weekly Clinics in Minneapolis Hospitals, by Prof. A. W. Abbott and Dr. A. E. Benjamin

Weekly clinics held in St. Joseph's Hospital, St. Paul, by Prof. Stone.

Weekly clinics at St. Luke's Hospital, St. Paul, by Professor McLaren.

Weekly clinics held at the City and County Hospital, St. Paul, during January, February, and March, by Dr. J. L. Rothrock.

The above announcements represent the surgical work given in gynecology throughout the entire year. Every operation in this branch of surgery is presented in these clinics. Owing to the limited field within which this work must be done, the attempt is always made to divide the class into small sections. Daily clinics for small sections are held at the University and St. Paul Free Dispensaries by Drs. A. W. Abbott, A. E. Benjamin, J. L. Rothrock, and H. P. Ritchie. This course is especially valuable since it brings the student into direct acquaintance with the patient. Individual instruction is given in history-taking, diagnosis, methods of examination, treatment and minor gynecology.

Text-Books:

Dudley's Diseases of Women.

Reed's Text-Book of Gynecology,

Kelly's Operative Gynecology.

Collateral reading—Emmett's Diseases of Women; Thomas and Munde's Gynecology; Pozzi's Diseases of Women.

OPHTHALMOLOGY AND OTOTOLOGY.

Course I. Diseases of the eye and its appendages; refraction and its errors.

Lectures and recitations. Three hours a week, first half, first semester, fourth year.

PROFESSOR TODD.

Course II. Diseases of the ear

Lectures and recitations. One hour a week, first half, first semester, fourth year.

PROFESSOR TODD.

Course III. Clinical lectures will be given and operations performed at St. Barnabas, Asbury or Northwestern Hospital, Minneapolis, every Saturday, third and fourth year. Clinics will be given at the Minneapolis City Hospital occasionally during November, December, January and February. Third and fourth year.

PROFESSOR TODD.

Course IV. Clinical instruction will be given at the University and St. Paul Free Dispensaries in the diagnosis of diseases of the eye and ear; in the methods of examination; in the use of instruments, including the ophthalmoscope, and in the treatment of eye and ear diseases etc. Fourth year.

Diseases of ear, St. Paul,

PROFESSOR SCHADLE.

Diseases of eye, St. Paul,

DR. APPLEBY.

Diseases of eye and ear, Minneapolis,

DR. MURRAY.

Course V. Ophthalmoscopy; a practical course of instruction, elective in the senior year.

DR. WM. R. MURRAY.

Text-Books:

Wood and Woodruff, Commoner Diseases of the Eye.

Fox's Diseases of the Eye.

Bacon's Diseases of the Ear.

Collateral reading—De Schweinitz's Diseases of the Eye; American Text Book; Norris and Oliver's Ophthalmology; Politzer's Diseases of the Ear; Veasey's Diseases of the Eye; Posey Wright, Diseases of the Eye, Ear, Nose and Throat; May's Diseases of the Eye.

NERVOUS AND MENTAL DISEASES.

The required courses of lectures and recitations in this department will be given in the fourth year. Instruction will be by recitations and the "case method." Elective courses in clinical neurology, psychiatry, medical electricity and neuropathology will be offered in the fourth year.

Course I. Neurology.

Lectures, recitations and demonstrations. Two hours a week, twelve weeks, first semester, fourth year.

PROFESSORS RIGGS AND JONES (Alternating).

Course II. Psychiatry.

Lectures, recitations and demonstrations. Two hours a week, five weeks, first and second semesters, fourth year.

PROFESSORS RIGGS AND JONES (Alternating).

Course III. Electro-therapeutics (elective).

Fourth year.

DR. A. W. DUNNING.

Course IV. Clinical neurology and psychiatry.

PROFESSORS RIGGS AND JONES.

Practical instruction will be given upon Thursdays and Saturdays, fourth year. Clinics will be conducted in St. Paul, by Professor Riggs, at the City and County Hospital, St. Luke's Hospital, St. Joseph's Hospital and the Free Dispensary; and at Minneapolis by Professor Jones, at the City Hospital, Asbury Hospital, St. Mary's Hospital and the University Free Dispensary.

Course V. Laboratory Course (elective).

Fourth year.

DR. L. B. WILSON.

Text-Books:

Oppenheim's Diseases of the Nervous System.

Dana's Nervous Diseases.

Church-Peterson, Nervous and Mental Diseases.

Collins' Treatment of Nervous Diseases.

Brower and Bannister's Mental Diseases.

Berkeley's Mental Diseases.

Robertson, Pathology of Mental Diseases.

Collateral reading—Clouston's Lectures on Mental Diseases; Edinger's Anatomy of the Central Nervous System; Gordinier's Anatomy of the Central Nervous System; Mills' Nervous Diseases; Beevor's Diseases of the Nervous System; Gower's Diseases of the Nervous System; Ada-Starr's Organic Nervous Diseases.

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 and genito-urinary diseases. Two hours a week, second semester, fourth year.

PROFESSOR VANDER HORCK.

Course II. Clinical lectures, in connection with the dispensaries and hospitals of Minneapolis and St. Paul Weekly in the third and fourth year.

PROFESSORS VANDER HORCK AND BURNSIDE FOSTER AND DR. F. R. WRIGHT.

Text-Books.

Keyes' or White and Martin's Diseases of Urinary Organs.

Collateral reading—Taylor's Genito-Urinary and Venereal Diseases;

Lydston's Genito-Urinary, Venereal and Sexual Diseases.

Hyde's Diseases of the Skin.

Walker's Dermatology.

Jackson's Diseases of the Skin.

Hyde and Montgomery's Venereal Diseases.

Collateral reading—Crocker's Diseases of Skin; Morris' Diseases of the Skin;

Hayden's Diseases of the Skin; Stelwagon's Diseases of the Skin.

DISEASES OF THE NOSE AND THROAT.

Course I. Anatomy and physiology of the nose and throat; pathology, diagnosis and treatment.

Lectures and recitations. Two hours a week, eight weeks, fourth year.

Course II. Clinical instruction, given at the University Free Dispensary, Minneapolis, in the diagnosis and treatment 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 a week, both semesters, fourth year.

Course III. Clinical instruction, given at the St. Paul Free Dispensary, in the diagnosis of diseases of the nose and throat; in the methods of examination; in the practical use of instruments and application of remedies; and in the applied anatomy of the nose and throat, illustrated by dry and wet preparations. Two hours a week, fourth year.

PROFESSOR SCHADLE.

Text-Books.

Coakley's Diseases of the Nose and Throat.

Grayson's Diseases of the Nose and Throat.

Collateral reading—Bosworth's Diseases of the Nose and Throat; Posey Wright's Diseases of the Ear, Nose and Throat.

DISEASES OF CHILDREN.

Course I. Lectures, arranged to cover, so far as possible, the general subject of pediatrics. A course, consisting of two lectures a week, in the second semester of the third year; beginning with a consideration of the special characteristics of the normal infant and child, as distinguished from the adult, and passing on to a detailed description of the features and management of the diseases peculiar to infancy and childhood and of the more or less specialized forms in which certain diseases common to all ages exist during the early years of life. These lectures will be suitably illustrated by charts, colored plates, specimens, and the occasional use of the stereopticon. Third year.

PROFESSOR T. S. ROBERTS.

Course II. Clinical instruction will be given at the St. Paul Free Dispensary and the St. Paul City Hospital four hours weekly throughout the third and fourth years.

PROFESSOR J. T. CHRISTISON AND DR. RAMSEY.

Course III. Clinical instruction will be given in Minneapolis at the contagious wards of the City Hospital, the Children's Home, the University Free Dispensary and other specially designated places at such times as opportunity presents. Third and fourth years.

PROFESSOR T. S. ROBERTS.

Text-Books.

Holt's Diseases of Children.

Rotch's Pediatrics.

American Text-Book of Diseases of Children.

Collateral reading—Osler's Practice of Medicine; Keating's Cyclopedia of Diseases of Children. Corlett's Acute Infectious Exanthemata. Chapin's Theory and Practice of Infant Feeding; Stengel's Nootnagel's Encyclopedia.

HYGIENE.

A course of lectures in hygiene is conducted by a corps of the faculty. The general subject is thus divided into several branches, namely: chemistry of air, water and soil (included in the course in chemistry); the hygiene of foods, beverages, clothing, bathing and exercise; public sanitation (including sewage and garbage disposal, applied and school disinfection, regulations of quarantine, the disposal of the dead, the development of vital statistics, the care of slaughter houses, etc.); the bacterial diagnosis of infectious diseases, and some practical phases of sanitary engineering. The examinations in this branch are conducted by the lecturers jointly. The course includes about forty lectures and recitations, which are given during the second half of the first and second semesters of the fourth year.

PROFESSORS BEARD, WESBROOK, BRACKEN AND BASS.

Text-Books

Coplin's and Bevan's Practical Hygiene.

Park's Hygiene.

Bergey's Principles of Hygiene.

Collateral reading—Richardson's Preventive Medicine; Buck's Hygiene and Public Health; Winter Blyth's Foods and Their Composition.

MEDICAL JURISPRUDENCE.

An elective course of lectures and recitations, in the legal relations of medicine. Two hours a week, second half, second semester, fourth year.

PROFESSOR SWEENEY.

Text-Books.

Taylor's Medical Jurisprudence.

Collateral reading—Hamilton's American System of Legal Medicine; Withaus' Principles of Forensic Medicine and Toxicology; Wharton and Stille's Medical Jurisprudence; Reese's Medical Jurisprudence and Toxicology.

THE HISTORY OF MEDICINE.

An elective course of lectures is given in the history of medicine and of the medical profession from the earliest times, including accounts of the epoch-making discoveries in medicine, brief sketches of the lives of eminent physicians and an account of the great plagues of history. Three hours a week, second half, second semester, fourth year.

PROFESSOR BURNSIDE FOSTER.

MECHANO-THERAPY.

Courses of illustrated lectures and clinical demonstrations in gymnastics, massage and hydrotherapy. The principles of the physiology, technique and therapeutics are discussed. Two hours a week, first half, second semester, fourth year.

DR. ALFRED LIND.

Text-Books:

Wilde's Handbook of Medical Gymnastics.

Baruch's Principles and Practice of Hydro-therapy.

CLINICAL MICROSCOPY.

An elective course given in the senior year. The course will include:

- (a) The urine: a microscopical study of its colors and sediments and the microscopical study of blood, pus, epithelial casts, spermatozoa, etc., in the urine of disease; (b) the blood: the enumeration of red and white cells in the blood of pernicious anaemia, leukaemia, secondary anaemias, leucocytosis, leucopaemias, etc.; the estimation of haemoglobin in chlorosis, secondary anaemias, pernicious anaemia, etc.; the making of blood smears and the fixing, staining, mounting and study of all forms of normal and pathological blood cells; (c) Stomach contents: the macroscopical, chemical and microscopical study of stomach contents from cases of cancer, ulcer, hyperacidity and anacidity, with especial reference to differential diagnosis; (d) Exudates and transudates: their study by lectures and demonstrations; (e) Parasites: their study by lectures and demonstrations. Nine hours a week during part of second semester, fourth year.

PROFESSOR GEORGE DOUGLAS HEAD.

Text-Books:

Simon's Clinical Diagnosis.

Cabot's Clinical Examination of the Blood.

Ewing, Clinical Pathology of Blood.

Rieder's Atlas of Urinary Sediments.

Sahl's Lehrbuch der Klinischen Untersuchungs Methoden.

Ogden's Clinical Examination of the Urine.

DEGREES.

The degree of doctor of medicine is conferred by the Board of Regents upon the students who are recommended, by vote of the faculty, for graduation. Candidates for the degree must possess the following essential qualifications:

- (1) Twenty-one years of age and upwards.
- (2) Good moral character.

(3) A degree of preliminary education equivalent to that demanded by the examination for entrance to this college.

(4) Four full college years spent in the study of medicine; the fourth year, at least, in this University, and the remainder in this or other recognized colleges of medicine.

(5) Satisfactory examinations passed in all branches in accordance with the foregoing rules.

THE ROLLIN E. CUTTS PRIZE.

Dr. Mary E. Cutts has created in the hands of the Board of Regents, in memory of her late husband, Dr. Rollin E. Cutts, with herself, an alumnus of the University of Minnesota, a fund, from the income of which is to be awarded each year a gold medal to that member of the senior class who shall present to the faculty of the college of medicine and surgery the best and most original thesis upon a surgical subject.

DISPENSARY AND HOSPITAL CLINICS.

DISPENSARIES.

The University free dispensary is located in the new clinical building. 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 the City Hospital are also open to the students of the University. They are largely attended by members of the faculty.

The St. Paul Free Dispensary is centrally situated and offers its clinics to the students of this college. It owns the building formerly used by the St. Paul Medical College—a twenty-room building, which has been equipped for its occupancy. It centralizes the clinical opportunities of St. Paul and its staff is, similarly, made up largely of faculty members.

HOSPITALS.

The hospitals of the city of Minneapolis and St. Paul have very generously opened their doors to the students of this department. Saturday and Thursday mornings and afternoons, throughout the year, are devoted to the use of these

clinical opportunities by the junior and senior classes. These classes alternate in periods of six weeks between the two cities upon the days mentioned.

The hospital facilities of the University are thus exceptionally good, since they are not limited to one large amphitheatre, where but a few students can closely observe diagnostic and surgical methods, but are divided among a number of hospitals where the various professors care for their private and clinical cases. This makes it possible to divide the classes into sections, so that each student has equal opportunities of observation and is in close touch with his teacher.

The City Hospital, of Minneapolis, occupies spacious buildings and affords a large mass of clinical material which members of the faculty upon its staff are permitted to utilize during their terms of service.

St. Mary's Hospital has a staff upon which this faculty is represented by four members. Its management has seconded the efforts of the staff to make the hospital useful to medical students by providing an amphitheatre of modern construction, in which seventy-five spectators can be accommodated. The hospital also opens its wards for the bedside study of disease. Surgical and medical clinics are held here upon the weekly clinic days.

St. Barnabas' Hospital has also generously equipped an amphitheatre, within which a class of fifty students can be gathered. Bedside instruction is given freely in its wards to the students of this college. Clinics are usually conducted in this amphitheatre on Saturdays. Its staff, also, numbers upon it several members of this faculty.

Asbury Methodist Hospital and the Swedish Hospital offer their clinical opportunities to the college. Thursday and Saturday clinics are held in their wards and amphitheatre. Their service is, in part, manned by faculty members.

The Northwestern Hospital has recently built a commodious amphitheatre, for the especial benefit of the University students and has added one more to the list of Minneapolis hospitals whose doors are open for clinical instruction. Its medical and surgical chiefs and several members of its staff are in the service of this college.

The City and County Hospital, of St. Paul, occupies a large building, of modern construction and generously equipped with clinical conveniences. Its management has spared neither

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 possesses all of the most desirable features of modern hospital architecture and has a large clinical service. It is furnished with an amphitheatre for the benefit of students and has a thoroughly equipped operating room, in which clinics are frequently conducted.

Minneapolis Clinics
FIRST AND SECOND SEMESTERS.
THURSDAY.

9:00-11:00	Medicine.....	} Prof. Bell and Inst. Rees.....	} ½ Class ...	}	HOSPITAL City
11:00-12:00	Medicine.....				} Prof. Nootnagel and Inst. Rees	}	City
9:00-11:00	Surgery.....	Prof. Moore.....	} ½ Class ...	}			N. W.
11:00-12:00	Gynæcology.....	Prof. Abbott.....			}	}	City or N. W.
9:00-10:30	Surgery.....	Prof. Little.....	} ½ Class ...	}			Asbury or City
10:30-12:00	Gynæcology.....	Inst. Benjamin....			}	}	St. Barnabas

NOON RECESS.

1:00-2:00	Surgery.....	Inst. Mann.....	½ Class ...		City or Clin. Bldg.
1:00-2:00	Medicine.....	} Prof. Head and Asst. de la Barre	} ½ Class ...	}	Clin. Bldg.
1:00-2:00	Laryngology.....					Prof. Laton or Asst. Mead or Campbell.....	1 Section..		Clin. Bldg.
1:00-2:00	Pediatrics.....	Asst. Dart.....	1 Section..		Clin. Bldg.
1:00-2:00	Gynæcology.....	Asst. Williams.....	2 students		Clin. Bldg.
1:00-2:00	Pharmacology...	Inst. Englund.....	3 students		Clin. Bldg.
1:00-2:00	Clinical Microscopy	Asst. Ulrich.....	3 students		Clin. Bldg.
2:00-3:00	Neurology.....	Prof. Jones.....	Class.....		Clin. Bldg. or City
3:00-4:00	Dermatology.....	} Prof. Van der Horek or Inst. Wright.....	} Class.....	}	Clin. Bldg. or City
4:00-6:00	Autopsies.....					Prof. White.....	Sections...		City

SATURDAY.

9:00-11:00	Surgery.....	Prof. Dunn.....	} ½ Class...	}	St. Mary's or City City or Clin. Bldg.
11:00-12:00	Medicine.....	Prof. Head.....				} ½ Class...	}	Asbury City
9:00-11:00	Surgery.....	Prof. Dunsmoor....	} ½ Class...	}	St. Bar., City or Asbury
11:00-12:00	Pediatrics.....	Prof. Roberts.....				} ½ Class...	}	City
9:00-10:30	Ophthalmology and Otology....	Prof. Todd.....	} ½ Class...	}	City
10:30-12:00	Medicine.....	Prof. Nippert.....				} ½ Class...	}	City

NOON RECESS.

1:00-2:30	Medicine.....	Prof. Hunter.....	½ Class...		} Clin. Bldg. or St. Bar.
1:00-2:30	Medicine.....	} Prof. Staples and Asst. Cross.....	} ½ Class...	}	City
1:00-2:30	Surgery.....					Prof. Stewart.....	½ Class...		City or N. W.
4:00-6:00	Autopsies.....	Prof. White.....	Sections...		City

Practical Physical Diagnosis (for Juniors) on Mondays, Tuesdays, Wednesdays and Fridays, from 12:30 to 1:30, by Professors Nippert and Nootnagel and Dr. Rees at Clinical Building.

Obstetric Clinics throughout the year by Prof. Cates and Instructor Litzenberg for Seniors at City Hospital and other places.

St. Paul Clinics 1904

THURSDAY

9 to 10	Orthopedia.....	Prof. Gillette.....	Class	} St. Luke, St. Joseph, City Hospital.
10:15 to 12	Gynæcology.....	Prof. MacLaren..	Sections.....	
10:15 to 12	Gynæcology.....	Dr. Rothrock.....		
10:15 to 12	Surgery.....	Prof. O'Brien.....	Sec.....	} St. Joseph, City Hospital.

NOON

1:30 to 2:30	Medicine.....	Prof. Green.....	Sec.....	Dispensary.
1:30 to 2:30	Medicine.....	Dr. Senkler.....	Sec.....	Dispensary.
1:30 to 2:30	Medicine.....	Dr. Hoff.....	Sec.....	Dispensary.
1:30 to 2:30	Surgery.....	Dr. Goodrich.....	Sec.....	Dispensary.
1:30 to 2:30	Surgery.....	Dr. Dennis.....	Sec.....	Dispensary.
1:30 to 2:30	Nervous Diseases.....	Dr. Dunning.....	Sec.....	Dispensary.
1:30 to 2:30	Eye.....	Dr. Appleby.....	Sec.....	Dispensary.
1:30 to 2:30	Pediatrics.....	Dr. Ramsey.....	Sec.....	Dispensary.
1:30 to 2:30	Ear, Nose and Throat.....	Prof. Schadle.....	Sec.....	Dispensary.
2:00 to 3:00	Genito-Urinary.....	Dr. Coon.....	Sec.....	City Hospital.
3:00 to 4:00	Medicine.....	Prof. Abbott.....	Sec.....	City Hospital.
4:00 to 5:00	Medicine.....	Prof. Abbott.....	Sec.....	City Hospital.
4:00 to 5:00	Pediatrics.....	Prof. Christison.....	Sec.....	City Hospital.
4:00 to 5:00	Medicine.....	Prof. Henderson.....	Sec.....	City Hospital.
4:00 to 5:00	Obstetrics.....	Dr. Leavitt.....	Class	City Hospital.
4:00 to 5:00	Genito-Urinary.....	Dr. Gilfillan.....	Sec.....	City Hospital.
4:00 to 5:00	} Autopsies and } Pathol'gic Spe's	Dr. Rothrock.....	Sec.....	City Hospital.
4:00 to 5:00		Dr. Colvin.....	Sec.....	City Hospital.

SATURDAY

9 to 10	Nervous Diseases....	Prof. Riggs.....	Class	} Dispensary. } St. Luke, } St. Joseph, } City Hospital.
10:15 to 12	Surgery.....	Prof. Rogers.....	Class	
10:15 to 12	Surgery.....	Prof. Ohage.....	Class	

NOON

1:30 to 2:30	Medicine.....	Dr. Senkler.....	2 Sec.....	Dispensary.
1:30 to 2:30	Medicine.....	Dr. Hoff.....	1 Sec.....	Dispensary.
1:30 to 2:30	Surgery.....	Dr. Dennis.....	1 Sec.....	Dispensary.
1:30 to 2:30	Surgery.....	Dr. Goodrich.....	1 Sec.....	Dispensary.
1:30 to 2:30	Nervous Diseases.....	Dr. Dunning.....	1 Sec.....	} Dispensary and } City Hospital.
1:30 to 2:30	Eye.....	Dr. Appleby.....	1 Sec.....	Dispensary.
4:30 to 2:30	Pediatrics.....	Dr. Ramsey.....	1 Sec.....	Dispensary.
1:30 to 2:30	Ear, Nose and Throat.....	Prof. Schadle.....	1 Sec.....	Dispensary.
4:30 to 2:30	Skin and Venereal.....	Prof. Foster.....	1 Sec.....	Dispensary.
4:00 to 4:00	Medicine.....	Prof. Abbott.....	Class	City Hospital.
4:00 to 5:00	Medicine.....	Prof. Abbott.....	Sec.....	City Hospital.
4:00 to 5:00	Pediatrics.....	Prof. Christison.....	Sec.....	City Hospital.
1:00 to 5:00	Medicine.....	Dr. Henderson.....	Sec.....	City Hospital.
3:00 to 5:00	Genito-Urinary.....	Dr. Gilfillan.....	Sec.....	City Hospital.
1:00 to 5:00	Obstetrics.....	Dr. Leavitt.....	Sec.....	City Hospital.
4:00 to 5:00	} Autopsies and } Pathol'c Spe's	Dr. Rothrock.....	Sec.....	City Hospital.

Gynæcology, Prof. Stone, St. Joseph's Hospital.

Obstetrics, Prof. Ritchie, Drs. Davis, Leavitt, and H. P. Ritchie.

Gynæcology, Drs. Rothrock and H. P. Ritchie, daily clinic at Dispensary.

The College of Homeopathic Medicine and Surgery

The College of Homeopathic Medicine and Surgery sets forth as its peculiar advantages:

First—That it is an integral part of a great university, fully equipped for carrying out of its work by the munificence of the state.

Second—That its students partake of all the privileges accruing from living in a university atmosphere which draws to itself the leaders of thought in all branches of science and literature.

Third—That the libraries not only of the Medical Department but of the entire university and the cities of Minneapolis and St. Paul are open to those investigating any line of thought.

Fourth—That the arrangement of work and division of classes is such as to give each student the greatest amount of individual practical work under trained instructors.

Fifth—The state of Minnesota shows its loyalty to the university by a constant demand for the graduates and the dean has each year requests for physicians to locate in various parts of the state.

The Faculty

CYRUS NORTHROP, LL. D., *President of the University.*
EUGENE L. MANN, A. B., M. D., *Dean of the College.*
694 Endicott Arcade, St. Paul.

MATERIA MEDICA AND THERAPEUTICS.

W. E. LEONARD, A. B., M. D., *Senior Professor.*
Andrus Building, Minneapolis.
F. A. BABENDRIER, *Lecturer on Pharmacy.*

PRACTICE OF MEDICINE.

G. E. CLARK, Ph. B., M. D., *Senior Professor.*
Stillwater, Minn.
O. H. HALL, M. D., *Associate Professor, Renal Diseases.*
Ernst Building, St. Paul.
D. W. HORNING, A. B., M. D., *Associate Professor, Diseases of Heart and Lungs.*
Pillsbury Building, Minneapolis.
ANNA H. HURD, Phm. D., M. D., *Lecturer, Diseases of Blood and Ductless Glands.*
Pillsbury Building, Minneapolis.

CLINICAL MEDICINE AND PHYSICAL DIAGNOSIS.

G. E. RICKER, A. B., M. D., *Senior Professor.*
City Hospital, Minneapolis.
D. W. HORNING, A. B., M. D., *Associate Professor.*
Pillsbury Building, Minneapolis.
S. G. COBB, M. D., A. G. PHELPS, M. D., H. D. NEWKIRK, M. D., *Assistants.*

SURGERY.

R. D. MATCHAN, M. D., *Senior Professor.*
Masonic Temple, Minneapolis.
W. S. BRIGGS, M. D., *Senior Professor, (Clinical.)*
Ernst Building, St. Paul.
A. E. COMSTOCK, M. Sc., M. D., *Professor, Regional Surgery.*
N. Y. Life Building, St. Paul.
A. E. BOOTH, M. D., *Lecturer, Orthopaedia.*
Andrus Building, Minneapolis.
W. B. ROBERTS, A. B., M. D., *Lecturer, General Surgery.*
Pillsbury Building, Minneapolis.
P. A. HIGBEE, A. B., M. D., *Assistant.*

OBSTETRICS.

B. H. OGDEN, A. B., M. D., *Senior Professor.*
Ernst Building, St. Paul.
HUGH J. TUNSTEAD, M. D., *Associate Professor.*
829 16th Ave. N., Minneapolis.

GYNAECOLOGY.

- GEORGE F. ROBERTS, M. D., *Senior Professor.*
Pillsbury Building, Minneapolis.
- R. R. ROME, M. D., *Professor.*
Andrus Building, Minneapolis.
- E. E. AUSTIN, M. D., *Professor.*
Andrus Building, Minneapolis.
- F. S. BECKLEY, M. D., *Assistant.*

MENTAL AND NERVOUS DISEASES AND MEDICAL JURISPRUDENCE

- A. P. WILLIAMSON, LL. M., M. D., *Senior Professor.*
Pillsbury Building, Minneapolis.

OPHTHALMOLOGY.

- F. M. GIBSON, M. D., O. et. A. Chir., *Professor.*
Pillsbury Building, Minneapolis.
- ETHEL S. HURD, M. D., *Assistant.*

RHINOLOGY AND LARYNGOLOGY.

- H. H. LEAVITT, A. M., M. D., *Professor.*
Pillsbury Building, Minneapolis.

OTOLOGY.

- EUGENE L. MANN., A. B., M. D., *Professor.*
Endicott Arcade, St. Paul.
- ANNA H. HURD, Phm. D., M. D., *Assistant.*

SKIN AND GENITO-URINARY DISEASES.

- C. H. NEILL, M. D., *Lecturer.*
Medical Building, Minneapolis.

PAEDOLOGY.

- H. M. LUFKIN, M. D., *Professor.*
Germania Life Building, St. Paul.
- MARGARET KOCH, M. D., *Assistant.*

ELECTRO-THERAPEUTICS.

- ETHEL S. HURD, M. D., *Lecturer.*
Pillsbury Building, Minneapolis.

ANATOMY.

- C. A. ERDMANN, M. D., *Professor.*
Pillsbury Building, Minneapolis.

PHYSIOLOGY.

- R. O. BEARD, M. D., *Professor.*
Pillsbury Building, Minneapolis.

HISTOLOGY AND EMBRYOLOGY.

- T. G. LEE B. S., M. D., *Professor.*
The University.

PATHOLOGY AND BACTERIOLOGY.

- F. F. WESBROOK, M. A., M. D., C. M., *Professor.*
The University.

TERMS OF TUITION.

The College of Homeopathic Medicine and Surgery has adopted a system of annual fees, in which are included all charges for matriculation, lecture courses, laboratory courses, dissections and graduation, except a rental fee for microscopes.* These level fees are as follows:

For the first year	\$100.00
For the second year	100.00
For the third year	80.00
For the fourth year	80.00

CURRICULUM.

The course in the College of Homeopathic Medicine and Surgery leads to the degree of doctor of medicine. It covers a period of four years of collegiate study, each year representing nine 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.

DEGREES.

The degree of doctor of medicine is conferred by the Board of Regents upon students who are recommended, by vote of the faculty, for graduation.

Candidates for the degrees must possess the following essential qualifications:

- (1) Twenty-one years of age and upwards.
- (2) Good moral character.
- (3) A degree of preliminary education equivalent to that demanded by the examination for entrance to this college.
- (4) Four full college years spent in the study of medicine; the fourth year, at least, in this university, and the remainder in this or some other recognized college of medicine.

*In each semester a fee of \$2.00 to \$4.00 will be charged for the rental of a microscope in each course in which its use is required, provided the student is not supplied with a satisfactory instrument of his own. It is an advantage for the student to possess a microscope.

(5) Satisfactory examination passed in all branches in accordance with the foregoing rules.

ANNOUNCEMENT.

The College of Homeopathic Medicine and Surgery offers special advantages to students seeking a medical education. Through the generosity of the state, an equipment of buildings, laboratories and apparatus is provided, equal to that of the best medical schools in this country or Europe. With this equipment it is possible to lay that broad foundation for a medical education without which no physician can hope for the highest success. An institution deficient in the requirements for teaching the fundamental branches of medical practice cannot long maintain the confidence of the medical profession. Homeopathy, as an expanding science, draws toward itself as a part of its rightful possession, every addition to medical knowledge that can be of any service in the cure of the sick. The homeopathic physician should feel that he is "heir of all ages" in medical learning, having that catholicity of training which places at his command every known resource, including as his especial advantage, the added power of coping with disease, that comes from his knowledge of the science of homeopathy.

The breadth of view of this result is provided in the college of homeopathic medicine and surgery in a real university course, botany, chemistry (organic and inorganic), histology, embryology, bacteriology, pathology, anatomy, physiology, hygiene and sanitary science, with all the accessories of laboratory work; second, in building upon this foundation a comprehensive knowledge of therapeutics, practice and surgery. The student has daily training in both the practical and theoretical aspects of medicine. In the first two years the practical training is provided in constant individual work in the laboratories of dissecting rooms; in the last two is a broad field of clinical study and observation, in both medical and surgical cases, which the nearly one-half million population of the Twin Cities abundantly supplies. The theoretical work is carried on in daily didactic lectures and text-book study throughout the entire course.

Special emphasis is placed upon clinical instruction in both dispensary and hospital practice. Senior students have the opportunity to attend out-door patients, assist in special and general operations, and to attend obstetrical cases during the last course of lectures.

The college alumni now in practice are evidence of the character of its work. The loyal support of the profession throughout the northwest has encouraged and upheld the faculty in giving form to this new phase of the work.

The college proposes to stand for a broad, catholic, scientific and therefore, homeopathic, education in medicine and surgery.

EXAMINATIONS.

Examinations will be conducted at the end of each year, upon subjects taught during the year, according to the schedule printed elsewhere. Attendance upon at least four-fifths of the lectures under each department is required in order that a student may be allowed to enter for final examination, or to receive a certificate of attendance. Ten per cent of the graduating class will be recommended to receive the degree of doctor of medicine, "cum laude." The selection will be based upon the efficiency of the work of the student during the period of the entire course.

CLINICS.

Every member of the faculty (with two exceptions) is a clinical teacher. Thus each professor demonstrates the application of his didactic work.

DISPENSARY CLINICS.

The dispensary, located at 1808 Washington avenue south, offers unusual facilities to the student for individual examination of patients. The location is within easy access of those whose means compel them to ask dispensary assistance, and presents ample opportunity for the study of all forms of disease usually met with in practice. Patients present themselves in large numbers daily (more than six thousand prescriptions having been made during the 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. Each student is assigned for a definite period as clinical assistant in each department of the clinic. The college clinics are conducted throughout the entire year. Students and practitioners are invited to attend them at all times.

DISPENSARY CLINICS 1-2 O'CLOCK P. M.

SUBJECTS	CLINICIAN	DAYS IN ATTENDANCE
Diseases of Women	Dr. F. L. Beckley	Monday
Nervous Diseases	Prof. R. R. Rome	Thursday
Diseases of the Eye	Prof. Williamson	Monday
Diseases of the Skin	Prof. Gibson	Tuesday and Friday
Diseases of the Ear	Dr. E. E. Hurd	Tuesday
Obstetrics	Dr. C. H. Neill	Tuesday and Friday
	Prof. Mann	Tuesday and Friday
	Dr. A. Hurd	Tuesday and Friday
	Prof. Tunstead	Wednesday
	Prof. Matchan	Wednesday
	Prof. Comstock	Saturday
Surgery	Dr. W. B. Roberts	Monday
	Dr. P. A. Higbee	Tuesday
	Dr. A. E. Booth	Friday
	Prof. Lufkin	Saturday
Diseases of Children	D. H. J. Tunstead	Tuesday
Diseases of Nose and Throat ..	Dr. M. Koch	Thursday
	Prof. Leavitt	Wednesday and Saturday
	Prof. Clark	Thursday
	Prof. Horning	Saturday
Internal Medicine	Dr. S. G. Cobb	Friday
	Dr. A. G. Phelps	Wednesday
	Dr. N. M. Smith	Monday
	Dr. P. A. Higbee	Tuesday

HOSPITAL CLINICS.

The college has unusual advantages in hospital clinics. In addition to calling upon students to assist the various professors in private cases regular clinics are provided in the city hospitals of both St. Paul and Minneapolis, and in St. Luke's and St. Joseph's Hospitals in St. Paul. Each Monday is devoted to clinics held in one of these hospitals by members 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, where one-fifth of all the patients admitted are placed under care.

CITY HOSPITAL, ST. PAUL.

This hospital likewise has a full staff of homeopathic physicians and surgeons which includes all the St. Paul members of the college faculty. Each member of the staff has full charge of all cases coming into his department during his term of service and uses suitable ones for clinical purposes.

ST. LUKE'S HOSPITAL, ST. PAUL.

This hospital has recently erected a new building thoroughly equipped with all modern facilities for caring for med-

ical and surgical cases. It contains an ampitheater in which clinical lectures are delivered. A number of the faculty are members of the visiting staff.

ST. JOSEPH'S HOSPITAL, ST. PAUL.

Through the addition to its staff of members of the college faculty, students have access to both surgical and medical cases upon exactly the same footing as the other hospitals.

HOSPITAL APPOINTMENTS.

Graduates of this college are eligible for appointment to the position of interne in the Minneapolis City, St. Paul City and County Hospitals and St. Joseph's Hospital, St. Paul. Also to the staff of the State Hospital for Insane at Fergus Falls.

GENERAL REMARKS.

In all hospital work students are given special bedside instruction in diagnosis, in "taking the case," in prescribing, in surgical dressing, in the after care of patients and all forms of accessory treatment.

All communications pertaining to the College of Homeopathic Medicine and Surgery should be addressed to the Dean, Eugene L. Mann, A. B., M. D., 694 Endicott Arcade, St. Paul, Minn.

Course of Study

The extension of the course of instruction to four years enables the faculty to present to the students a more thorough and practical training in the practice of medicine than has heretofore been possible. The schedule of study is so arranged that the student reaches the practical work of his profession by gradual steps through theoretical and laboratory course. 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.
 Anatomy—bones, muscles and joints.
 Physiology.
 Homeopathic pharmacy.

SECOND YEAR.

Materia medica—experimental.
 Organic chemistry—toxicology and urinalysis.
 Histology and embryology—laboratory.
 Anatomy, dissection.
 Physiology—chemical and experimental.
 Surgical emergencies and bandaging.
 Bacteriology.
 General pathology.

THIRD YEAR.

Surgical anatomy.
 Materia medica and therapeutics.
 Practice of medicine, organon and institutes of medicine
 Clinical medicine and physical diagnosis.
 Obstetrics.
 Principles and practice of surgery.
 Diseases of women.
 Ophthalmology.
 Nose, throat and ear.
 Medical jurisprudence.
 Clinics, medical and surgical.
 Special pathology.

FOURTH YEAR.

Surgical pathology.
 Materia medica and therapeutics.
 Practice of medicine.
 Clinical medicine.
 Mental and nervous diseases.
 Dermatology and genito-urinary diseases.
 Obstetrics.
 Clinical obstetrics.
 Principles and practice of surgery.
 Ophthalmology.
 Diseases of women—didactic and practical.
 Orthopaedic clinical surgery.
 Pædology.
 Electro therapeutics.
 Life insurance examination.
 Clinics, medical and surgical.

SIX YEARS' COURSE.

In the year 1903-4, the University established a six years' course of study, arranged especially for students of medicine. This course is conducted in the colleges of science, literature and the arts, and of homeopathic medicine and surgery. It leads to the degree of bachelor of science at the end of the first four years and to the degree of doctor of medicine at the end of the six years course. The work of the first two years is adapted to the needs of the student of medicine and all who expect to take the professional degree are urged to enter this course.

The outline of the course is as follows:

FIRST YEAR.

1. **German.*
2. *Botany.*
3. *Chemistry.*
4. *Zoology.*
5. *Higher Algebra and Plane Trigonometry.*

SECOND YEAR.

1. *Rhetoric.*
2. *German or French.*
3. *Chemistry.*
4. *Comparative Anatomy of Vertebrates.*
5. *Physics, (special course.)*

THIRD YEAR

1. *Human Anatomy*, as outlined in Courses I, II, III and IV, department of anatomy, college of homeopathic medicine and surgery.
2. *Histology and Embryology*, as outlined in Courses IV and V, department of histology and embryology, college of homeopathic medicine and surgery.
3. *Medical Chemistry*, including organic chemistry, toxicology, urinalysis and sanitary chemistry, etc.
4. *Physiology*, as outlined in Courses I and II, department of physiology, college of homeopathic medicine and surgery.
5. *Materia Medica*, as outlined in present courses in the college of homeopathic medicine and surgery.
6. *Pharmacy.*
7. *History and Methodology of Medicine.*

FOURTH YEAR.

1. *Human Anatomy*, as outlined in Courses V and VI, department of anatomy, college of homeopathic medicine and surgery.
2. *Histology and Embryology*, as outlined in Courses III and IV, department of histology and embryology, college of homeopathic medicine and surgery.
3. *Medical Chemistry*, courses continued as outlined in third year.
4. *Physiology*, as outlined in Courses III, IV and V, department of physiology, college of homeopathic medicine and surgery.
5. *Therapeutics*, as outlined in present courses in the college of homeopathic medicine and surgery.
6. *Bacteriology, and General Pathology*, as outlined in Courses I and II, department of pathology and bacteriology, college of homeopathic medicine and surgery.
7. *Materia Medica.*
8. *Surgery and Bandaging.*

FIFTH AND SIXTH YEARS.

The work of the fifth and sixth years will be essentially the same as is given in the third and fourth years in the college of homeopathic medicine and surgery.

*Note—Students who enter with two years of German may elect French in its stead in the first or second years.

Course of Instruction

MATERIA MEDICA AND THERAPEUTICS.

This course upon this subject is graded to cover four years' study. Lectures, daily quizzes and daily demonstrations of materials and methods are held regularly throughout the year.

FIRST YEAR.

Ten lectures in the first half of the year are given upon the methods of homeopathic pharmacy, each student being trained in writing and filling prescriptions and the technique of the more common preparations. Apparatus and material for these purposes are taken from Professor Leonard's laboratory, which is abundantly supplied with the crude and perfected drugs for demonstration throughout the course. Mr. G. A. Babendrier, who has kindly given this instruction so satisfactorily for several years, will continue the same the coming year.

SECOND YEAR.

The toxicological and physiological action of a few typical drugs will be studied in lectures and quizzes twice each week; including the action of both large and small doses as well as the official doses (U. S. P.) of the leading drugs and their alkaloids. Here, in the more detailed study of a few drugs, the groundwork will be laid for the comprehension of the symptomatology of the later years.

When practicable, actual experiments on the effects of the drugs upon individual persons in the class will be made, the blanks used and methods being under Professor Leonard's personal supervision and in accordance with the rules of the Provers' Union of the American Institute of Homeopathy.

THIRD YEAR.

Three lectures a week with quizzes, upon the vegetable remedies, about thirty major and seventy-five minor drugs, arranged according to their natural groups and their clinical relationship in diseases, and studied in their origin, history, preparation, physiology and symptomatology, full practical comparison being made with other allied remedies. The endeavor on these studies and those of the following year will be to present only such usage of drugs as is practical and fully corroborated.

FOURTH YEAR.

Three lectures and quizzes each week upon the mineral, animal and nosological remedies of materia medica—about forty major and twenty minor drugs grouped and studied in detail as those of the second year, attention being given to their toxicological and physiological action, where this has a direct bearing upon their homeopathic application to chronic diseases, inasmuch as the drugs of this course are more often applied thereto.

Examination in the form of written review quizzes from time to time or at the end of the term, will be held, the student's final standing being made up of this and his daily quiz markings.

TEXT-BOOKS AND COLLATERAL READINGS.

Materia Medica and Therapeutics.

First year—

Pharmacopœa of the American Institute of Homeopathy.

Second year—

Hugh's Pharmaco-Dynamics.

Third and fourth years—

Materia Medica Manual—Fahnestock.

Farrington's or Cowperwaite's Materia Medica, Hahnemann's Organon.

Reference Books—third and fourth years—Allen's Hand-Book, Hering's Condensed Materia Medica, Dunham's Lectures.

THEORY AND PRACTICE.

Lectures on the theory and practice of medicine will be delivered to students of the third and fourth year. It will be the purpose to thoroughly acquaint the student with the description, course and diagnosis of disease, and the method of treating such disease in accordance with the homeopathic law of cure.

The cardinal principles of the philosophy of homeopathy will be clearly presented in didactic and clinical lectures. Students are familiarized with accurate methods of investigation, records of symptoms and history of cases, with the use of the repertory to assist in accurately affiliating the indicated remedy.

THIRD YEAR.

The course for the student of the third year consists of twenty-six didactic lectures, mainly on the diseases of the mouth, stomach and bowels. Eight lectures will be given in the philosophy of homeopathy. Frequent selections of cases from private practices will be given to better set forth the various lectures, as well as methods employed in the record of cases and selections of the remedy. One-half of the time allowed will be employed in frequent quizzes and review of the work gone over.

FOURTH YEAR.

The course for students for the fourth year consists of twenty-one lectures on pulmonary and hepatic affections, with such of the important continued fevers as fall to this chair. The organon work will take the form of frequent "class-room talks," chiefly on the subjects of the following selections, viz.: 272-274; 247; 245-251; 252-255; 167-168; 204-205.

In addition students will be required to present written reports of the history and symptoms of cases treated, the repertory work in selecting the remedy and dose, repetition and results. Much time and attention will be given to this feature, and the course as tending in the highest manner to perfect the pupil in the art of accurate prescribing.

TEXT-BOOKS AND COLLATERAL READING.

Practice of Medicine.

- Goodno's Practice.
- Raue's Therapeutics.
- Lippe's Repertory.
- Knerr's Repertory.
- Pepper's System of Medicine.
- DaCosta's Diagnosis.
- Auder's Practice of Medicine.

PHYSICAL DIAGNOSIS.

The course on physical diagnosis consists of a series of twenty-four didactic lectures to the third year class, illustrated upon the healthy human subject, thus familiarizing the student with the normal appearances, feelings and sounds. These lectures are classified as follows: Introduction, general examination, respiratory system, circulatory system, digestive system, urinary system.

CLINICAL MEDICINE.

FOURTH YEAR CLASS.

For this course abundant material is found in the University homeopathic free dispensary, where clinics are held every day, and in the City hospitals of Minneapolis and St. Paul, where clinics are held each Monday morning.

In these clinics particular effort is made to supplement the course in physical diagnosis and to fully illustrate the application of the homeopathic law of therapeutics.

In order that the student may obtain as wide a view as possible in this all important branch, they receive instruction, not only from Professor Ricker at the bedside in the City Hospital wards, but from the various members of the homeopathic staffs in the Twin Cities, attending the hospitals but not otherwise connected with the University.

In addition the dispensary furnishes many outside cases, which are treated in their own homes, by the members of the fourth year class, under the supervision of Professor Ricker, thus enabling the student to acquire the self-reliance and confidence so necessary to the beginning practitioner.

Physical Diagnosis, Clinical Medicine.

Lillenthal's Therapeutics.
 Lippe's Repertory.
 Farrington's Clinical Materia Medica.
 Vierodt's Medical Diagnosis.
 Abram's Manual of Clinical Diagnosis.
 DaCosta's Diagnosis.

SURGERY.

The course in surgery is so graded to extend through Sophomore, Junior and Senior years. It consists of didactic lectures, clinical demonstration and actual work by the students of Senior and Junior classes, as they are given one month's work each or more in dispensary clinics every day under charge of attending professor, and are held responsible by him for all emergencies and dressings. They also give all anaesthetics and attend to the post operative treatment. These advantages given our students cannot be excelled, and gives each member that opportunity of gaining for himself that valued knowledge and confidence which only comes by actual experience.

Two years ago the work in surgery enlarged. It now occupies two full years, the third and fourth, including the labors of four members of the college faculty. The work is divided into clinical and didactic surgery.

EMERGENCIES AND BANDAGING.

(1) A course of lectures on surgical emergencies and bandaging is given the students of the Sophomore year in consideration of the means in administering first aid to the injured, also laboratory instructions of how to apply dressings, bandages, splints and the materials used.

GENERAL AND SPECIAL SURGERY.

(2) The Juniors and Seniors are given two lectures each week each on general and special surgery, during the entire two years, covering all the surgical diseases, and special technique in operative surgery, especial attention being paid to pathology, diagnosis and treatment of each disease from a surgical standpoint in conjunction with the valued homeopathic application of remedies. Besides this the Juniors are given a special course on surgical anatomy and the Seniors one on surgical pathology.

OPERATIVE SURGERY.

(3) During the Senior year the class will be instructed in the surgical laboratory in operations on the cadaver, in which the student is called upon to do the work under the special criticism of the professor in charge, thus perfecting themselves by actual practice with operations they will be called upon to perform in later years.

CLINICAL SURGERY.

(4) The work in clinical surgery consists in operations before the class in connection with clinical lectures given upon the cases presented. These occupy each Monday of the fourth year, which is set apart as the day for clinics. The third year class is required to attend the clinics, unless their regular class work interferes.

At the clinics which are held at the City and County Hospital, St. Luke's and St. Joseph's Hospitals, of St. Paul, and the City Hospital and Free Dispensary, Minneapolis, are demonstrated the value of antiseptic treatment of wounds, the minute details of the application of surgical appliances and dressings, and operative technique. Post-operative care for reaction, shock, etc., are considered.

Senior students are instructed in the practical use of anaesthetics and are required to attend a number of surgical patients at their homes, carrying out post-operative detail under the direction of the professor.

The surgical department aims to give a complete and thorough course on the subject and its collateral branches.

It should be distinctly understood that examinations on the clinical and laboratory work, both sectional and at the end of the term, no matter by whom the teaching is done, are counted with the didactic course, the average of all combined constituting the student's standing in surgery for each year. The marks for the four years go to make up his graduation average.

TEXT-BOOKS.

Park's Surgery.
 Trene's Operative Surgery.
 Wyeth's General and Operative Surgery.
 Surgical Technique, by Von EsMarch and Kowalzig.

DIDACTIC COURSE.

The didactic course covers the entire field of the principles and practice of surgery. The lectures will occupy the third year class two hours and the fourth year class three hours each week. Demonstrations will be made upon the cadaver, aided by models and charts.

The lectures to the third class will include surgical pathology, inflammation, hemorrhage, surgical appliances, surgical emergencies, minor surgical operations, ligation of arteries, burns and scalds, surgical treatment of the anus and rectum, antiseptics, anæsthetics, abscesses, ulcers, gangrene, hernia and the elements of the treatment of wounds, fractures, dislocations and amputation.

The lectures of the fourth year class will include the surgery of the bones, joints, genito-urinary organs, tumors, cysts, fractures, dislocations, amputations, syphilis, together with the operative surgery of the head, face, chest, abdomen, pelvis, skin, nerves and extremities.

All the lectures will aim to be comprehensive, practical, and in keeping with the best standards of advanced surgery.

TEXT-BOOKS, DIDACTIC COURSE.

Park's Surgery.
Homeopathic Text-Book of Surgery.
Mamline's American Text-Book of Surgery.
Bradford & Lovett's Orthopaedic Surgery.
Pye's Surgical Handicraft.

ORTHOPAEDIA.

The course on this subject is both didactic and clinical. It consists of one lecture a week during the fourth year.

The whole subject of deformities, their etiology, pathology, course and treatment is carefully considered in detail. Charts and drawings are used to illustrate the work. The mechanical apparatus used in the treatment of such cases is exhibited and rules laid down for the improvising and applying temporary means and instruments. Recent progress in the knowledge of the underlying causes of bony, muscular and habit deformities, and their serious reflex effects, has led to great changes in the methods pursued to overcome them. The early recognition and treatment of such cases are of the utmost importance, and hence, as they are usually first presented to the general practitioner, a full knowledge of this branch of surgery becomes exceedingly valuable. In the Dispensary Clinics the student sees carried out the teachings of the didactic course.

The subjects discussed include functional and organic diseases of the bony spine, the several forms of club foot, joint inflammations and deformities, both simple and tuberculous and their sequelae, cleft-palate, hare-lip, etc.

OBSTETRICS.

This subject is taught by lectures and recitations, thoroughly illustrated with charts, manikins and specimens. The course will be graded and divided between the third and fourth years.

During the third year subjects covered will embrace the anatomy and physiology of the female generative organs and the pelvis, the development of the embryo, the maternal changes of pregnancy, the diagnosis of pregnancy, the physiology, pathology and hygiene of pregnancy, the physiology and the course of normal labor, the conduct of normal labor and the management of the puerperium.

During the fourth year the following subjects are taught: the mechanism of labor, diagnosis and management of the various presentations, dystocia, complications of labor, physiology, pathology and management of the puerperium, and obstetric surgery.

CLINICAL OBSTETRICS.

This department instructs the fourth year students and applies practically the teachings of the department of obstetrics. An abundance of material is supplied by the dispensary and city hospitals of St. Paul and Minneapolis. The student will be thoroughly educated to locate accurately the position and condition of the internal parts both in health and disease, the obstetric points of the pelvis, as well as the diameters, planes and curves, the presentation and position of the child and methods of diagnosis, the stages and mechanism of labor, the management of normal and abnormal labors, the application of the forceps and the necessary steps in performing version.

Each member of the class will be assigned at least three cases of pregnancy, which he will be required to attend under the immediate direction of the professor of the chair.

During the last month of pregnancy of a case as assigned, the student in charge will report to the professor the patient's name, address, age, number of previous labors, date of first birth and last labors, date of quickening, condition of uterus, heart, lungs, bowels, kidneys, etc., and a detailed statement regarding the appearance of the patient, location of the foetal heart, position of the child, character and size of the pelvis.

At the time of labor the student will be required to keep a record of the following facts:

Number of the case, date, name, address, condition of the osuteris, height of presenting part, pulse rate and quality (ante and post partum), rapidity of foetal heart beats and where heard most clearly, presentations, position and duration of the first, second and third stage.

Also the sex of the child, the diameters of its head, weight, and length. The post partum condition of the uterus, servix and perineum.

An operative course on the female cadaver will also be given, demonstrating the operative technique in symphysiotomy and Casarean section.

TEXT-BOOKS AND COLLATERAL READINGS.

Leavitt.

Lusk's Midwifery.

American Text-Book of Obstetrics.

Hirst's Text-Book of Obstetrics.

Grandin & Jarman's Midwifery.

Playfair's Midwifery.

Boisliniere, Obstetric Accidents.

Davis' Obstetrics.

DISEASES OF WOMEN.

This course will consist of one didactic lecture during the third and fourth years and two clinics a week during the fourth year.

In the third year, both semesters, the anatomy, physiology and pathology of the pelvic contents and perineum are carefully described. The preparation of the patient for surgical operation, together with the necessary steps taken, the various surgical procedures as well as the medical treatment of all pelvic diseases, will receive minute attention both semesters of the fourth year.

The medical and surgical diseases of women will be treated in didactic lectures and recitations. The entire field of gynecology will be covered in the lecture room. As cases present themselves in the city hospitals of St. Paul and Minneapolis, the subject thus described will be demonstrated on the living subjects.

Gynecology.

Wood, Text-Book of Gynecology.

DISEASES OF CHILDREN.

The course on this subject will consist of one lecture each week and three clinics to the fourth year students, and extending over two semesters. The clinics are full and afford an exceptional opportunity to study the common diseases of childhood. In the out door department many cases of exanthematous cases are treated by the members of the class.

The didactic course embraces a description of the normal development of infancy and childhood, natural and artificial infant breeding, signs and symptoms of hereditary syphilis, contagious and infectious diseases, tuberculosis, erysipelas, and the diseases of the respiratory and urinary organs; those of the circulatory, nervous and digestive systems, rhachitis and diseases of the skin.

TEXT-BOOKS AND COLLATERAL READING.

Tooker's Diseases of Children.

Holt's Diseases of Children.

Fisher's American Text-Book of Diseases of Children.

Collateral reading—Cyclopedia of Diseases of Children.

MENTAL AND NERVOUS DISEASES.

This course consists of twenty-eight didactic lectures, in the fourth year, and as many clinical demonstrations as material is presented at the dispensary and the City Hospital, Minneapolis. It is the aim of the chair to qualify the student to detect the earliest symptoms of insanity and diseases of the nervous system.

The anatomy and physiology of the brain and spinal cord are reviewed and particular attention is paid to the causes, development, characteristic symptoms and the pathological conditions of the diseases of the nervous system. The thera-

peutics, dietetics and direction of the personal care in each disease is especially elaborated.

Talcott's Mental Diseases.
 Clouston's Mental Diseases.
 Elinger's Anatomy of Central Nervous System.
 Martin's Nervous Diseases.
 Dana Text-Book Nervous Diseases.
 Rigelow's System of Electro-Therapeutics.
 Oppenheim's Diseases of the Nervous System.

Collateral reading—Black Tuke's Dictionary of Psychological Medicine; Bevan Lewis' Mental Diseases; Kirchoff's Handbook of Insanity; Ferrier's Localizations of Cerebral Diseases; Strumpell's Text-Book of Medicine; Hirt's Diseases of the Nervous System; Horsesley's Brain and Spinal Cord.

Hygiene.

Coplin and Bevan's Practical Hygiene.
 Park's Hygiene.

Collateral reading—Richardson's Preventive Medicine; Buck's Hygiene and Public Health.

ELECTRO-THERAPEUTICS.

This subject will be carefully taught. The physics of electricity will be sufficiently considered to enable the student to understand the construction and manipulation of galvanic faradic, sinusoidal and static batteries. The application of every form of electricity will be practically demonstrated.

MEDICAL JURISPRUDENCE.

The object of this chair is to familiarize the student with his duties, rights and responsibilities from a legal standpoint. The law on each subject discussed is carefully explained and illustrated, as far as possible, with adjudicated cases. *Medical Jurisprudence.*

Taylor's Medical Jurisprudence.
 Herold's Manual of Legal Medicine.

Collateral reading—Hamilton's American System of Legal Medicine; Withaus' and Becker's Medical Jurisprudence and Toxicology; Wharton and Stille's Jurisprudence.

OPHTHALMOLOGY.

In the department of ophthalmology the endeavor is to give thorough instruction in those parts of the work which will ordinarily come into the hands of the general practitioner.

The course is supplemented by as much practical work as time allows, in the use of the ophthalmoscope for the study of intraocular troubles, whose recognition would aid in the diagnosis of various conditional affections; and following a short didactic course given early in the year on the subject, practical work in the correction of the refraction is carried on at the dispensary during both semesters.

The clinical material provided in the department is very abundant, interesting and instructive cases, embracing all varieties of eye troubles calling for medical and surgical aid being presented to the students bi-weekly throughout the entire year.

The following schedule shows the subjects considered in the present course of lectures:

Anatomy and physiology of the eye; refractions and use of the lenses for the correction of its errors; diseases of the lids; conjunctiva; cornea; sclera; lacrymal apparatus; iris and ciliary body; lens choroid; retina and optic nerve; affections of the muscular apparatus of the eye and the general relationship between eye-strain and reflex and nervous disorders.

The didactic course consists of thirty-two lectures during the fourth year and ten during the third year.

Ophthalmology.

Norton, Buffum, Swanzy, Noyes.

Collateral reading—Fuch's Diseases of the Eye.

DISEASES OF THE NOSE, THROAT AND EAR.

The course will consist of didactic lectures and clinical demonstrations.

One didactic lecture a week will be given to students of the third year. An understanding of the anatomy and physiology of the organs is presupposed, and but little time will be devoted to the review of the more important points in their bearing upon diseases of these organs. The lectures will enter upon the diseased processes in the nose—the various forms of acute and chronic catarrhai

inflammation, their courses, developments, symptoms, consequences and treatment, both general and local, abnormal growths, affections of the septum and diseases of the accessory sinuses, finishing the course on the nasal cavities with the neuroses, functional and organic.

The diseases of the naso-pharynx are treated with special reference to their dependence upon nasal conditions and their influence upon the organ of hearing. The course includes acute and chronic catarrhal processes, adenoid vegetations and morbid growth.

Diseases of the pharynx are considered in their dependence upon alimentary disorders, acute and chronic inflammatory conditions; morbid growths and neurosis, together with the pharyngeal and tonsillar conditions incident to the exanthemata, diphtheria, typhoid fever, etc.

In the laryngeal disorders we become more closely associated with respiratory diseases; the various forms of laryngeal inflammation, morbid growths and nervous affections will be discussed—special stress being put upon the early laryngeal manifestations of tuberculosis and the laryngeal disorders of voice users with the importance of proper vocalization and respiration upon all diseases of this organ.

Ear diseases resolve themselves into: Diseases of external canal and pinna, dermoid inflammation; diseases of the middle ear; mucous inflammation; diseases of the internal ear; serous and nerve inflammation.

The course to the fourth year students will be entirely clinical, the class being divided into sections for dispensary work; the aim will be to familiarize the students with the use of the various diagnostic means at their disposal, and the appearance of the various abnormal conditions, together with the technique of the numerous operative procedures. The material for clinical demonstrations is abundant.

Ear: Barr.

Nose and Throat: Kyle, Bosworth, Ivins, McDonald.

Nose, Throat and Ear: Veshlaget & Hallett; McBride, Burnett.

SKIN AND GENITO-URINARY DISEASES.

This course will consist of one didactic lecture and one clinic each week for students of the fourth year. It will include the diseases of the skin, syphilis and all genito-urinary affections.

The first semester will be devoted to a study of the diseases of the skin, the second to syphilis and venereal surgery. The dispensary clinics will be especially valuable in supplementing the work of the professor in the lecture room by familiarizing students with the appearance of the various forms of skin and venereal diseases. Each student is required to diagnose cases and treat patients under the supervision of the professor, thus giving him actual experience in administering remedies and using instruments. During the course of the year each student has personal charge of about fifty patients in this department.

TEXT AND REFERENCE BOOKS.

Dermatology: Kippax, Stelwagon, Durhing, Dearborn.

Genito-Urinary: Carlton, Hoyne, Franklin, American Text-Book, Bumstead and Taylor.

HISTORY AND METHODOLOGY OF MEDICINE.

The lectures given in this chair are an exposition of the philosophy and art of medicine by the historical method. The student is taught to see how in each age practice of medicine has been the outgrowth of the beliefs current regarding the nature of man. Give to a student the theories held by a people regarding the constitution of matter, the nature of mind and force, and he can accurately foresee the medical science such as people will accept. The unfolding of the world's thought in medicine sets homoeopathy in its high place and gives the student an outlook much needed in the profession. The tendency of medicine has always been to over-estimate the material side of man's nature and to make innumerable hypotheses to explain disease. The conflicts in medicine have been the clashing, not of opposite sects, but of antagonistic systems of thought, and reconciliation is possible only on the grounds of higher science than that of mere sense knowledge. This ground is revealed in the history of the philosophy of medicine.

The course includes the medicine of the Egyptians, Persians, Indo-Chinese, Hebrews, Greeks, Arabians and of Europe down to the present.

One lesson each week during the freshman year.

The College of Dentistry

FACULTY.

- CYRUS NORTHROP, LL. D., *President.*
- WILLIAM P. DICKINSON, D. D. S., Andrus Building. *Dean and Professor of Materia Medica.*
- THOMAS B. HARTZELL, M. D., D. M. D., Andrus Building. *Professor of Pathology, Therapeutics and Oral Surgery.*
- OSCAR A. WEISS, D. M. D., 506 Masonic Temple. *Professor of Prosthetic Dentistry and Orthodontia.*
- ALFRED OWRE, D. M. D., M. D., C. M. *Professor of Operative Dentistry and Metallurgy.*
- E. FRANKLYN HERTZ, D. M. D., Andrus Building. *Professor of Dental Anatomy and Prosthetic Technics.*
- JAMES O. WELLS, A. M., D. M. D., Masonic Temple. *Professor of Crown and Bridge-Work and Porcelain Art.*
- CHARLES A. ERDMANN, M. D., *Professor of Anatomy.*
- RICHARD O. BEARD, M. D. *Professor of Physiology.*
- THOMAS G. LEE, A. M., M. D., *Professor of Histology and Embryology.*
- WINFIELD S. NICKERSON, Sc. D., *Assistant Professor of Histology.*
- H. C. CAREL, B. S., *Assistant Professor of Chemistry.*
- IRA HARRIS DERBY, B. S. *Instructor in Chemistry.*
- FRANK F. WESBROOK, M. A., M. D., C. M., *Professor of Bacteriology and Pathology.*
- S. M. WHITE, B. S., M. D., *Assistant Professor of Bacteriology and Pathology.*
- FRANK R. WRIGHT, D. D. S., M. D., *Lecturer on Anaesthesia and Chief of Anaesthesia Clinic.*
- MARY V. HARTZELL, D. M. D., Andrus Building. *Instructor in Comparative Dental Anatomy.*
- H. M. REID, D. D. S., 423 Medical Block. *Instructor in Prosthetic Dentistry.*
- JAMES M. WALLS, D. M. D., St. Paul. *Instructor in Operative Technics, and Demonstrator of Operative Dentistry.*
- FRED. S. YAEGER, D. D. S., *Instructor in Crown and Bridge-Work.*
- J. N. PIKE, D. D. S., *Demonstrator in Operative Dentistry.*
- MARGARET L. NICKERSON, M. A. *Instructor in Histology.*
- ANDREW J. WEISS. *Instructor in Technics.*
- H. K. READ, M. D. *Demonstrator of Anatomy.*
- M. RUSSELL WILCOX, M. D. *Demonstrator in Physiology.*
- E. R. HARE, M. D., *Prosecutor of Anatomy.*
- FRANK W. SPRINGER, E. E. *Lecturer on Electricity and Its Uses in Dentistry.*
- H. V. MERCER, LL. M., *Lecturer on Jurisprudenc*
- A. L. MOORE, *Infirmmary Clerk.*

Announcement

The College of Dentistry of the University of Minnesota offers a progressive course of study which covers four terms in four separate calendar years, beginning early in September and closing the last week in May following. Students who successfully pursue this course are given the degree D. D. S. (Doctor of Dental Surgery), which entitles them to come before any state board of dental examiners for a license to practice dentistry in that state.

The central idea upon which this institution was founded is that dentistry is a branch of the healing art, and that the practitioner should possess a medical education, hence the curriculum is arranged to include the fundamental principles that underlie the practice of medicine. In this connection special attention is called to the fact that while a thorough course is required, practical work is not neglected. The technical courses are very complete and the clinical facilities are unsurpassed.

Another special feature of this institution is that in laboratory work and infirmary practice, students at all times operate under competent instructors, the professors themselves serving as demonstrators, and every stage of each operation receives due criticism and marking.

The College of Dentistry of the University of Minnesota is a member of the National Association of Dental Faculties, and its diplomas are recognized by the Dental Examining Boards of every state.

Course of Instruction

With the session of 1903-1904, the four-year course was inaugurated in accordance with the vote in 1901 of the colleges composing the National Association of Dental Faculties; the publication of which fact has been made in the college bulletins since that time.

The following outline will show the character of work, and in a general way the amount to be done, under the new arrangement.

The crowding of studies, heretofore, in some years, will be obviated by a rearrangement and amplification, which experience has demonstrated, with addition of others that have been impossible to find time for, together with increased opportunities for infirmary work in all branches, and for the pursuit of special work in what are usually considered as post-graduate studies.

The schedule of the studies and work of each year will be in print at the beginning of the session.

ANATOMY.

Osteology.

Lectures and recitations upon the human skeleton and supplementary work on the osteology of domestic mammals; three hours each week, for 10 weeks of first semester. Practical study of the skeleton, followed by recitations from the specimen, taken by the class, in sections; 2 hours each section, for 10 weeks, first semester. Required of all first year students.

Syndesmology.

Lectures, recitations and laboratory demonstrations. Three hours each week, for 4 weeks, first semester.

Myology and angiology.

Lectures and recitations covering the entire muscular and arterial systems of the human body, with a supplementary study of comparative myology; 3 hours each week, 16 weeks. Laboratory work consists in identifying the muscles of the human body on dissected preparations and showing their actions. Class, in sections, 4 hours each week for 5 weeks.

Text-books required. Quain's Anatomy, tenth addition, Vol. 11, parts 1 and II, or Morris' Anatomy.

Splanchnology.

Descriptive and topographical anatomy of the thoracic viscera, the alimentary and urino-genital organs. Lectures and recitations, 3 hours each week, for 10 weeks.

Descriptive and surgical anatomy.

Head, neck, trunk and extremities. Lectures and recitations, 3 hours each week for 12 weeks.

The nervous system.

Cerebro spinal axis and its membranes; the cranial and spinal nerves; the sympathetic nervous system, and the special-sense organs. Lectures and recitations, 3 hours each week for 8 weeks.

Text-books required. Morris' Anatomy. Edinger's Anatomy of Brain and Cord.

Dissecting. The work extends over a period of eight weeks, requiring 15 hours each week. The dissection of the entire human body is required. The method of work follows that laid down in Holden's Manual of Dissections.

DENTAL ANATOMY.

The subject is taught by a thorough laboratory course, in which the student studies the teeth by dissection, modeling, carvings and drawings. In the study of dental anatomy, human and comparative, the definition, terminology, notation, form and arrangement of the teeth will be fully considered; also macroscopic and microscopic characteristics of sections, including the study of the relation of enamel to dentine and of the pulp canal.

In the study of structural anatomy, teeth will be selected and mounted upon wooden blocks. They will be filed down until the pulp chamber and canals are exposed, and drawings from actual measurements of the different aspects will then be made and carefully studied. Opportunity for the study of microscopic sections and lantern slides will also be afforded. The didactic instruction will be illustrated by "chalk talks," lantern slides, lectures, heroic models and skulls.

The standing of the student will be determined by marks given on the cutting of sections, models, drawings and recitations. Lectures and recitations, covering the influence of form and arrangement of the teeth upon caries will also be given.

Text-book required. Blacks' Dental Anatomy.

Collateral reading.—American Text-Book. Comparative Dental Anatomy, (Thompson). Dental Anatomy, Human and Comparative (Tomes').

COMPARATIVE DENTAL ANATOMY.

The instruction in this subject embraces a comparative study of animal life, giving special attention to number, form and arrangement of teeth, and their adaptation to food habits, ranging from the horny teeth of invertebrates, to the complex tooth-forms of the most highly specialized animals of the present time. The lectures will be illustrated with the stereopticon, casts, models and skulls.

Text-book. Thompson. *Collateral reading,* Tomes.

PHYSIOLOGY.

The subject is taught by recitations and lectures illustrated by practical demonstrations. These embrace the discussion, and as far as possible, the observation of physiological ingredients of the animal body; of the physiology of cell life or the fundamental properties of the cell; the nutritive media, blood, lymph and chyle; of the elementary functions of the nervous system; of the muscular tissues; and of the epithelial tissues; of the vascular mechanism; of the alimentary canal; of the organs of secretion, excretion and respiration.

Text-book required. Foster's Physiology.

HISTOLOGY AND EMBRYOLOGY.

This course will consist of lectures, recitations, laboratory work and demonstrations and will include a study of the structure and properties of protoplasm; the cell, its structure and properties, cell division, reproduction, ovum, spermatozoon and formation of blastoderm. A study of the structure and life history of certain type forms of unicellular animals and plants as amoeba, paramoecium yeast, spirogyra, etc., simple metazoa, as hydra, etc.; consideration of the structure of vertebrates; the tissues, as epithelium, connective tissue, cartilage, bone, etc., muscle, nerve, blood and lymph; vascular and lymphatic system. The teeth, enamel, dentine, cementum, pulp, etc. A general outline of the development of the embryo; the formation of the head; development of the jaws, teeth, oral cavity, glands, etc.

N. B.—Recitations, four hours per week; laboratory, six hours per week.

Text-book required. Stohrs' Histology.

CHEMISTRY.

- (a) Lectures on the chemistry of the elements.
- (b) Laboratory work in general inorganic chemistry of non-metallic and metallic elements.
- (c) Lectures on qualitative analysis with special attention to the examination of alloys.
- (d) Laboratory work corresponding to course (c) and including the qualitative determination of bases and acids. In this course several alloys are analyzed by each student.
- (e) Recitations are carried on throughout the year to test the individual knowledge of each student.

Text-book required. Inorganic Chemistry Syllabus and Laboratory Notes on Qualitative Analysis, prepared by the department.

- (a) Lectures on the analysis of urine.
- (b) Laboratory work in qualitative and quantitative examination of normal and abnormal urine.
- (c) Recitations are carried on throughout the year to test the individual knowledge of each student.
- (d) Optional courses are offered in quantitative analysis, water analysis, saliva, etc.

Text-books required. Inorganic Chemistry Syllabus, and Chemical Urinalysis, prepared by the department.

MATERIA MEDICA.

This course will include the terminology and general consideration of the sources, classification characteristics and physiologic action of drugs and therapeutic measures employed in dentistry.

Special study will be devoted to the methods of use, administration and physiological action of those of greatest value to the dental practitioner. Germicides, antiseptics and the rest, being fully discussed.

Medicines used for systemic treatment in cases of dental and oral derangements, poisons and their antidotes, dosage and rules for the same, the making of percentage preparations, anesthetic agents, both local and general, dentifrices and mouth-washes, and the writing of prescriptions will receive due attention according to the importance of each.

A feature of this course will be the examination of new remedies, and new methods suggested for the treatment of pathologic conditions of the mouth and teeth.

BACTERIOLOGY AND PATHOLOGY.

Bacteriology. Lectures, recitations and laboratory work, a short general survey of the problems brought to light by bacteriology, and general methods and technique involved, will be followed by special study of certain micro-organisms, such as pyogenic cocci, B. tuberculosis, B. diphtheriae, etc. These studies will be pursued by means of actual cultivation on the various media, the making and examination of microscopic preparation of pure culture, and both cultivation from and microscopic examinations of infected tissues and fluids of the body, by the students themselves.

Text-Book. Muir & Ritchie.

Pathology. Lectures, recitations and laboratory work. Special study of inflammations and histological changes occurring in the tissues and fluids, constitute the major portion of this course. Some attention is given to the degenerations and the subject of tumors with special reference to the face and oral cavity. Students prepare and examine many of the specimens and receive loan slides of the rarer types, or those difficult of preparation.

PATHOLOGY AND THERAPEUTICS.

The instruction in this branch will begin with a consideration of the terminology belonging to the subject, followed by the presentation of the lesions of inflammation, local and general, and the degenerate change in the tissues.

The general character of tumors, practical consideration of pathological dentition, interstitial gingivitis, (pyorrhoea alveolaris) pulpitis, pulp nodules, secondary dentine, pericementitis, alveolar abscess, caries of jaw and necrosis, dependent on a diseased condition of the teeth, the various inflammations of the oral cavity, including syphilis and tuberculosis, will all receive due attention.

Text-book required. Burchard.

Therapeutics. This course is given by lectures and recitations, and clinically. The student being instructed in the special therapeutics of dental and oral diseases; systematic treatment in cases requiring it, receives due consideration. New remedies that give promise of value are fully studied and put to practical test in the infirmary, under direct supervision. Antiseptic and disinfectant methods, as well as dental hygiene, also receive due attention.

ORAL SURGERY.

The subject of oral surgery will be taught clinically and didactically. The large amount of clinical material presented 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; fractures of the maxillae; 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; epulis growths; fungoid pulp; ranula; exostosed teeth; ankylosis and dislocation, 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 several clinics. An abundance of material representing all the different forms of diseased conditions of the mouth and associate parts is to be found in the infirmary service, which will be assigned to students for treatment under direction of the professor of oral surgery.

Clinical lectures on the cases presented will be given from time to time. These cases include alveolo-dental abscesses; caries and necrosis of the maxillary bones; diseased conditions of the antrum; interstitial gingivitis; dislocations and ankylosis; facial neuralgias; tumors of the mouth and associate parts, hare-lip; cleft-palate; implantation cases and fractures.

Text-book required. Marshall's Oral Surgery.

PHYSICAL DIAGNOSIS AND ANESTHESIA.

The subject of physical diagnosis will be taught didactically and practically, and will have direct bearing upon the subject of anaesthesia and will be as complete as its importance demands.

A course in urinalysis will be given in connection with this course.

The technics of anaesthetics, both general and local, receive full consideration. All anaesthetics are administered in the clinic, and full instruction concerning their use is given. The members of the senior class are required, under direction, to administer them and extract teeth under these agents.

Text-books required. Tyson, Physical Diagnosis, and Turnbull's Manual of Anaesthetics.

OPERATIVE DENTISTRY.

Didactic. Lectures and recitations illustrated by lantern slides, charts, heroic models and physical apparatus will be given on cavity classification and nomenclature, instrument nomenclature and instrumentation, removal of deposits, rubber-dam and exclusion of moisture; cavity preparation, the enamel in its relation to cavity margins; hypersensitive dentine and pulp treatment, conservative and radical; including discoloration, its cause and treatment; canals, their cleansing and filling; matrices; separating teeth and correcting interproximate space; preparation and insertion of filling materials, including inlays; finishing fillings; clinical operations in their relation to vital tissue, including a review of the technic of conservative operations; the conduct of a practice.

Both junior and senior classes attend these lectures and stand quiz. The questions to each class vary according to their work. An examination will be held at the close of each subject.

Technical. The course of technics includes the formation of typical cavities in plaster models, vulcanite and ivory teeth; protecting nearly exposed pulps, and capping exposed pulps; gaining access to canals; cleansing and filling canals with various materials, subsequently examining them to note results; application and retention of the rubber-dam; preparing and inserting the various filling materials, gutta percha, cements, amalgams, tin and gold.

Clinical.

Before beginning work upon patients, students are given an "infirmary drill," in which they are taught to meet patients, adjust the chair, make examinations, remove deposits and cleanse the teeth, and apply the rubber-dam. In the infirmary, students are under the immediate supervision of the instructors of this branch, who teach them how to diagnose, treat, and prognose cases, beginning with those requiring the simplest service and progressing as their skill increases. This intimate association of the technical and clinical enhances the value of the former and facilitates progress in the latter. Each operation is first presented to the student by a demonstration given by the instructor.

Text-books required. American Text-Book Operative Dentistry. Reference, Johnson's Principles and Practice of Filling Teeth.

OPERATIVE DENTISTRY—ADVANCED COURSE.

Didactic. The lectures on operative dentistry are delivered to both second and third year classes. All will be required to attend and stand "quiz." The questions to the senior class will bear more upon the application of principles in practice. An examination will be held at the conclusion of each subject.

Clinical. Many clinics demonstrating advanced operations and peculiar methods are given in this year. The student has ample opportunity to put these methods into practice; he will also give special attention to the different forms of pathological lesions that pertain to daily office practice, and will carry cases 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 record so made, together with a written examination on the didactic work, will form the final test in this branch.

Text-book required. Kirk's American Text-Book of Operative Dentistry.

Reference. Johnson's Principles and Practice of Filling Teeth.

PROSTHETIC DENTISTRY.

The work of the first year is almost entirely technical; only such lectures and demonstrations being given as to enable the student to carry on his work in the laboratory intelligently. The work comprises a consideration of impression materials, taking impressions, and making casts and models, making upper and lower retaining plates for a fellow student's mouth; and after which the upper is broken and repaired; making partial upper plate with rubber base, comprising the making of trial plate, taking bite, mounting case in articulator, grinding and arranging teeth for proper articulation, flasking, packing, vulcanizing and finishing. Making full upper and lower sets of teeth upon rubber base, using plain teeth and arranging same in accordance with the Bonwill-law of articulation; making full upper and lower swaged metal plates, comprising the making of models, molding in sand, casting dies and counter-dies; swaging plate to fit model, soldering rim and grinding and polishing metal. Making lower cast-metal plate, comprising the making of models and moulds, casting and polishing.

Didactic. Lectures and recitations of the second year will cover the preparation of the mouth for artificial dentures, choice of impression materials, the various base-plates, their composition and preparation. Porcelain teeth, their composition, form and color as related to temperamental types, and their forms as adapted to the various base-plates.

The various methods of retention, and the indications and uses of the different forms of partial plates is fully considered.

Technical. Making upper swaged plate of german silver, mounting plain teeth thereon to articulate with model of lower natural teeth. Making upper combination swaged metal and rubber plate, mounting gum-section teeth thereon to articulate with lower cast metal plate. Making partial swaged metal plate reinforcement and clasps. Making partial upper swage metal plate with teeth attached by soldering. Making lower cast metal plate, casting metal around lingual side of teeth and forming gum upon labial and buccal sides with pink rubber. Making lower swaged aluminum plate with turned rim.

Clinical. The student enters the infirmary upon completion of the technic course, and puts into practice the principles there acquired.

Text-book required. Essig's American Text-Book of Prosthetic Dentistry.

PROSTHETIC DENTISTRY—ADVANCED COURSE.

Didactic. Lectures and recitations upon the use, construction and adjustment of obturators and artificial vela in the treatment of cleft-palate cases. Continuous gum-work, construction and uses, will be fully illustrated and demonstrated.

Clinical. An excellent clinic is provided, enabling each student to make not less than twelve dentures, covering the various conditions usually met with in general practice. Cases of unusual occurrence appearing in the clinic will be utilized as special clinics for the advantage of the entire class.

Text-Book. Essig's American Text-Book of Prosthetic Dentistry.

CROWN AND BRIDGE WORK.

Didactic. Lectures and recitations will cover the subject of crown and bridge-work.

All forms of crowns and bridges will be taken up in order, and considered from theoretical and practical view-points.

Technical. The technics are arranged so that each student is required to complete the technics illustrate the following types of crowns and dummies: with root preparation for the former, and to assemble the same in bridges.

The completed technics illustrate the following types of crowns and dummies; the shell crown, the shell crown with porcelain face; the Richmond crown; the same with removable porcelain face; the Logan crown, with and without band; partial crowns for lingual attachment; porcelain crowns for incisors and cuspids, and the same for bicuspid and molars. Porcelain-faced dummies for bicuspid and molars, and the same with removable facings. Solid metal dummies for bicuspid and molars, and porcelain faced saddle dummies for incisors and cuspids, and the same with removable facings.

CROWN AND BRIDGE WORK—ADVANCED COURSE.

Technical. The construction of porcelain crowns and bridges, and crowns with attachments for the rigid retention of the same.

Clinical. The student in this year will perform practical operations in the mouth, covering all forms of crown and bridge-work.

Text-Book required. Essig's American Text-Book of Prosthetic Dentistry.

PORCELAIN INLAYS.

Didactic. Lectures and recitations will be given on the indication for inlays, the character and manipulation of the porcelain bodies, cavity preparation, forming the matrix, baking and setting the inlay.

Technical. Each student will be required to make at least one inlay in an extracted tooth.

ORTHODONTIA.

The work in the first year of a two-years' course is technical, with such lectures and demonstrations as will enable the student to perform the laboratory work. In addition to this, the student will be required to attend the lectures given the third year class, so that upon entering the senior year to carry on a clinical case, he will have a general idea of the practice of orthodontia.

The technic course is thorough and complete in its scope, it being deemed necessary that the student should have the requisite skill to make regulating appliances, in order to properly place them in the mouth; in other words, it requires no more skill to make appliances than should be possessed to correctly place and operate them.

Furthermore, no system of "ready-made" appliances is considered wholly adequate or best adapted for the correction of all irregularities, thus the necessity for making them.

The technic work in this year includes a consideration of material for regulating appliances. German silver, its properties, annealing and tempering; drawing wire, making tubing and band material; constructing band with screw; jackscrews of different forms, rotation and expansion appliances, retractors and retainers.

The properties of steels, forging, hardening, tempering and polishing, the making of excavators and chisels, band drivers, band removers and wrenches or keys. Making taps for threading nuts, etc. Each operation is performed by the student after a demonstration by the teacher.

Text-Book required. Gullford's Orthodontia.

ORTHODONTIA—ADVANCED COURSE.

Didactic. Lectures and recitations upon the classification of irregularities of the teeth; etiology, local and constitutional; evils arising therefrom; advisability of correction; methods of treatment, including a consideration of the positive or intermittent and constant forces.

The principles of application of force and anchorage are given special consideration, rather than appliances.

Retention and methods of accomplishing the same are fully considered.

Clinical. In this year an ample clinic affords opportunity for each student to treat cases of irregularity.

The correction of at least one case by each student is required. The student is also required to observe and inspect the cases of his classmates, thus enabling him to see a large variety of cases with their treatment.

The student will use such of the technic appliances as are adapted to the case in hand and make such new ones from the material left over from the previous year as the case may require.

Text-Book. Guilford's Orthodontia.

METALLURGY.

Didactic. This subject will be treated in the following order: Metallurgical terms, processes and the principles upon which they are based; the various metals and their ores; process of extraction and refining; their properties and application in the arts, especially in dentistry; alloys, general, and those used in dental amalgams. Lectures and recitations once a week throughout the year, written quizzes monthly.

Technical. Refining of gold and silver, producing pure metals from scraps and fillings. Making alloys for plate, crown and bridge-work, solders and alloys for dental amalgams.

Special attention is given to the melting, casting, cutting, annealing and testing of dental amalgam alloys. Each student will be required to provide metal scraps for refining, and metals for amalgam alloys with which to produce by the processes named, metals and alloys, which will be retained by him for future use.

Text-book required. Hodgen's Practical Dental Metallurgy.

USES OF ELECTRICITY IN DENTISTRY.

A course of laboratory instruction will be given upon the different forms of batteries, dynamos and motors in use in dental practice. Their construction, use, care and operation. Electricity as used in surgery and for therapeutic purposes, including application of the x rays, will be made clear by laboratory demonstrations and practical application.

DENTAL JURISPRUDENCE.

A course of lectures will be given upon the special duties, obligations and privileges of professional men, with respect to their patients, fellow practitioners and the general public. Laws relating to expert witnesses, cases of alleged malpractice, liabilities incurred from septic infection, etc., will have due consideration.

The enactments regarding the attainment of legal standing as practitioners in Minnesota and other states will also be fully explained.

STUDENTS DENTAL SOCIETY.

At the beginning of the senior year a society is organized, which is under the direct supervision of the faculty, and is made a part of the course of instruction. Every senior student is required to prepare an original paper upon some dental or allied topic, to be read before and discussed in open meeting. The meetings will commence the first week in October.

The junior students will be required to attend the meetings of the students' dental society, to familiarize themselves with the proceedings of such bodies.

General Information

THE COLLEGE YEAR.

The seventeenth annual session of this college opens Tuesday, August 30, 1904 and closes on Saturday, May 26, 1905.

The technic and laboratory courses begin Tuesday, September 6.

The college year will be divided into semesters, the first ending January 14, 1905. The succeeding week will be devoted to the mid-winter examinations. The second semester begins Monday, January 24. The lecture courses will close May 20, and the final examinations of the year begin on Monday, May 22.

Practical work for both the senior and junior classes will continue until May 26.

Commencement exercises will occur in common with the other departments of the University on Thursday, June 1st, 1905.

All statements in this announcement as to courses of study, conditions, requirements or fees, have reference to or binding force only upon the session of 1904-1905, unless otherwise definitely stated.

QUALIFICATIONS FOR MATRICULATION.

The requirements for admission to the College of Dentistry for the session of 1904-1905, and thereafter, will be graduation from an accredited four-year high-school course, or its equivalent, and a credit in manual training. Failing to have the latter, the prospective student will be required to demonstrate, by test, the possession of mechanical capability.

If the applicant has no credit in Latin, he will be required to take a course in a private class provided in the College of Medicine, and for which a fee is charged. After the present session all students will be expected to furnish the Latin credit upon **matriculation.**

The "equivalent" of a high-school graduation will be twelve one-year credits; a "credit" representing the ground covered in a high-school study, for a course of at least thirty-six weeks, five recitations per week.

Students wishing to matriculate in this school, must present credentials signed by a city, county or state superintendent of schools, a principal of an accredited high school or academy, or the state high school board.

A regulation blank, upon which to make out these certificates, will be found inside back cover of this Bulletin.

Students not having the above credentials, or an insufficient number of them, may take examinations before a committee appointed by the president, from the college of science, literature and the arts, of the University.

Examinations are held only in the English language.

ENROLLMENT.

Students will be assigned seats in 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, in the library building.

Seats in the amphitheatre, laboratory benches and lockers, as well as chairs and lockers in the infirmary, are assigned to students in the order of their matriculation.

ADVANCED STANDING.

Applicants for advanced standing must present satisfactory evidence of possessing the preliminary educational qualification required of the class they desire to enter.

They must also satisfy the professors of the branches from which they wish to be exempt, that the work pursued by them in other institutions was equal in scope and amount to that passed by the class they propose to enter.

No credits are accepted unconditionally, the Faculty reserving the privilege of examining any applicant when deemed necessary.

All certificates pertaining to advanced standing must be presented to the dean who will send them to the respective professors for acceptance or report of further requirements for acceptance.

Students coming from other schools must make up their technic conditions under supervision of the instructors of this school, at the convenience of the instructor.

One-year credit will be allowed graduates in medicine, but the dental technic branches of the first year must be taken and completed before advanced work in these branches can be entered upon, and the courses in dental pathology, dental histology and bacteriology taken as they occur in the curriculum.

When a student, for any cause, transfers from one college to another of the National Association of Dental Faculties, his certificate of attendance and standing must be verified by the dean of the school he withdraws from. This is done by correspondence between the executive officers of the two schools.

The dates for examinations in anatomy, physiology, histology and chemistry, for students having conditions, and applicants for advanced standing in those branches, will be held on the following dates.

September 1st, 9 a. m.—Anatomy, first year.

September 1st, 2 p. m.—Histology, first year.

September 2nd, 9 a. m.—Physiology, first year.

September 2nd, 9 a. m.—Anatomy, second year.

September 2nd, 2 p. m.—Chemistry, first year.

ATTENDANCE AND DISCIPLINE.

The college hours are from 8:30 a. m. to 12:30 p. m., and from 1:30 to 5:30 p. m.

Attendance upon all lectures, and infirmary and laboratory hours as scheduled is obligatory. A complete record of each student's attendance is kept, and all absences and tardinesses are noted.

All laboratory courses must be taken in full and must invariably be entered during the first week in which they begin.

Habitual absence, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension.

The practice of dentistry by students, except under the direct superintendence of a preceptor, is prohibited by law in the state of Minnesota, and a rule of the National Association of Dental Faculties to which this college belongs, reads as follows: "Students in attendance in colleges of this association are required to obey the laws regulating the practice of dentistry in the various states, and, failing to do this, shall not be again received into any college of this association." Any student detected in violating this rule will be suspended or expelled.

The connection of any student with this college may be terminated at any time, without a return of fees, whenever such action may be advisable on the ground of immorality, or disorderly conduct, or a failure to conform to the established rules.

BREAKAGE AND LOSS.

A deposit of five dollars (\$5.00) will be required in addition to the first semester fee, to cover loss of and breakage or damage to college property. This will be returned at the end of the year, providing there is no charge against the student. This fee is to be deposited with the University accountant each year when the student matriculates.

INSTRUMENTS, BOOKS, TOOLS AND MATERIALS.

All students are required to provide themselves with instruments, books, tools and materials as prescribed by the college. These can be obtained in the city, with the usual discount to students. The first installment must be procured and approved by the instructor before seats can be assigned in the technic laboratories.

COLLEGE MUSEUM.

Members of the dental profession, and others interested, are invited to contribute pathological specimens, casts of malformations, irregularities of the teeth, models, charts, drawings, etc., which may be useful as illustrative matter in the lecture rooms.

ALUMNI ASSOCIATION.

An association of the graduates of the college has its annual meeting during commencement week.

CLINICAL FACILITIES.

The opportunities for acquiring a practical knowledge of both operative and prosthetic procedure is unsurpassed, the material presented in the infirmary clinic being more than ample for all purposes of instruction.

GRADUATION.

At the close of the third year, a student who has passed all examinations satisfactorily, receives the degree of Doctor of Dental Surgery (D. D. S.), upon the following conditions:

He must be twenty-one years of age.

He must have attended four full courses of instruction, the last of which must have been in this college.

He must have passed the full requirement in dissections and must have performed satisfactorily in the college all the required operations in operative and prosthetic dentistry.

Immorality, disorderly conduct, or a failure to conform to the rules of the college, will be deemed a sufficient bar to any receiving his degree.

Under no circumstances are degrees *in absentia* conferred by this college.

Students failing to graduate will be required to pay a fee for completing each branch of unfinished work.

FEES AND EXPENSES.

The annual fee, which includes all charges for matriculation, lecture and laboratory courses, and dissections is, one hundred dollars (\$100.00).

One-half of this fee will be payable when the student matriculates. The accountant's receipts for the portion will entitle the holder to take entrance examinations and to classify. The second half will be payable at the opening of the second semester. These receipts must be presented to, and countersigned by the Dean before entering upon the work of each semester.

There is no fee for diploma upon graduation.

If the applicant fails to pass the entrance examinations, his fee will be returned by the accountant.

In addition to the college fee there is a rental fee of \$2.00 for a microscope, in each semester when its use is required, provided the student is not supplied with a satisfactory instrument.

There is also a rental fee of \$1.00 for microscope in the course of bacteriology in the third year. It is an advantage for the student to possess his own microscope, and assistance in the selection of one will be **given when desired.**

There are no free scholarships, and no students are received for less than the regular fee.

No student will be permitted to take final examinations until after all fees and charges have been paid.

After having entered upon the course of study, fees are not returnable, and no rebate will be recommended should a student discontinue work, but the faculty may recommend the application of a part to the succeeding year.

Senior students failing to graduate, will be required to pay a fee of ten dollars (\$10.00) for each branch examined in or taken subsequent to the close of the session in which the failure occurred. A fee of \$10.00 will also be charged for the completion of each branch of unfinished laboratory or practical work.

Rooms and board convenient to the college can be obtained at prices ranging from \$3.00 to \$5.00 per week according to accommodations.

Furnished rooms without board, from \$5.00 to \$10.00, and unfurnished rooms from \$4.00 to \$7.00 per month.

A list of rooms and boarding places is kept by the secretary of the University Y. M. C. A., to whom inquiries or applications may be addressed.

From one hundred and fifty to one hundred and seventy-five dollars are necessary to defray the expenses of the first month. These include tuition, for first semester, board and room for the month, and books, instruments, tools, and materials for the year, which must be purchased before commencing work. In order to avoid embarrassment, the student should bring sufficient funds to cover these first expenses.

For further information, address Dr. W. P. Dickinson, Dean, College of Dentistry, University of Minnesota, Minneapolis.

CALENDAR—FIRST SEMESTER.

1904.

- AUGUST 30-31. Registration and assignment of seats.
- SEPTEMBER 1-2. Examinations for conditions and advanced standing
9 a. m. and 2 p. m.
- 5. Examination and Registration completed.
- 5-6. Classification of students.
- NOVEMBER 5. Half semester ends.
- 24. Thanksgiving Day.
- DECEMBER 17. Holiday vacation begins.

1905.

- JANUARY 3. Work resumed.
- 16-21. Mid-Year examinations, ending first semester.

SECOND SEMESTER.

- JANUARY 24. Second semester begins.
- FEBRUARY 12. Lincoln's Birthday—holiday
- 22. Washington's Birthday—holiday.
- MARCH 25. Half semester ends.
- MAY 22. Annual meeting of the faculty to pass upon candidates for graduation.
- 22-26. Final examinations, primary studies, ending second semester.

The College of Pharmacy.

THE FACULTY.

- CYRUS NORTHROP, LL. D., *President.*
FREDERICK JOHN WULLING, Phm. D., LL.M., etc., *Dean: Professor of Pharmacology, Pharmaceutical Chemistry and Pharmaceutical Jurisprudence.*
HENRY MARTYN BRACKEN, M. D., *Professor of Materia Medica.*
.....*Professor of Pharmacognosy.*
H. C. CAREL, B. S., *Professor of Chemistry; General, Medical, Analytical and Organic.*
CONWAY MACMILLAN, M. A., *Professor of Botany.*
FREDERICK K. BUTTERS, M. S., *Instructor in Botany and Practical Pharmacognosy.*
FRANK FAIRCHILD WESBROOK, M. A., M. D., C.M., *Professor of Bacteriology.*
GEORGE B. FRANKFORTER, M. A., Ph. D., *Professor of Organic Chemistry (Post-Graduate).*
GEORGE DOUGLAS HEAD, B. S., M. D., *Instructor in Clinical Microscopy.*
RICHARD OLDING BEARD, M. D., *Professor of Physiology.*
M. RUSSELL WILCOX, M. D., *Instructor in Physiology.*
..... *Professor of Hygiene.*
ALBERT M. WEBSTER, A. B., *Instructor in Medical and Pharmaceutical Latin.*
ARTHUR L. PARSONS, *Instructor in Mineralogy.*
GUSTAV BACHMAN, Phm. D., *Instructor in Pharmacy and Laboratory Assistant.*
I. DERBY, *Assistant Professor of Chemistry.*
W. H. CONDIT, M. D., *Instructor in Materia Medica.*
C. N. MCCLOUD, Phm. D., M. D., *Lecturer on First Aids to the Injured.*

ANNOUNCEMENT.

In the organization of this college the Board of Regents has aimed to secure the co-operation of the pharmacists of the state. The character of instruction is of high order and every effort is made to comply with the demands of the profession in the Northwest, or elsewhere, in the maintenance of a course of instruction of the highest grade. The college is located on the University campus, in the Medical Science Laboratory Building, and is one of the colleges of the department of medicine, but is distinct in the government of its affairs. The building and laboratories are on a par with the best, and their equipment is complete.

The work of the college, as outlined in the following pages, is conducted by means of lectures, quizzes and laboratory exercises. Students will find their time fully occupied. The work is of such a nature that no student can accomplish it in the short term of five or six months. Students who may feel unable to complete the work in two years may divide it in a manner to complete it in three years. Practicing pharmacists who desire to take certain branches of study may avail themselves of any of the college facilities, but their studies and time will be subject to regulation as special students.

COURSES OF INSTRUCTION.

PHARMACY—*General*—Metrology; nomenclature; pharmaco-technology; dispensing.

Inorganic—Non-metals; metals; gravimetric analysis; alkalimetry; acidimetry; pharmaceutics.

Organic—Organic drugs; assays; pharmaceutics.

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.

MATERIA MEDICA—*Inorganic*—Non-metals; salts of metals; new remedies.

Organic—Vegetable drugs; new remedies.

PHARMACOGNOSY—*Organic*—Descriptive; microscopical.

PHYSIOLOGY—*Human*—Elementary; descriptive.

BACTERIOLOGY—*Elementary*—Descriptive; practical—optional.

MATHEMATICS—*Pharmaceutical*—*Chemical*.

URINALYSIS—*Complete*—*Chemical*; microscopical.

LATIN—*Elementary*—*Medical*; pharmaceutical.

HYGIENE—*Lectures*.

PHARMACAL JURISPRUDENCE—*Lectures*.

MINERALOGY—*Elementary*—*Pharmaceutical*.

PHYSICS—*Pharmaceutical*—*Chemical*.

TOXICOLOGY—*Lectures*.

DISPENSING—*Practical*.

THERAPEUTICS—*Lectures*.

HOMEOPATHIC PHARMACY—*Lectures*.

MICRO-CHEMISTRY—*Lectures and laboratory*.

The courses are comprehensive and thorough, especially adapted to the higher education of pharmacists. In most cases the instruction enters into minute details, and the most effective modern methods of teaching are employed, including laboratory work. The studies are graded and progressive throughout.

FIRST YEAR.

General pharmacy, metrology, nomenclature, pharmaco-technology, inorganic pharmaceutical chemistry, inorganic elementary chemistry, qualitative chemistry, pharmal mathematics, physiology, botany, materia medica, physics, pharmacognosy, microscopy, Pharmacopoeia, Latin.

SECOND YEAR.

Advanced pharmacology, advanced pharmaco-technology, advanced inorganic pharmaceutical chemistry, advanced organic pharmaceutical chemistry, advanced inorganic general chemistry, advanced qualitative chemistry, advanced pharmacognosy,

advanced microscopy, advanced materia medica, volumetric analysis, gravimetric analysis, pharmaceutical jurisprudence, bacteriology, toxicology, urinalysis, mineralogy, hygiene, Pharmacopœia, unofficial pharmacy.

PHARMACEUTICAL BOTANY AND MICROSCOPY.

This course occupies the equivalent of six hours a week throughout the Junior year. It aims to give a comprehensive and scientific view of the vegetable kingdom, to lay a broad foundation for the study of pharmacognosy, and to furnish practical training in the use of the microscope, the preparation of material for microscopic examination, including the use of micro-chemical reagents, and the representation by drawings of all structures observed.

During the first semester the course embraces the comparative morphology of the cryptogams. Especial attention is paid to the green algae, the foundation of the vegetable kingdom, and to the line of development which leads through the archegoniate series to the seed plant.

The second semester is chiefly devoted to a study of the morphology and anatomy of the higher seed plants with especial attention to the microscopic characters of roots, stems, leaves, fruits and seeds. The formation and occurrence of carbohydrates, glucosides, alkaloids, organic acids, resins and gums are carefully studied.

Throughout the course one lecture a week is devoted to the discussion of the plant as a living unit and the fundamental problems of plant physiology and ecology.

The successful completion of the course in botany is prerequisite to the study of pharmacognosy.

Text-book—Coulter's Plant Structures.

Reference books—Strassburger Noll, Schenck and Schimper; Bastin; Bessey; Vines, etc.

THIRD YEAR.

Students who divide their work among three years will take the following studies in the first year and divide the remaining subjects equably among the remaining two years: Inorganic general chemistry, inorganic pharmaceutical chemistry, qualitative chemistry, physiology, botany, Latin.

PHARMACY, THEORETICAL AND PRACTICAL.

The junior course begins with preliminary lectures considering the history and development of pharmacy, the rank which pharmacy occupies among other professions, text-books and works of reference. The Pharmacopœia and dispensaries receive attention. Measures and weight; 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.

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, etc.

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-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.

Solution—chemical, pharmaceutical, simple, chemical, saturated; circulatory, dispensement.

Dialysis—construction of dialyser, osmosis, endosmosis, exosmosis, crystalloids and colloids.

Maceration—expression, infusion, decoction.

Percolation—history, theories, various methods and forms of percolators, exhaustion, repercolation, continuous percolation, etc.

Filtration—filtering media, filtration of chemical solutions, oils, syrups; rapid filtration, in vacuo, hot 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 effecting, etc.

Precipitation—separation, weighing, drying.

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 and inorganic drugs. It embraces a careful study of every important galenic preparation with the method of preparation, physical characteristics, reactions, impurities, adulterations, sophistications, etc.

A study of incompatibility is one of the special features of this course; it is viewed from a pharmaceutical and chemical standpoint.

Among the important subjects that are treated, are the following:

Plant exudations, gums, resins, balsams, gum-resins, oleo-resins, etc.

Cellulin and its various products.

Destructive distillation of wood, acetic series, etc.

Carbohydrates: their relationship and characteristics.

Fermentation products, alcohols, ethers, chloroform, nitrous ether, chloral, spirituous liquors etc.

Organic acids—The official salts and preparations, of tartaric, salicylic, benzoic, citric acid and others.

Fixed oils and fats—Their preparation, composition and purification; various methods of examination; chemical properties and relations; liquid and solid fats.

Waxes and animal fats.

Volatile oils—Their preparation, physical and chemical properties, composition; adulterations and their detection; botanical and chemical classification.

Alkaloids—Physical and chemical properties; the various methods of extraction and identification; classification, alkaloidal reagents, etc.

Glucosides—Difference from alkaloids; full consideration of properties.

Animal drugs and products; all the animal drugs are taken up in detail.

The prescription; the study of the prescription, of incompatibilities, reactions, solubility, etc. New remedies are studied, and an exposition of their chemistry and pharmacy is presented.

The laboratory work in pharmacy follows each lecture, and has direct reference to the subjects treated at the lecture. The preparation of the official standard solutions is fully illustrated. The course includes a thorough study of the pharmacy of the following metals and their salts and preparations: Sodium, potassium, ammonium, lithium, barium, calcium, zinc, magnesium, lead, copper, aluminum, mercury, silver, arsenic, antimony, bismuth, iron, manganese, gold, platinum, etc. The course includes a thorough application of the U. S. P. tests of identity, impurities and strength of official preparation. Considerable time is given to quantitative work, volumetric and gravimetric.

Text-books—U. S. Pharmacopoeia, U. S. Dispensatory, Remington's Pharmacy, National Dispensatory, Caspari's Pharmacy.

MATERIA MEDICA AND THERAPEUTICS.

The work in organic and inorganic materia medica, which includes some therapeutics and toxicology, extends through part of the two years, and occupies from four to six hours weekly. It is taught by lectures, frequently illustrated with specimens belonging to the collection of the college. Pharmaco-dynamics, including the study of the identity, quality and characteristics of drugs, which is usually included in materia medica, shares attention in the courses of pharmacognosy.

Text-books—U. S. Pharmacopoeia, Bracken's Materia Medica, Maisch's Materia Medica, U. S. Dispensatory and National Dispensatory.

PHAMACOGNOSY.

This important subject is taught in the senior year.

The vegetable drugs of the United States Pharmacopoeia are taken up in the following order: Roots, rhizomes, tubers and bulbs, woods, barks, leaves, herbs and flowers, fruits, seeds, plant exudations, resins, gum-resins, waxes and starches. Each drug is carefully examined both macroscopically and microscopically. Students are also provided with specimens for home study. The lectures give, in compact form, the history and important features of each drug, with consideration of

its importance to the pharmacist. The quizzes include careful drill on the constituents action and dose and official preparation of each drug considered. Identification receives careful attention, and there are weekly tests of the student's ability. A short course is given in the microscopic examination of some of the more important alkaloids and glucosides, and of certain emulsions and inorganic salts, if time permits.

Text-books—Sayre's Organic Materia Medica and Pharmacognosy.

Reference books—U. S. P., U. S. D., Fluckiger and Handbury's Pharmacographia, Tschirch's Atlas der Pharmacognosie, etc.

The drugs are considered in the following order:

Roots—Sarsaparilla (Mexican, Para and Honduras), senega, gentiana, taraxacum, pyrethrum, inula, lappa, apocynum, stillingia, sumbul, asclepias, phytolacca, althaea, belladonna, bryonia, calumba, rheum, glycyrrhiza (Spanish and Russian), ipecacuanha, pareira, krameria, rumex.

Rhizomes—Aspidium, zingiber (Jamaican, East Indian and African) calamus, veratum viride, iris, cypripedium, convallaria, triticum, sanguinaria, geranium, podophyllum, valeriana, arnica, serpentaria, spigelia, hydrastis, caulophyllum, cimicifuga, leptandra, gelsemium, menispermum.

Tubers and Bulbs—Jalapa, aconitum, colchicum, scilla, allium.

Twigs and Woods—Quassia, haeatoxylon, santalum rubrum, guaiacum, dulcamara,

Barks—Cinchona (Rubra et Flava), prunus virginiana, vilburnum, prunifolium, viburnum opulus, rubus, quercus, alba, granatum, aspidosperma, frangula, rhamnus purshiana, juglans, xanthoxylum, mezereum, gossypii radix, euonymus, quillaja, ulmus, sassafras, cascarilla, cinnamomum (Ceylon, Saigon and cassia).

Leaves and Leaflets—Pilocarpus, eucalyptus, uva ursi, senna (Alexandria and India), coca (Bolivian and Truxilla), belladonna, stramonium, hyoscyamus, tabacum, digitalis, matico, salvia, hamamelis, castanea, eriodictyon, chimaphila, buchu (long and short), rhus toxicodendron.

Herbs and Flowers—Santonica, caryophyllus, sambucus, calendula, cusco, arnica, matricaria, anthemis, rosa gallica, rosa centifolia, crocus, zea, chondrus, cetraria, cannabis indica, pulsatilla, scoparius, eupatorium, grindelia, tanacetum, artemisia, absinthium, lobelia, mentha piperita, mentha viridis, melissa, hedeoma, marrubium, scutellaria, chirata, sabina, chelidonium.

Fruits—Humulus, piper (longum et amara), pepo, myristica, sinapis (alba et nigra), nux vomica, staphisagria, ricinus, tigilium, stramonium, colchicum, strophanthus, linum.

Seeds—Physostigma, amygdala (dulcis et amara), pepo, myristica, sinapis (alba et nigra), nux vomica, staphisagria, ricinus, tigilium, stramonium, colchicum, strophanthus, linum.

Miscellaneous—Guarana, lactucarium, aloe (Socotrina, Barbadosensis, et Capensis), catechu, kino (Malabar et Pallas), opium, elastica, manna, saccharum, saccharum lactis, mel, acacia, tragacantha, mastiche, guaiacum, benzoinum, cambogia, asafoetida, ammoniacum, scammonium, myrrha, copaiba, terebinthina, terebintha canadensis, resina, pix (Burgundica et liquida), styrax, balsamum peruvianum, balsamum toluitanum, camphora, thymol, menthol, ergota (Spanish and German), sassafras medulla, galla (Aleppo et Chinensis), gossypium purificatum, kamala, lupulinum, lycopodium, amyllum, cetaceum, cera, cantharis, coccus, ichtthyocolla, moschus, carbo animalis.

Besides the foregoing a number of the more important unofficial drugs will also be discussed.

POWDERED DRUGS.

This course consists of laboratory work and occasional lectures. The more important vegetable drugs are examined microscopically, in powdered form. Especial attention is paid to the identification of unknown powders, and to the detection of the various forms of sophistication to which powdered drugs are subject. The course occupies one half-day weekly during the second semester of the senior year.

Text-book—Schneider's Powdered Vegetable Drugs.

Reference books—Koch's Drogenpulver, Moeller's Pharmacognostischer Atlas.

GENERAL CHEMISTRY.

This is a course in general chemistry given in the department of medicine. In the presentation of the subject, practical work in the chemical laboratory follows

the lectures. The system is one which gives the student confidence in his work from the beginning and the better enables him to keep step with the rapid progress of the instruction.

The course is graded through the junior and senior years..

Text-books—Remsen's Inorganic Chemistry—Wulling's Chemistry, Carel's Outlines.

QUANTITATIVE CHEMISTRY.

The course in quantitative analysis is given during the senior year. It is graded and begins with simple gravimetric determination of certain acids and metals, followed by determination 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.

Text-books—Schrump's Volumetric Analysis.

PHARMACEUTICAL ORGANIC CHEMISTRY.

This course is given in the senior year. It includes both descriptive and experimental lecture and laboratory work. The organic chemistry of pharmacy is taught in connection with the course in pharmacy and pharmaceutical chemistry.

PHARMACEUTICAL INORGANIC CHEMISTRY.

Inorganic and organic pharmaceutical chemistry are 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 courses in chemistry are here applied directly to pharmacy. The chemistry necessary to the thorough comprehension of the Pharmacopoeia 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 of 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.

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 effects upon the system cannot be intelligently carried on without some knowledge of the structure and functions of the various organs.

Text-book—Martin's Human Body.

BACTERIOLOGY.

The course in bacteriology is given to the seniors, and consists of lectures and recitations illustrated by microscopic preparations and culture of various bacteria. Opportunity is afforded in the laboratory for special research work. This course is optional with students in pharmacy.

MATHEMATICS.

Students in this college receive careful drill in the application of mathematics to pharmacy and chemistry.

URINALYSIS.

This course comprehends both qualitative and quantitative determination of the constituents of normal and pathological urine, and a microscopical examination of deposits. Seniors attend in the latter half of the year. The instruction is given partly in the chemical and partly in the pharmaceutical laboratory.

Text-book—Tyson's Examination of the Urine; Hoffman and Ultzmann.

HYGIENE AND SANITARY SCIENCE.

A course of from six to ten lectures is provided in this subject, if time permits. For seniors.

Text-books—Parks.

HOMEOPATHIC PHARMACY.

A course in homeopathic pharmacy has been added to the curriculum. It comprises both lectures and laboratory work and is given in the senior year, if time permits.

Text-book--Homeopathic Pharmacopoeia.

MICRO-CHEMISTRY.

A brief course is provided for seniors, if time permits.

MEDICAL AND PHARMACEUTICAL JURISPRUDENCE.

A course of lectures in this subject is provided and seniors are required to attend. The lectures are delivered by the dean of the college.

LATIN.

A special course is provided in medical and pharmaceutical Latin, which all students are earnestly advised to attend. Latin is one of the entrance requirements, and this course has been introduced especially for students who are proficient in the other entrance requirements, but not in Latin. The attendance upon the lectures is obligatory for such, and optional for those who have fulfilled the entrance requirement in Latin. The latter will profit by taking this course as it is especially adapted to pharmacists. Two hours weekly are given to the study during the school year. An extra fee is required of those taking this course. The fee is \$10.

MINERALOGY AND CRYSTALLOGRAPHY.

A short course of lectures embracing the minerals and ores which are the sources of the metals and salts used in pharmacy is given in the junior year.

PHYSICS.

Students are required to be familiar with elementary physics before entering this college. The physics involved in the various chemical and pharmaceutical processes, is, however, fully elucidated as occasion suggests or requires, and considerable attention is given the subject incidentally, principally in the pharmaceutical laboratory.

PHARMACY LAW.

Several lectures will be given to the seniors on the pharmacy laws of the state.

FIRST AIDS TO THE INJURED.

A series of six to eight lectures on this subject is delivered to the seniors the latter part of the second semester.

TEXT AND REFERENCE BOOKS.

Pharmacu: U. S. Pharmacopoeia, Remington's, Caspari's and Coblenz's, Practice of Pharmacy, U. S. Dispensatory, National Dispensatory, Lyon's Pharmaceutical Assaying, Storer's Dictionary of Solubilities, Hager's Handbook of Pharmacy, Fluckiger and Hanbury's Pharmacographia, Era Formulary, American Pharm. Assoc. Proceedings, Berichte der Pharm. Gesellschaft, Peter's Ancient Pharmacy, National Formulary, Homeopathic Pharmacopoeia, German Pharmacopoeia, British Pharmacopoeia, Volatile Oils, Kremer's Gildemeister & Hoffman.

Pharmaceutical Chemistry: Wulling, Sadtler and Trumble, Attfield, Simon, Hoffman and Power's Examination of Medical Chemicals, Schmidt, Elsner.

General Chemistry: Remsen's Inorganic, Prescott and Johnson's, Watts' Fownes, Gmelin's Handbook, Roscoe and Schorlemmer, Watts' Dictionary, Fresenius, Sadtler's Industrial Organic Chemistry.

Prescriptions: Ruddiman on Incompatibility. Gerrish's Prescription Writing. Rice's Posological Tables.

Mathematics: Oldberg's Pharm. Problems, Weights and Measures, Mathematical Chemistry, Helm and Morgan's Metric System by Hamblin Smith.

Materia Medica: U. S. Pharmacopoeia, Sayre, Bracken, Maisch, U. S. Dispensatory, National Dispensatory, Culbreth, Bently and Trimen's Medicinal Plants.

Pharmacognosy: Sayre, Maisch, Rusby and Jeliffe, Fluckiger, Huseman and Hilger's Pflanzenstoffe, Base on Vegetable Microscopy, Hanbury's Pharmacogra-

- phic and Science Papers, Tschirch and Oesterle's Anatomischer Atlas der Pharmacognosie, Herlant's Micrographies des Poudres Officinales.
- Botany:** Strassburger Noll and Shimper's, Bergen, Bastin, Vines, Bessey, Bentley, Gray, Cross and Bevan on Cellulose, Weisner's Rohrstoffe, Strassburger and Hillhouse, Geddes, Zimmerman on Botanical Microtechnique, Warming and Posser.
- Urinalysis:** Tyson, Flint, Von Jaksch on Clinical Diagnosis, Simon's Clinical Diagnosis, Beale's Chart, Hoffman and Uitzmann, Peyer's Atlas.
- Mineralogy:** Dana.
- Physiology:** Martin's Human Body, Foster, Howell's American Text-book of Physiology.
- Bacteriology:** Schenck, Sternberg, Fraenkel, Abbott.
- Toxicology:** Reese, Taylor on Poisons.
- Latin:** Latin Grammar of Pharmacy, Jones, Harkness.
- Miscellaneous:** Gill's Oil Analysis, Mandel's Bio-Chemistry, Leffmann and Beam's Analysis of Milk, Wing's Milk and its Products, Lassar and Cohn's Chemistry in Daily Life, Park's Hygiene and Sanitary Science, Stewart's Pocket Dose-Book.

LIBRARY.

The students of this college have free access to all the library facilities of the University and of the city. The medical library contains, in addition to about twenty-four 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, eight and one-half months each. Students may arrange their work so as to take the course in three years, without additional expense to them. It is quite possible that a three years' course may be required of students in this college in the near future.

The thirteenth annual course begins Tuesday, September 6, 1904, at 9:00 a. m., at which time registration commences in the dean's office. Registration closes on Monday, September 12th. Actual work begins on Tuesday, September 13, at 9 a. m.

The college year is divided into two semesters; the first ending January 22d, 1905. The week following is devoted to mid-year examinations. The second semester begins February 1st and closes May 17th, when the final examinations in all subjects begin.

REQUIREMENTS FOR ADMISSION.

I. Candidates who present a diploma of a reputable college, or of a high school of the first grade, or of the advanced course of a Minnesota State normal school, or of the preparatory department of either Hamline University or Carleton College, or of Pillsbury Academy, or of the Minneapolis Academy, or of any

institution of similar standing or grade, will be admitted without examination. If the diploma does not cover physics, that branch will need to be taken up by the student during the first year of attendance.

Those bringing certificates of good standing in institutions of the collegiate grade are also admitted without examination.

II. Applicants who bring evidence of having been engaged in the practice of pharmacy for one or more years, who cannot meet the above requirements, are examined in the following branches:

1. English—An original composition of not less than 300 words upon some topic to be announced at the time of examination. Orthography, punctuation, use of capitals, grammatical construction and rhetorical fitness will be considered.

2. Algebra—elementary.

3. Physics—elementary.

4. Latin—elementary.

III. Other applicants will be examined in the following branches:

1. English.

2. Algebra or geometry—elementary.

3. Physics—elementary.

4. Physiology or botany.

5. Latin—Jones' First Latin Book or an equivalent.

A foreign language, preferably German or French, may be offered in place of Latin, but Latin must then be pursued subsequent to entrance. Applicants whose preparatory course of study has not conformed precisely to the requirements above enumerated will be allowed to offer, in lieu of a portion of these requirements, equivalent preparation in similar branches of study; and if they show, by examination, or by other evidence, that their preparation has been substantially equivalent, such branches will be accepted as substitutes for those omitted.

The examinations for entrance are conducted by the faculty of the college of pharmacy, in the pharmacognosy room, beginning at 9:00 a. m., on Monday, September 14, 1903. Lecture work begins as soon as possible after the examinations, usually the following day.

IV. All applicants are required to furnish a certificate of good moral character.

REGISTRATION.

All applications for admission to the regular courses must present to the Dean on September 6th, 1904, at 9 a. m. or not

later than September 12th, their school or high school certificates, diplomas or such other credentials as they may wish to offer toward meeting in whole or in part the entrance requirements. If these are found satisfactory the applicant will register in the office of the University registrar, who will issue a card to the University accountant to whom the applicant will pay the tuition and breakage fees and microscope rental and receive receipts therefor. Registration is completed by depositing these receipts in the office of the Dean. The student is then classified.

PROFESSIONAL EXAMINATIONS.

Examinations are held during the last two or three weeks of the regular session and during the last week of the first semester, 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 throughout the year, and all students who have a standing of ninety per cent, or more, in certain of the branches, may not be required to take the final examination in those branches.

Students are not required to write graduating theses, but, instead, they keep complete records of all their laboratory work. The records are to be kept in substantially bound books, to be approved by the faculty. The respective professors call for the records for inspection and rating once a month or oftener. Duplicates of records are to be furnished the college by the students. The college provides the paper.

ATTENDANCE.

Students are required to attend at least four-fifths of the lectures in each course. This rule is not intended for the benefit of those who seek admission after the opening of the college year, but is designed to cover cases of sickness or unavoidable absence. It does not apply to laboratory courses which must be taken in full and must be entered during the first week in which they begin.

CONDITIONS

Students having conditions in more than one major or in more than two minor subjects of the first year, cannot enter upon the second year's work. All entrance conditions must be removed before the spring examination. Candidates for gradu-

ation must have removed all conditions before entering upon the second semester of the graduating year.

Condition examinations are held during the week preceding the beginning of the course in September. The dates are posted in June. Conditioned students are required to inform themselves as to these dates as soon as they learn that they are conditioned, as no other notice is given.

All who carry a condition and fail to remove it within one year will be charged an extra examination fee.

Students who carry a condition into a succeeding year may find a conflict of lecture or laboratory hours. In such cases they are to give preference to the lower course.

STANDING.

The standing of students is determined by the results of recitations, written examinations and laboratory work. It is indicated by the terms "passed" or "conditioned." Conditions may be removed as indicated above. Incomplete work must be made up before the final examinations of the following year.

ADVANCED STANDING.

Applicants for advanced standing must pass the entrance examinations or present the usual equivalents. They must furnish satisfactory evidence of time spent and subjects covered in previous professional studies, and must present themselves at the above date and pass the examinations of all departments in which they wish to be exempt, if such examinations are deemed necessary by the professors in charge of the various departments. Students will not be permitted to substitute private work in any branch for the regular course work.

DEGREE.

This college confers the degree of pharmaceutical chemist (Ph. C.) upon the graduates of the regular course.

REQUIREMENTS FOR GRADUATION.

Regular attendance at lectures, quizzes and laboratory exercises is required. Students will not be permitted to present themselves for final examination unless they have been in attendance upon at least seven-eighths of the required number of exercises.

Every person upon whom the degree is conferred must be of good moral character, and must be at least 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 payment of an additional fee of five dollars, and complying with all other requirements.

GRADUATE COURSE.

In addition to the course outlined, and which leads to the degree pharmaceutical chemist (Ph. C.), this college offers two graduate courses, the first continuing through one college year and leading to the degree of **master of pharmacy**, and the **second** continuing through an additional year or longer, and leading to the degree of doctor of pharmacy. The first graduate course, the one leading to the master's degree, is now in operation. It is intended that the curriculum shall include higher pharmaceutical chemistry, pharmaceutical assaying, higher organic chemistry, proximate and ultimate analysis, chemistry of food, spectroscopic work, therapeutics, and bacteriology, and a thesis of at least 3,000 words, embodying the results of original work, but this curriculum may be changed by the faculty if occasion or experience so require.

The requirements for admission are a diploma from a Minnesota high school of the first grade, or an equivalent; a diploma from a college of pharmacy whose curriculum, extent and kind of work and length of under-graduate course are equal to those of the under-graduate work of this college; an acquaintance with either German or French sufficient to enable the students to read and understand the scientific literature in those languages, and a certificate of registration as pharmacist from any state board of pharmacy. The fees for this course will be seventy-five dollars, and, in case of graduation, an additional fee of ten dollars for diploma. The rules relating to damage, waste or breakage in laboratories are the same as those applying to the undergraduate course.

The course leading to the doctor's degree will begin as soon as there are sufficient applicants.

BREAKAGE AND LOSS.

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give receipt. 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.

CAUTION FEE.

A deposit of five dollars will be made with the accountant each year, by every student, at the time of enrollment as a caution fee. This fee is intended to cover the cost of unnecessary damage in the college buildings and of breakage and loss of laboratory apparatus and materials. It will be returned to the student at the close of each year, minus the cost of articles assigned to him, which are not returned in good condition, or of damage to college property for which he is individually responsible. If responsibility for such damage cannot be individually fixed, a pro rata charge upon all students will be made.

GENERAL STATEMENT.

Those who do not pass the entrance examinations, may enter this college and complete their course in three years, provided they pursue the subjects required for admission, in addition to the professional work that may be assigned to them, and pass their entrance examinations, before the end of the first year. There are a number of preparatory schools in the neighborhood of the University, where the subjects required for admission may be pursued.

Students are permitted to use their own crude drugs for the making of preparations, provided such material is approved by the dean of the college as suitable to demonstrate the lesson in hand. Finished products from such material, if of satisfactory quality, are at the disposal of the student, unless made with the tax-free alcohol belonging to the college.

Absence will not be excused, unless satisfactory reasons are given to the professor in charge. Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to tempo-

rary or permanent suspension. 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 on their work, nor will they be examined unless they make special request therefor. All the facilities for work in the University are open to the students of this college, subject to the approval of the dean. Opportunity is afforded to do advanced work in all branches. Text-books may be obtained after coming to the University.

Rooms and board convenient to the college can be obtained at prices ranging from \$3.00 to \$5.00 per week, according to accommodations.

Furnished rooms without board, from \$5.00 to \$10.00, and unfurnished rooms from \$4.00 to \$7.00 per month.

A list of rooms and boarding places is kept by the secretary of the University Y. M. C. A., to whom inquiries or applications may be addressed.

FEEES.

TWO YEAR COURSE.

First year	\$75.00	
Second year	90.00	
	<hr/>	\$165.00

Students who divide their work into three years pay their fees as follows:

THREE YEAR COURSE.

First year	\$45.00	
Second year	55.00	
Third year	65.00	
	<hr/>	\$165.00

There are no other fees in the regular course. They are payable at the time of registration, but where this is not possible half the annual fees may be paid before entrance, and the remaining half before January 15th. Those desiring to take special work will be required to pay fifteen dollars a subject in the didactic courses and twenty-five dollars in the laboratory courses.

Students will be charged for laboratory material if used unreasonably. At the end of laboratory courses students will be required to pay for breakage and damage to utensils in their care. If a student is careful this charge need not amount to more than two or three dollars. Students are to provide themselves with a set of metric weights, a set of apothecary's

weights and steel spatulas. The expense of these is within two dollars. Students using platinum crucibles are charged for same. Upon the return of the crucible in the original condition the charge is canceled; if the crucible is in any wise damaged the full value is collected from the student. A rental of two dollars per college year is charged for the use of a microscope. All money is payable to the accountant of the University, who will give receipts which must be deposited in the dean's office.

Students will be required, when entering upon laboratory work, to deposit five dollars with the accountant to cover breakage, damage and waste. At the end of the laboratory course any part of the sum unused will be returned to the student.

If a student is forced to discontinue work before the Christmas vacation for sufficient reasons, his lecture fee will be returned pro rata; if he discontinues work for insufficient reason, the fee will be retained and credited pro rata, on any succeeding course of lectures.

Laboratory fees will not be returned, except in case of discontinuance for sufficient reason, before the student has been assigned to a place in the laboratory. It is desirable 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 four or five times each year. For information concerning the Board, address the Secretary, Mr. H. G. Webster, 517 Bank of Commerce Building, Minneapolis, Minn.

COLLEGE OF PHARMACY ALUMNI ASSOCIATION.

The Alumni Association meets annually in the college building the day before commencement, at 3 p. m. Every member of the Association is urgently requested to report change of address to the secretary.

COMMUNICATIONS.

Address all communications to Professor Frederick J. Wulling, Dean, University of Minnesota, Minneapolis, Minn.

Students

GRADUATE STUDENTS, 116.

CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY—45.

- Alcott, A. N., *B. A., Washington and Jefferson University.* Minneapolis
Sociology, Philosophy, History.
- Anderson, Peter J., *B. A.* Helena, N. D.
German, Norwegian, Economics.
- Angus, William, *B. A., '93* Wadena
American Public Economy—Taxation, History.
- Beggs, Walter J., *M. A., Harvard.* St. Paul
Latin, Greek, Hebrew.
- Bergin, Rev. Alfred, *M. A., Augustana.* Cambridge
Semitic, German, Scandinavian.
- Boraas, Julius J., *M. L., '95* Red Wing
Psychology, English, Pedagogy.
- Butters, Frederick K., *B. S., '99* Minneapolis
Botany, Zoology, Geology.
- Coneland, John, *M. A., Princeton.* St. Paul
Sociology, History of Philosophy, Economics.
- Deinard, Samuel A., *De Pauw; U. of C.* Minneapolis
Hebrew, French, German.
- Downey, Hal, *B. A.* Minneapolis
Animal Biology, Medical Anatomy, Bacteriology.
- Festerson, John S., *M. A., Harvard.* Pine Island
Scandinavian, Philosophy, Ethics.
- Findlay, M. C., *M. A., Hamline.* Parkeville, Mo.
Botany, Zoology, Palæontology.
- Firkins, Oscar W., *M. A.* Minneapolis
English, Greek Poetry, Latin.
- Freeman, Edward M., *M. S.* St. Paul
Botany, Embryology, Chemistry.
- Funk, Henry B., *Macalester.* St. Paul
Comparative Philology, Hebrew, History.
- Gibbs, Gertrude E., *B. S., M. S., Cornell.* Everett, Wash.
Botany, German, Zoology.
- Grimsky, Henry J. P., *M. A., U. of W.* St. Anthony Park
Norwegian, English, History.
- Hemingway, Ernest E., *Ripon.* Minneapolis
Animal Biology, Botany, Political Science.

Hillesheim, Catherine, <i>M. A.</i> Botany, Geology, Entomology.	Minneapolis
Holmstedt, Victor E., <i>B. A., Gustavus Adolphus.</i> Mathematics, History, Scandinavian.	Minneapolis
Hone, Daisy S., <i>M. A.</i> Botany, Zoology, Entomology.	Minneapolis
Johnson, Mrs. Julia M., <i>Mt. Holyoke.</i> English, Latin, Philosophy.	St. Paul
Johnston, George H., <i>M. S., '97</i> Philosophy, History, Political Science.	Minneapolis
Kampen, Ingvold Anderson, <i>B. A., '00</i> English, Comparative Philology, Scandinavian.	Minneapolis
Knox, Herbert W., <i>B. A., Cornell.</i> Semitic, English, Philosophy.	Minneapolis
Lantz, Charles E., <i>M. A.</i> Latin, Philosophy, Greek.	Butterfield
Lyon, Harold L., <i>M. S., '01.</i> Botany, Animal Biology, Geology.	Minneapolis
Mattson, Rev. Peter A., <i>Gustavus Adolphus.</i> Semitic, Swedish, German.	Minneapolis
Melom, Carl M., <i>M. A.</i> French, Spanish, Italian.	Minneapolis
Miller, Frederick Casper, <i>B. A.</i> Political Science, History, Geology.	St. Paul
Nelson, Emil A., <i>M. A., '01.</i> Politics, History, Pedagogy.	Minneapolis
Nicholson, Edward E., <i>B. S., Nebraska.</i> Chemistry, Mining, Metallurgy.	Minneapolis
Pease, Levi B., <i>M. S.</i> Chemistry, German, Mining.	Minneapolis
Peck, Mary G., <i>B. A., Elmira.</i> English, History, Comparative Philology.	Minneapolis
Potter, Frances B., <i>M. A., Elmira.</i> English, French, Italian.	Minneapolis
Ringstad, Edward O., <i>B. L.</i> English, Comparative Philology, Old Swedish.	Hector
Rypins, Isaac L., <i>B. L., U. of Cinn.</i> Philosophy, Greek, Semitic.	St. Paul
Shillock, Anna, <i>M. L., '97.</i> German, History, Philosophy.	Minneapolis
Stangeland, Charles E., <i>B. A., Augsburg, M. A., '01</i> Political Science, Latin, Sociology.	Minneapolis
Stapleton, Michael, <i>A. C., Middlebury.</i> Latin, Greek, Sanskrit.	Minneapolis
Swenson, David F., <i>B. S.</i> Philosophy, Greek, Physiology.	Minneapolis
Tilden, Josephine, <i>M. S., '97.</i> Algology, Organic Chemistry.	Minneapolis
Vickner, Edwin J. W., <i>M. A.</i> Scandinavian, French, Teutonic Philology.	St. Peter

- Williams, Charles B., *U. of C.* Minneapolis
Economics, Sociology, Politics.
- Zeleny, Anthony, *B. S.*, '93; *M. S.*, '95. Minneapolis
Physics, Theoretical Mechanics, Mathematics.

FOR DEGREE OF MASTER OF ARTS—47.

- Adams, W. C. T., *Taylor University.* Minneapolis
Pedagogy, Ethics, Philosophy.
- Baker, Franklin Luther, *B. A., Colgate.* Duluth
Geology, Chemistry, Animal Biology.
- Ballard, Gertrude E., *B. A.,* Minneapolis
English, Rhetoric.
- Bentel, Joseph E., *Dennison.* Boise, Idaho
Chemistry, Mineralogy, Physics.
- Burkhard, Oscar Carl, *B. A.*, 'or Preston
German, French, Teutonic Philology.
- Cannon, Bernice M., *B. A.* St. Paul
Philosophy, Biology, History.
- Carlson, Frank, *B. A.* Minneapolis
Scandinavian, Economics, History.
- Driscoll, Alfred E., *University of Manitoba.* Minneapolis
Sociology, English, Philosophy.
- Duncan, Theodore L., *B. S.* Northome
Geology, Forestry, Surveying.
- Foerster, Alma, *B. A.* St. Paul
German, English, Philology.
- Henkel, Isabel, *B. S., Purdue.* Minneapolis
Geology, Botany, Chemistry.
- Holt, Charles M., *B. A.* Minneapolis
Pedagogy, English, Philosophy.
- Huff, Charles, *B. S.* Springfield
Botany, Geology, Social Science.
- Jackson, Charles W., *B. S.* Hallock
Pedagogy, History, Geology.
- Johnson, George Luther, *Carleton.* Cannon Falls
History, Economics, Politics.
- Kells, Lucas C., *B. A.* Sauk Center
Philosophy, Sociology, Pedagogy.
- Kunze, William Frederick, *B. S.,* Red Wing
Physiographic Geology.
- Lillehei, Lars L., *Augsburg.* Beaver Creek
Scandinavian, English, Greek.
- McCann, Charles Maxwell, *B. A.* Minneapolis
English, Comparative Philology, Rhetoric.
- McMinn, Amelia, *B. S., Wisconsin.* Minneapolis
Botany, Geology, Zoology.
- McVey, Kate, *Woman's College, Baltimore.* Des Moines, Ia.
English, Rhetoric, History.
- McWhorter, Lou M., *B. A.* Minneapolis
Roman Satire, Sanskrit, Economics.

Maley, Linda H., <i>B. A.</i> English, Rhetoric.	Minneapolis
Mallory, Helen, <i>B. A.</i> English, Harmony, Philology.	Minneapolis
Mathews, Sarah E., <i>Smith.</i> History, English, Economics.	Minneapolis
Miller, Shirley P., <i>S. D. Agricultural College.</i> Zoology, Cytology, Bacteriology.	Minneapolis
Nixon, Lillian, <i>B. A.</i> English, Philosophy, French.	Minneapolis
Perry, Florence M., <i>B. A.</i> English, History, Philosophy.	St. Paul
Peterson, Gustaf A., <i>Gustavus Adolphus.</i> Swedish, History, German.	Minneapolis
Prendergast, Alice M., <i>B. M.</i> Latin, English Literature, Sanskrit.	St. Paul
Random, Gilbert, <i>B. S., Wisconsin.</i> Physics, Chemistry, Mathematics.	Minneapolis
Sardeson, Eva R., <i>B. A.</i> Comparative Philology, Principles of Criticism, Vertebrate Palæontology.	Minneapolis
Severson, Samuel O., <i>B. A.</i> Philosophy, Pedagogy, Scandinavian.	Brandt, S. D.
Shellenberger, Emma W., <i>B. Ph., Iowa.</i> English, History, German, French.	St. Anthony Park
Smith, Alice Mildred, <i>B. L.</i> English, German, Rhetoric.	Drain, Oregon
Stewart, F. Alexander, <i>B. A.</i> Chemistry, Mathematics, Spanish.	Minneapolis
Swanson, C., <i>O., B. A., Carleton.</i> Agricultural Chemistry, Agriculture, Animal Histology.	Minneapolis
Tawney, Mary A., <i>B. S., Albert Lea College.</i> Mathematics, Physiology, German.	St. Paul
Urseth, Hans A., <i>Augsburg.</i> English, Greek, Philosophy.	Minneapolis
Warner, Florence Maurine. Botany, Physiology, Physiography.	Windsor, Wis.
Rankin, Jean Sherwood, <i>B. S. Ripon.</i> English, Pedagogy, Philosophy.	Minneapolis
West, Ruth, <i>B. A.</i> History, English, Philosophy.	Minneapolis
Westerson, William A., <i>Carleton.</i> History, Political Science, Geology.	White Rock
Weston, Florence M., <i>B. L.</i> Physics, Zoology.	Minneapolis
Whitney, Nellie A., <i>B. A.</i> English Philosophy, German.	Missoula, Mont.
Wulfsberg, Einar, Jr., <i>Luther.</i> English, Latin, History.	Decorah, Ia.

Ylvisaker, Sigurd C., *B. A., Luther.* Hamline
English, Latin, Hebrew.

FOR MASTER OF SCIENCE—2.

King, R. S., *C. S. M.* Minneapolis
Mechanical Laboratory, Shop Economics, Thermodynamics.
Stevens, Jessie E., *B. S.* St. Paul
Mathematical Theory of Electricity, Stresses, Machine Design, Topography, Structural Details.

OTHERS DOING GRADUATE WORK—23.

Alexander, Hugh S., *B. A., Macalester.* St. Paul
Astronomy, Hebrew, Physics.
Andrews, Alice E., *M. A.* St. Paul
English.
Barr, Laura, *B. A., Monmouth.* Monmouth, Ill.
Greek, Sociology, Latin.
Blackmon, J. W. Kindred, N. D.
Physiographic Geology.
Buell, Kate. Rhinelander, Wis.
Physiographic Geology.
Chalmers, Lillian Hatch, *B. S.* Minneapolis
Physical Culture.
Cooper, Walter T., *M. A., Hamilton.* Minneapolis
History.
Dalaker, Hans H., *B. A.* Minneapolis
Mathematics, Mechanics.
Easton, Benjamin G. St. Paul
General Geology.
Erikson, Henry A., *B. E. E.* Minneapolis
Physics.
Graham, E. C.
Mechanics.
Hendrickson, H. N. Minneapolis
Latin.
Huff, Ned, *B. A.* Little Falls
Physiographic Geology.
McLaughlin, Elizabeth, *B. A.* Minneapolis
History, Politics, German.
Mann, Edith L., *B. L.* St. Paul
Latin.
Northrop, George N., *B. L.* Minneapolis
English.
Osborn, E. C. Minneapolis
Politics.
Potter, Marion E., *B. L.* Minneapolis
Jewish History.
Shumway, Royal R., *B. A.* Minneapolis
Mathematics, Mechanics.
Snell, Edith J., *B. A.* St. Anthony Park
English.

Thomas, William I. Politics, History.	Minneapolis
Weeks, L. C., <i>M. D.</i> Water Supply.	Detroit
Weston, Alfred S., <i>M. A., Princeton.</i> History.	Minneapolis

THE COLLEGE OF SCIENCE, LITERATURE AND
THE ARTS.

SENIOR CLASS—184.

Adams, Helen, Minneapolis.	Cadwell, Carrie May, Le Sueur.
Alden, Mary M., Minneapolis.	Choate, Isaac Watts, West Barnet, Vt.
Aldrich, Helen Jane, Denver, Col.	Christopherson, Clara, Faribault.
Ames, Elizabeth Harriet, Litchfield.	Churchill, Irwin Allen, Rochester.
Arnold, Morris Le Roy, Minneapolis.	Clancy, Margaret Agnew, St. Paul.
Aygarn, Martin Hallock, Choice.	Cole, Marjorie H., Minneapolis.
Baker, Merton Franklin, Elgin.	Collins, Louis Loren, St. Cloud.
Barnum, Cyrus Paine, Minneapolis.	Collins, Richard Delos, Windom.
Bean, Alice Annette, New Prague.	Colter, Ester Helen, St. Paul.
Bedford, Caroline Lydia, Provo, Utah.	Cook, Amy Josephine, Minneapolis.
Beede, Ethel Remington, Minneapolis.	Cotter, Mary Scholastica, Austin.
Birnberg, Margaret Rebecca, St. Paul.	Danforth, James Arthur, Parker, S. D.
Blanchar, Clarence Leroy, Fox Lake.	Davis, Scottie Primus, St. Paul.
Blitz, Annie Dudley, Minneapolis.	Dinsmoor, Marian Ethel, Austin.
Bockman, Sigurd, St. Anthony Park.	Docken, Elizabeth Glassford, Edina Mills.
Bolin, Mamie Anglim, Brainerd.	Drake, Clarence Everette, Mitchell, Ia.
Boraas, Ingmar J., Hader.	Dunbar, Louise Estelle, Minneapolis.
Boutelle, Anna Kimber, Marshall.	Dungay, Neil S., Faribault.
Bradford, Eva Austin, Minneapolis.	Dye, John Walter, Winona.
Bradford, Fanny Paine, Minneapolis.	Easton, Leora, Warren.
Brohaugh, C. Mary, St. Paul.	Eaton, Mabelle, Minneapolis.
Bryden, Mabel Clare, Rushmore.	Eide, Carl John, Minneapolis.
Burdick, Emma C., Minneapolis.	Erickson, Theodore August, Alexandria.
	Fagundus, Mary Wilson, Minneapolis.

- Farnsworth, Florence, St. Paul.
 Feely, Mary Corinne, St. Paul.
 Fiske, Mary Ednah, St. Paul.
 Fleming, Mable Clare, St. Paul.
 Fleming, Winnie Avis, St. Paul.
 Foulke, Anne Elsie, St. Paul.
 Frost, Mabel Blanche,
 Norway, Mich.
 Frye, Anna Marion, St. Paul.
 Garrow, Lilian Bird, St. Paul.
 Gibbons, Archibald Ray, Austin.
 Glass, Courtney Thomas,
 Luverne.
 Godward, Blanche Agnes,
 Elbow Lake.
 Goetzinger, Katherine Bertha,
 Fergus Falls.
 Goodsell, Clarence W.,
 Flandreau, S. D.
 Goodwin, Helen Marie, St. Paul.
 Gould, Laura, Minneapolis.
 Grant, Avis Winchell,
 Evanston, Ill.
 Hanson, Albert,
 Eau Claire, Wis.
 Harholdt, Marie, St. Paul.
 Harris, Marian Jane, Lake City.
 Harris, Martha Fallis,
 Minneapolis.
 Harsh, George W., Canton.
 Hawes, Harriet Maria,
 Minneapolis.
 Higginbotham, Blanche Oves,
 Kansas City, Mo.
 Hillesheim, Anna L.,
 Sleepy Eye.
 Hillesheim, Mary Josephine,
 Sleepy Eye.
 Hoerger, Benjamin George,
 Faribault.
 Holm, John Gunnlevy,
 Minneapolis.
 Holt, Charles Mead,
 Minneapolis.
 Houck, Edna Christiana,
 Preston.
 Hovda, Olaf, Duluth.
 Hull, Clara Blanche,
 Minneapolis.
 Hurd, Ina Francis, Minneapolis.
 Hyser, Alice Maude,
 Minneapolis.
- Janney, Emily Florence,
 Minneapolis.
 Jenks, Grace Mae, Minneapolis.
 Jensen, Dagmar Christena,
 St. Paul.
 Jewett, Gertrude Ellen, St. Paul.
 Johnson, Arthur Monrad,
 Minneapolis.
 Johnson, Jennie Helena,
 Casselton, N. D.
 Johnston, Emily Lydia,
 Minneapolis.
 Jones, Marion Isabella,
 Minneapolis.
 Joy, Lillias Anne, St. Paul.
 Kells, Lucas Carlisle,
 Sauk Center.
 Kelsey, Carleton Gale,
 Minneapolis.
 King, Francis LeRoy,
 Ellendale, N. D.
 Koehler, Nora Evelyn,
 Zumbrota.
 Kovarik, Alois F., Spillville, Ia.
 Kraft, Mary Helen,
 Minnetonka.
 Kranz, James Philip, Hastings.
 Lavell, Richard A., Minneapolis.
 Leach, Hugh Ellis,
 Spring Valley.
 Leonard, Ruth, Minneapolis.
 Lewis, Laurel, St. Paul.
 Lippold, William H., Peru, Ind.
 Littlefield, Lura M.,
 Minneapolis.
 Loomis, Earl Alfred,
 Owatonna.
 Lucker, Clara A., Minneapolis.
 Ludwig, Corabelle, Minneapolis.
 McCarriel, Myra, Minneapolis.
 McCurdy, Myrtle B.,
 Minneapolis.
 McCurdy, M. Pearl,
 Minneapolis.
 McGrath, William H.,
 Waverly, Ia.
 McKittrick, Elizabeth,
 Minneapolis.
 McLaughlin, Elizabeth,
 Mapleton.
 McManigal, William Allison,
 St. Paul.

- McMillan, Ethel May,
Minneapolis.
- McMurray, Mable Louise,
Minneapolis.
- Maland, Clarence, Rushford.
- Mannheimer, Elsa, St. Paul.
- Martin, Thomas Roy,
Mantorville.
- May, Grace Jane L., St. Paul.
- Mersen, Alice Margrett,
Hutchinson.
- Moody, Cora Louise,
Minneapolis.
- Nisbit, Jane, Rochester.
- Nord, William Axel, Willmar.
- Norton, Frank Egbert,
Minneapolis.
- Norton, Willis I., Minneapolis.
- Noyes, Edgar Leonard,
Minnetonka Mills.
- Nye, Marshall Albee,
Minneapolis.
- Oberg, Marie Josephine,
Litchfield.
- Oman, Alfred Edward,
Hastings.
- Pattee, Richard Storrs,
Minneapolis.
- Peabody, Eunice Diantha,
St. Paul.
- Pehoushek, Charles,
Minneapolis.
- Peteler, Gertrude May,
Minneapolis.
- Peterson, Horace, Pillager.
- Pettijohn, Mary,
St. Anthony Park.
- Pierce, Clifford V., St. Paul.
- Pierce, Ernest Boynton,
St. Paul.
- Pingry, Frank Richardson,
Minneapolis.
- Poppe, Frederick Harold,
Minneapolis.
- Putnam, Edith Elizabeth,
Minneapolis.
- Read, Sara Juzi, Minneapolis.
- Reid, Eva Christie, Minneapolis.
- Remele, Albert Charles,
Sleepy Eye.
- Rickard, Truman Elwell,
Minneapolis.
- Rockwell, Alice Amelia,
Duluth.
- Rosholt, Lillian Ruth,
Minneapolis.
- Rueth, Agnes T. E., St. Paul.
- Sandstrom, John Ferdinana,
Benson.
- Scripture, Bessie Byrona,
Minneapolis.
- Shedorsky, Sara, St. Paul.
- Sheldon, Eleanor Augusta,
Minneapolis.
- Shuck, Warren Ellsworth,
Rushmore.
- Sjoberg, Edith June, Duluth.
- Skoog, Artie Nettie, Red Wing.
- Smith, Florence Ella,
Minneapolis.
- Smith, Hortense M., Algona, Ia.
- Soderberg, Nathaniel Ferdinand,
Dawson.
- Stebbins, Lillian Brownell,
Minneapolis.
- Stevens, Charles Sidney,
Farmington.
- Stewart, F. Alexander,
Minneapolis.
- Stinchfield, Nellie May,
Rochester.
- Stone, George Hartwell,
Minneapolis.
- Stone, Lilla Grant, Minneapolis.
- Strathern, Moses Lane,
Rich Valley.
- Sydow, Henry Gustave,
Fairmont.
- Teeter, Jennie Lind, Austin.
- Thomas, Josephine Lydia,
Minneapolis.
- Thompson, Edith Lillian,
Spokane, Wash.
- Thomson, Joseph, St. Paul.
- Thornton, Margaret Amelia,
St. Paul.
- Tucker, Florence May,
Chatfield.
- Varco, Albert Raymond,
Minneapolis.
- Veldey, Tedlef, Hanley Falls.
- von Bodenstedt, Eleanor Ma-
thilde, St. Paul.

Warner, Cecil Elisha,	Ashville, O.	Wier, Amelia Louise,	Stillwater.
Washburn, Grace Emma,	Oxford, N. H.	Welles, Albert B.,	Center, N. D.
Watson, Harriet,	Sauk Rapids.	Wold Carl John Adolph,	Minneapolis.
Wayne, Alta M.,	Minneapolis.	Wright, Daisy Mabel,	St. Paul.
Weir, Sue Allen,	Minneapolis.	Youngquist, Charles,	Minneapolis.

JUNIORS—235.

Abbott, John Steele,	St. Paul.	Brooks, Jessie,	Renville.
Adams, Charles Edwin,	Minneapolis.	Browne, Isabelle V.,	Minneapolis.
Aldrich, Addie Rumsey,	Minneapolis.	Buell, Ella Louise,	Minneapolis.
Aldrich, Harry,	Minneapolis.	Buell, Pearl,	Hudson, Wis.
Alexander, Anne Frances,	Lake City.	Bullard, Polly Caroline,	St. Paul.
Alexander, Ida Mary F.,	Carver.	Burbridge, Helen Pauline,	Minneapolis.
Alexander, Sara,	Lake City.	Burnham, Chilo Webb,	Carrington, N. D.
Allyn, Anna Louise,	St. Paul.	Caldwell, Grace Ferne,	Mankato.
Anderson, Abbie,	Wells.	Campbell, Robert Henry,	Burkeville, Va.
Armstrong, James Hamilton,	Luverne.	Carlson, Lily Elizabeth,	Minneapolis.
Austin, Caroline Isabel,	St. Paul.	Carlson, Philip Emanuel,	Cannon Falls.
Bakke, Anna Helen,	St. Louis Park.	Chilton, Almena Jane,	Frazee.
Bank, Albert M.,	Minneapolis.	Clark, Louise Campbell,	St. Paul.
Beck, Maud Gertrude,	Ashland, Wis.	Clarke, Helen,	Algona, Ia.
Belden, Antoinette,	Austin.	Cole, Marion Alice,	Minneapolis.
Belden, M. Perle,	Spring Valley.	Conway, Estelle,	Minneapolis.
Bell, Margaret George,	Minneapolis.	Cooper, Maud Lovina,	Minneapolis.
Bell, Mary Elizabeth D.,	St. Paul.	Cornwell, Georgie F.,	Little Falls.
Best, Sarah,	Fargo, N. D.	Covey, William Sumner,	Minneapolis.
Biermann, Frederick Elliott,	Decorah, Ia.	Cox, Elizabeth Jennings,	Minneapolis.
Blaisdell, Arthur,	Fairmont.	Craig, Agnes Somerville,	Minneapolis.
Bolstad, Alfred C.,	Dawson.	Cramer, Margaret Ethel,	Minneapolis.
Bonwell, Emily Learned,	Blue Earth.	Cressy, Earl Herbert,	Minneapolis.
Boutelle, Louisa Elizabeth,	Marshall.	Crouse, Ella Dix,	Minneapolis.
Boyce, Jessie Wadleigh,	Minneapolis.	Davenport, Murray Taylor,	Minneapolis.
Brandenburg, Elizabeth M.,	Faribault.	Davis, Irma Lee,	Minneapolis.
Brockway, Hart Leebert,	Balaton.		
Brooke, Mrs. Helen L.,	Minneapolis.		

- DeBell, Florence,
Rosebud Agency, S. D.
- deHaas, Virginia Gertrude,
St. Paul.
- DeMeules, Sophie Charlotte,
Minneapolis.
- DeVaney, John P.,
Lake Mills, Ia.
- Dibble, Walter Gordon, St. Paul.
- Doolittle, Leroy Edson,
Luverne.
- Dow, Don Carlos, Worthington.
- Dredge, Belle, Lake Crystal.
- Einarson, Sturla, Duluth.
- Evans, Lina Frances,
Brookings, S. D.
- Everett, Elsie Nettleton,
Minneapolis.
- Fairchild, F. Tracy,
Minneapolis.
- Faunce, Carroll Seth,
Minneapolis.
- Finkle, Kate Talbot, Moorhead.
- Fish, Helen Jennings,
Minneapolis.
- Fitzgerald, Sadie Monica,
Litchfield.
- Foot, Laura A., Red Wing.
- Francis, Harry Edwin,
Osceola, Wis.
- Frank, Sylvania Stern,
Minneapolis.
- Gallagher, Richard, Anoka.
- Garbett, Louise, Minneapolis.
- Gearing, Maud Parthena,
St. Paul.
- Gibson, May, Stillwater.
- Gilmore, Charles Edwin,
Lake Crystal.
- Gilmore, Eph. Irwin,
Minneapolis.
- Gippe, Hilda Marie, Watson.
- Goodrich, Lois Ethel,
Minneapolis.
- Gordon, Mildred C.,
Minneapolis.
- Gove, Helen Ruth, Minneapolis.
- Gray, Raymond Hulbert,
Elk River.
- Greaves, Grace Ethel,
Minneapolis.
- Griebenow, Frederick F.,
Alexandria.
- Grindeland, Synneva, Warren.
- Gunckel, Kathleen Elizabeth,
Minneapolis.
- Halvorson, Ella, Dawson.
- Harden, Elizabeth Carleton,
Minneapolis.
- Harding, Rowena Wilhelmina,
Minneapolis.
- Healy, Bessie Olivia,
Minneapolis.
- Heily, Patrick Robert,
McKinney, N. D.
- Hendrikson, Marie, Ossian, Ia.
- Hensel, Charles N., St. Paul.
- Hollinshead Cornelia,
St. Anthony Park.
- Holmes, Myrtle Evangeline,
Mankato.
- Hunter, Mildred Marion, Tracy.
- Huyck, Ethel Indie,
Minneapolis.
- Ives, Agnes Sherwin,
Minneapolis.
- Ives, Mary, Minneapolis.
- Jacobson, Walter Jacob,
Luverne.
- Janes, Susie, Pipestone.
- Johnson, Adella Tena,
Minneapolis.
- Johnson, Andrew William,
New Richland.
- Johnson, Rose Mathilda,
St. Paul.
- Jones, David M., Wabasha.
- Jorgenson, Louis,
Staplehurst, Neb.
- Kelsey, Inez Adele, Anoka.
- Kendall, Rita Harriet, St. Paul.
- Kennedy, Helene, Minneapolis.
- Kinnard, Bertha Clay,
Minneapolis.
- Kinyon, Edna Abigail,
Owatonna.
- Koch, Albert Charles, Pekin, Ill.
- Kraft, Arthur William,
Groton, S. D.
- Lagerstrom, Ansgar T.,
Minneapolis.
- Lamphere, Eugenie M., St. Paul.

- Rank, Minnie Louise,
Brown's Valley.
- Ransom, John Elmir.
Albert Lea.
- Rawson, Fannie Maria, Wadena.
- Reed, Robert Ray,
River Falls, Wis.
- Rich, Bertha Elizabeth,
Sauk Center.
- Robertson, Jessie Anne,
Minneapolis.
- Robinson, Ellis A.,
Ostrander, O.
- Rosenthal, Rose Bronie,
St. Paul.
- Rowe, William Henry, Jr.,
St. James.
- Ruble, Harry Eustace,
Albert Lea.
- Ruger, Thomas Wright,
Devils Lake, N. D.
- Salisbury, Carolyn T., St. Paul.
- Sanborn, John Benjamin,
St. Paul.
- Sandvall, Ruth Josephine,
Minneapolis.
- Sanford, Roscoe Frank,
Faribault.
- Schermerhorn, Lucien V.,
Berne, N. Y.
- Schouten, Charles Pearsall,
Lisbon, N. D.
- Sewall, Harriet Winslow,
St. Paul.
- Shadewald, Elsie Anna,
Minneapolis.
- Sharpe, Mabel Lovejoy,
Minneapolis.
- Sherman, John C., Winston.
- Sinclair, Arthur Duncan,
St. Thomas, N. D.
- Smith, Carroll Ninde, Pekin, Ill.
- Smith, Emmett W., St. Paul.
- Smith, Lillian Mae,
Minneapolis.
- Smith, Roy Howard, Shakopee.
- Stanley, Lucy Mabel,
Chippewa Falls, Wis.
- Stene, Isabelle Caroline,
Minneapolis.
- Stevens, Fred Walter,
Minneapolis.
- Stromswold, Joseph Christian,
Bellingham.
- Sullivan, May Elane,
Minneapolis.
- Sutton, Cora Olyve, Prioq Lake.
- Taft, Laura Janet, Minneapolis.
- Tennant, Lois Agnes,
Minneapolis.
- Tinompson, Alice Elizabeth,
Minneapolis.
- Thompson, Charles Richard,
Mankato.
- Thompson, Willard Eeles,
Algona, Ia.
- Thomson, Eva F., St. Paul.
- Upson, Arthur W., Minneapolis.
- Van Bergen, Margaret P.,
Minneapolis.
- Vanstrom, Fred Wilhelm,
Dawson.
- Van Wert, Mary Caroline,
Minneapolis.
- Walker, George Thompson,
Devils Lake, N. D.
- Walston, Marion Cragg,
Minneapolis.
- Warrington, Helen Louise,
Minneapolis.
- Webster, Milo DeLancey,
Minneapolis.
- Whited, Oric O., Minneapolis.
- Whittier, Bessie M.,
Minneapolis.
- Williams, Fred Mortimer,
Elk River.
- Willson, Laura Blanche,
Rochester.
- Wirth, Frederick Adolphus,
Minneapolis.
- Wold, Claudia Emilie,
Minneapolis.
- Wold, Ethel Amelia, Austin.
- Woodward, Ruth, St. Cloud.
- Wright, Charles Rolla,
Fergus Falls.
- Wynne, Janet Isabella,
St. Thomas, N. D.

SOPHOMORE—285.

- Abbott, Jessie, Minneapolis.
Ainsworth, May,
 Chippewa Falls, Wis.
Aldrich, Alma Clara,
 Minneapolis.
Anderson, Deborah Marie E.,
 Minneapolis.
Anderson, G. Eldon,
 White Sulphur Springs, Mont.
Andrews, Roy Newberry,
 Mankato.
Atterbury, Marie, Anoka.
Austin, Hattie, Minneapolis.
Aygar, Magnus Hellick,
 Choice.
Baier, Florence Jeannette,
 Jamestown, N. D.
Barnes, Arthur R.,
 Wahpeton, N. D.
Barquist, Elsie Mariam,
 Minneapolis.
Barrows, Vera Judith, Herman.
Bartlett, Madge Laurette,
 Minneapolis.
Beckos, Marie Ashby.
Benson, Leslie E., Wadena.
Bergstrom, C. Walter,
 Minneapolis.
Beyer, Wilhelmina S. C.,
 St. Paul.
Blasdell, Eva Maude,
 Minneapolis.
Bliss, Maude Stewart,
 Minneapolis.
Bofferding, Aline Elsie,
 Minneapolis.
Bonsteel, Belle V., Morris.
Bostrom, August Edward,
 Evansville.
Bowers, Bessie Adelle,
 Redwood Falls.
Bowne, Gertrude, Duluth.
Broberg, Martha L.,
 New London.
Broderick, John Joseph, Byron.
Brown, Cyrus Snell,
 Minneapolis.
Browne, Paul Frederick,
 Aberdeen, S. D.
Bullard, Marjorie Louise,
 St. Paul.
- Bullock, Bernice Vieva,
 Northfield.
Burgan, Essie M., Minneapolis.
Burgess, Florence Emma,
 Minneapolis.
Burton, Beulah Isabel,
 Minneapolis.
Campbell, Carl Graham,
 Burkeville, Va.
Campbell, Georgia E.,
 Princeton.
Card, Evelyn May, Minneapolis.
Carrigan, Charles, Buffalo Lake.
Castor, Florence Rose, Waseca.
Chamberlain, Frances D.,
 Minneapolis.
Chase, Celia Marie, Minneapolis.
Christianson, Christian T.,
 Lac qui Parle.
Clark, Stephens Gilman,
 Stillwater.
Cockburn, Ethel Clark,
 Minneapolis.
Cogswell, Frank, Lake City.
Colburn, Algernon O.,
 Minneapolis.
Constantine, Earl Gladstone,
 St. Paul.
Cornish, Samuel Paul,
 Vernon Center.
Critchfield, Lyman R.,
 Hunter, N. D.
Crogan, Ida Christine,
 Minneapolis.
Crooks, Harriet Marie, St. Paul.
Currer, Alice Isabelle, Le Sueur.
Daly, Walter Aloysius, St. Paul.
Daniels, Edna E., Mitchell, S. D.
Dansingberg, Paul, Minneapolis.
Davidson Raymond,
 Sauk Center.
Dawson, Jennie, Humboldt, Ia.
Dawson, William, Jr., St. Paul.
De Lamere, E. Eleanore,
 St. Paul.
Dickey, Robert Randolph,
 Minneapolis.
Dickinson, Florence Augusta,
 St. Paul.
Diether, Mary Louise, St. Paul.

- Johnson, Esther Laurine,
Minneapolis.
- Kaercher, Minnie Barbara,
Minneapolis.
- Kennedy, Amy Annie,
Clear Lake, Ia.
- Kief, Clara Alma, Murdock.
- Kinnard, Blanche, Minneapolis.
- Kjelland, Andrew Arthur,
Rushford.
- Knowlton, Anna Isabel,
Estherville, Ia.
- Kramer, Arnol Otto, Preston.
- Kummerer, Hettie, Minneapolis.
- La Due, Eva, Fertile.
- La Grange, Myron Hall,
Bloomington.
- Lamphere, Adelaide Ruth,
St. Paul.
- Larson, Lewis, Atwater.
- Larson, Martin, Atwater.
- Lauderdale, Hazel M.,
Minneapolis.
- Lawrence, Mary Wyman,
Wabasha.
- Leonard, Elsie Preston,
Minneapolis.
- Leveroos, Emma C., St. Paul.
- Lindberg, Arvid Claus, Harris.
- Linkfield, Edith Alda,
Minneapolis.
- Litowitz, Annie Sylvia,
Minneapolis.
- Loe Eliza Serene, Minneapolis.
- McElroy, Neva M., Minneapolis.
- McGill, Wilson, St. Paul.
- McIntyre, Ethel Marie,
Minneapolis.
- Mackall, Henry Clinton,
Moorhead.
- McLachlan, Honora Christina,
Glenwood.
- McLaurin, Hamish L.,
Grand Forks, N. D.
- McVoy, Bessie Grace,
Minneapolis.
- Markus, Leola Louise, Duluth.
- Martinson, Ida Emelia,
Maynard.
- Marvin, Hattie Evelyn,
Zumbrota.
- Mason, Kittybelle, Mineapolis.
- Mayo, Helen Maria,
Minneapolis.
- Merrick, Lulu, Austin.
- Miles, Carlton Wright,
Fergus Falls.
- Millar, Catherine, Minneapolis.
- Mills, Abby Lee, Minneapolis.
- Moe, Carl Henry, Minneapolis.
- Monette, Mabelle Sophia,
Minneapolis.
- Moody, Grace Adele,
Minneapolis.
- Moran, Sadie Veronica,
Graceville.
- Moran, Sarsfield Gerald,
Graceville.
- Moreland, Marie Footner,
Birchwood, White Bear.
- Morse, Guy Moses, Minneapolis.
- Moses, Frank Ray,
Marshall, Mich.
- Nebbergall, James Z.,
Sioux Falls, S. D.
- Neilson, Clarence J.,
Mt. Pleasant, Utah.
- Nelson, Clara Isabel, St. Paul.
- Nelson, Melvin Sylvanius,
Dawson.
- Nelson, Nels Frank,
Heron Lake.
- Nesta, Elmina Olsen,
Sioux Falls, S. D.
- Neuman, Wilhelmina Harriet,
Little Falls.
- Newell, Agnes Francis, Morris.
- Newell, Floyd Howard,
Baraboo, Wis.
- Newell, Marie Dorothea,
Minneapolis.
- Newton, Fay Margaret,
St. Paul.
- Norton, William Wellington,
Minneapolis.
- Nyquist, Anna, Eagle Lake.
- Oakes, Reuben Walter,
Worthington.
- Okkelberg, Peter Olaus, Hader.
- Olberg, Clara Mabel,
Minneapolis.
- Olsen, Theresa Anna,
Minneapolis.

- Olson, Oliver Siggeir,
West Duluth.
- Overmire, Jessie Starr, Eureka.
- Papst, Grace Edith Marie,
Minneapolis.
- Parker, Florence Josephine,
Faribault.
- Partridge, Jarvis M.,
Grand Rapids.
- Pattee, Sidnee, Minneapolis.
- Peterson, Adolph Conrad,
Brooklyn, N. Y.
- Peterson, Annie Mathilde,
Minneapolis.
- Phillips, Ruby Gwenelian,
Minneapolis.
- Pomeroy, Alice Lydia,
Minneapolis.
- Powers, Arba Joseph,
Granite Falls.
- Putnam, Fred Warren,
Red Wing.
- Radcliffe, Grace Irene,
Minneapolis.
- Raihle, Florence Maria,
Chippewa Falls.
- Randall, John Ralph,
Minneapolis.
- Reed, Edith Louise,
Minneapolis.
- Reed, Horace Garner,
Minneapolis.
- Richard, Homer Ernest,
Little Falls.
- Rittle, Rose Dolores, St. Paul.
- Robertson, Archibald Wright,
Litchfield.
- Robie, Guy Richmond,
Superior, Wis.
- Roe, Viola Anna, Hudson, Wis.
- Ronning, Ole Edward,
Norwegian Grove.
- Rosenstein, Dora B.,
Minneapolis.
- Ross, Ethel Calfine, Lake City.
- Running, Albert, St. James.
- Sanborn, Charlotte,
Minneapolis.
- Sanborn, Lottie Eldora,
Minneapolis.
- Schaetzel, Jacob Alonzo,
Minneapolis.
- Schnell, Eleanora L.,
St. Charles.
- Schoch, Alice Barbara, St. Paul.
- Shannon, Harriet Frances,
Duluth.
- Sheldon, Walter B.,
Minneapolis.
- Sigler, Clarence H.,
Sioux Falls, S. D.
- Sinclair, John Franklin,
St. Thomas, N. D.
- Slaven, Estella, Austin.
- Smith, Carrie H., Minneapolis.
- Smith, Eloise, Brainerd.
- Smith, Helen Maude,
Minneapolis.
- Smith, Mabel Edna,
Minneapolis.
- Smith, Pearl, Minneapolis.
- Snyder, Fred Alton, Austin.
- Spooner, Paul Lord Morris.
- Stakman, Elvyn Charles,
Brownton.
- Steichen, Victoria Anna,
Northwood, Ia.
- Stewart, Alice May, Mankato.
- Stewart, Mark Leonard, Mabel.
- Stinson, Blanche A.,
Sheldon, Ia.
- Stocking, Mabelle Vail,
Minneapolis.
- Stratton, Paul Don,
Granite Falls.
- Stroud, Arthur Dexter, Mabel.
- Sublette, Io, Minneapolis.
- Suffel, George Edward, Duluth.
- Sullivan, Kathryn, Adrian.
- Sundt, Mathias, Madelia.
- Sutton, Charles Stewart,
Prior Lake.
- Swanson, Elaine Elizabeth,
Red Wing.
- Taney, Katherine M., St. Paul.
- Taylor, Kenneth, St. Paul.
- Thompson, Antoinette,
Montevideo.
- Thompson, Harry J.,
Montevideo.
- Thompson, Nellie Lovinna,
Minneapolis.
- Thompson, Stuart McMillan,
Minneapolis.

- Truesdell, Eloise Neville,
St. Anthony Park.
- Tucker, Bessie Mae,
Minneapolis.
- Ulen, George Christian,
Minneapolis.
- Vallentyne, Lydia,
Neihart, Mont.
- Van Bergen, Hattie,
Minneapolis.
- Van Rickley, Nellie Margaret,
Minneapolis.
- Vickery, Roy Albion, Mora.
- Walker, George Alden,
Minneapolis.
- Walsh, Cassia Norena, St. Paul.
- Ward, Hazel May, Glenwood.
- Wasser, Maud Ethel,
Minneapolis.
- Wasser, Ruby Susan,
Minneapolis.
- Watson, Agnes Merritt, St. Paul.
- Watts, James Thompson,
Mankato.
- Way, Clara Lucile, Minneapolis.
- Wennerlund, Camilla,
Minneapolis.
- Werner, Nils Owen, Jr.,
Minneapolis.
- West, Margaret Christie,
Minneapolis.
- West, Rodney Mott,
Minneapolis.
- Weum, Anna, Minneapolis.
- Weum, Thurston William,
Minneapolis.
- Weyrens, Joseph Peter,
St. Nicolas.
- Wheeler, Josephine Marie,
Minneapolis.
- Wheeler, Mabel Amelia,
Minneapolis.
- Whitcomb, Esther Elizabeth,
Atwater.
- Whitney, Anna May, Rochester.
- Williams, George Elmer,
Randolph, Wis.
- Williams, Vesta Flavilla,
Brooklyn Center.
- Wilson, John Joseph, Lydia.
- Wiseman, Lucy Pearl, Pine City.
- Wistrand, Edwin Richards,
Excelsior.
- Wright, Walter Oscar,
Westfield, Vt.
- Yaeger, Floyd F., Webster, S. D.
- Young, Hattie M., Appleton.

FRESHMAN CLASS—453.

- Allen, Jessamine Evangeline,
Minneapolis.
- Anderson, Annetta Agnes,
Estherville, Ia.
- Anderson, Ella Mary, Hibbing.
- Anderson, G. Eldon,
Minneapolis.
- Anderson, Paul August,
Minneapolis.
- Arndt, William Frank,
Stillwater.
- Atwater, Florence Fay, St. Paul.
- Babcock, Donald Campbell,
Minneapolis.
- Bacon, Lora Darlene,
Minneapolis.
- Badger, Walter Lucas,
Minneapolis.
- Bahr, Arnold C., Waseca.
- Barber, Marion Louise,
Minneapolis.
- Barnes, Katherine, Minneapolis.
- Barnes, Marie, Fargo, N. D.
- Barnes, Percia Margaret,
Lake Crystal.
- Barney, Leon Amtrose,
River Falls, Wis.
- Barrett, Edith Margaret,
Stillwater.
- Barse, J. Raymond, Minneapolis.
- Batson, M. Josephine,
Pine Island.
- Bearnes, Clara Hughes,
Minneapolis.
- Bearnes, Julia Gray,
Minneapolis.
- Bedford, Clayton Delos,
Rushmore.
- Berger, Edla Gustavia, St. Paul.
- Berkman, Helen Phoebe,
Rochester.
- Best, Ina, Fargo, N. D.

- Bickford, E. Albi, Maine.
 Bicknell, Blanche L.,
 Minneapolis.
 Blackwell, Hiram Ross,
 Minneapolis.
 Blakeley, Bonnie Eleanor,
 White Bear.
 Bliss, Margaret Sidle,
 Minneapolis.
 Blomgren, Edwin Alfred,
 St. Paul.
 Bogart, Madge Tozer,
 Minneapolis.
 Bond, Harold H., St. Paul.
 Booren, Clifton Augustus,
 Stillwater.
 Borchardt, William Arthur,
 Snerburn.
 Bowler, Edna Beatrice,
 Minneapolis.
 Boyd, Leon Morelle,
 Alexandria.
 Boynton, Clifford, St. Paul.
 Brazie, Florence, Minneapolis.
 Brearley, Harriet Hamilton,
 Minneapolis.
 Brill, Kenneth Gray, St. Paul.
 Brimmer, Archie Eli, St. Paul.
 Brooberg, Ethel Seraphia,
 Minneapolis.
 Brooks, Pearl Mary,
 Minneapolis.
 Broom, Edna M., Minneapolis.
 Brown, Bert H., Granite Falls.
 Brown, Hazel, Minneapolis.
 Brown, Montreville Jay, Morris.
 Bryden, Jessie June, Rushmore.
 Buckley, John, Farmington.
 Buell, Julia Thurber,
 Minneapolis.
 Bull, George Walter,
 Minneapolis.
 Burke, Teresa Anastasia,
 Janesville.
 Burnett, W. Edward, St. Paul.
 Burns, Carl E., Mason City, Ia.
 Burns, Ellen Agnes, Hopkins.
 Burns, Herbert Arthur, Stewart.
 Burton, Florence Annette,
 Minneapolis.
 Butler, Anna, Minneapolis.
 Butler, Marietta, Minneapolis.
- Byrnes, George Goodrich,
 Minneapolis.
 Cady, Edward Philip, Pipestone.
 Campbell, Alma B.,
 Minneapolis.
 Campbell, Anna Jean, Hopkins.
 Campbell, Helen Spence,
 Fort Snelling.
 Campbell, Roy English,
 St. Paul.
 Cawley, Margaret Gray,
 Pipestone.
 Chambers, Gertrude, Aurora, Ill.
 Chapman, Emily K.,
 Sioux Falls, S. D.
 Clark, Frances Mildred,
 Minneapolis.
 Clark, Harry J., Wells.
 Clark, James Kendall,
 Minneapolis.
 Clark, Marjorie, Omaha, Neb.
 Clutter, Guy Earl, Anoka.
 Coapman, Wall G.,
 Columbus, Wis.
 Cockburn, Ethel Clarke,
 Minneapolis.
 Cograve, Pansy Blossom,
 St. Paul.
 Cogswell, Frank, Lake City.
 Cole, Vera Vivian, Minneapolis.
 Converse, Rose Katherine,
 Palatine, Ill.
 Cooper, Florence, Minneapolis.
 Copley, Mary Elizabeth,
 St. Paul.
 Cornish, George,
 Vernon Center.
 Corson, Helen Hovenden,
 Minneapolis.
 Cosgrove, Myrtie Alice,
 Le Sueur.
 Cox, Ella Goldsworthy, Cloquet.
 Crosman, Rose Anna,
 Minneapolis.
 Crouse, Agnes Ray,
 Minneapolis.
 Dahl, Anna Dorothy,
 Minneapolis.
 Dahlberg, Effie Harriet,
 Minneapolis.
 Dahleen, Henry, Granite Falls.
 Dart, Raymond H., Litchfield.

- Davenport, John Edgar,
Minneapolis.
- Davis, Theodore Albert,
Audubon.
- Davis, Walter George, Windom.
- Dean, Helen Marjorie,
Minneapolis.
- Delmore, John Leo,
Marshfield, Wis.
- De Veau, Katherine Lee,
Minneapolis.
- Dever, Martha, Minneapolis.
- Dickey, Robert Randolph,
Minneapolis.
- Dickinson, Grace, Buffalo.
- Diether, Althea, St. Paul.
- Donovan, Kathryne, Clontarf.
- Dorr, Henry Bryan, St. Paul.
- Dowdall, Augustus Sylvester,
Minneapolis.
- Dredge, Stella McMillan,
Lake Crystal.
- Dreves, Carl Armin, St. Paul.
- Dunlop, Madge Love, St. Paul.
- Dunn, Mary Irene, St. Cloud.
- Dyar, Ralph Emerson, Winona.
- Ebert, Michael Higgins,
Glencoe.
- Egerton, Margaret Godwin,
St. Paul.
- Edsall, James Kirtland,
Minneapolis.
- Eheim, Christopher Clarence,
Glencoe.
- Ellison, Culver, Minneapolis.
- Engdahl, John Louis,
Minneapolis.
- Erickson, Edna Virgiana,
Red Wing.
- Esser, John, Austin.
- Eusterman, George Bysse,
Lewiston.
- Evans, Gertrude Sophia,
Miles City, Mont.
- Faegre, Minnie Lorena,
Flandreau, S. D.
- Fairfield, Elizabeth Pillsbury,
Minneapolis.
- Farwell, Edith Lucinda,
Zumbrota.
- Fay, Opal Stella, Minneapolis.
- Fisher, Irving Louis,
Sauk Center.
- Fluke, Helen Frances, Herman.
- Flynn, Francis Earl, Lake City.
- Flynn, Robert E., Caledonia.
- Fosness, Walter Edwin,
Montevideo.
- Frelin, Julius Theophilus,
Faribault.
- French, Merritt, Hibbing.
- Frisbee, Gertrude M.,
Sheldon, Ia.
- Froelich, Anna Lucette,
St. Paul.
- Frye, Lucius Arnold, St. Paul.
- Fulkerson, Jay Everett,
Zumbrota.
- Gaasch, James Erle,
Minneapolis.
- Gallup, Helen Tolman,
St. Cloud.
- Gardner, John William,
Big Stone.
- Gardner, Ray, Mantorville.
- Gates, Cassius Emerson,
Alma City.
- Gaus, Mildred Belle,
Minneapolis.
- Gee, Gertrude Lucy, Monticello.
- Goddard, Jessie Celestine,
Hurley, S. D.
- Goddard, Maud, Athol, Mass.
- Gould, Edna Hall, Rushford.
- Gowan, Lillian, Duluth.
- Graves, Nora Florence, St. Paul.
- Green, Grace Elberta,
Minneapolis.
- Green, Helen Lotta,
Minneapolis.
- Griggs, Richard Leslie, Virginia.
- Grime, Florence Lavinia,
Minneapolis.
- Grindeland, Clarice, Warren.
- Guinan, Margaret Mary,
Webster City, Ia.
- Guthrie, Florence Katherine,
Blooming Prairie.
- Haas, M. Loretto, St. Paul.
- Haggard, Mildreth Janet,
Minneapolis.
- Hainert, Frank Henry,
Minneapolis.

- Hammond, Lola, Minneapolis.
Hansen, Anna Katherine,
 St. Paul.
Hansen, Mabel Julia Celinda,
 Alden.
Hardesty, William Howe,
 Minneapolis.
Hartson, Daisy June,
 Minneapolis.
Harsh, Bessie Rathbun, Duluth.
Hare, Howard Hurlburt,
 Minneapolis.
Hass, Lily, Wheaton.
Hasson, Alice, St. Paul.
Hayes, Michael Francis,
 Lanesboro.
Haynes, George Oliphant,
 St. Paul.
Heebner, Harry Clinton,
 Elk River.
Heffner, Sarah Corinne,
 Minneapolis.
Heffron, Gussie Beatrice,
 Bemidji.
Heintz, Golda Mae,
 Minneapolis.
Hellickson, Blanche Mae,
 Minneapolis.
Helson, Mary Clymo, St. Paul.
Henderson, Richard Gordon,
 St. Paul.
Hicks, Frances, St. Paul.
Higbee, Marie Alice,
 Minneapolis.
Higgins, Adele Lucile,
 Minneapolis.
Higgins, Fannie, Minneapolis.
Higgins, Henry Malcolm,
 Minneapolis.
Hill, Helen, St. Cloud.
Hill, Ruth Harriet, Minneapolis.
Hille, Clara Elizabeth,
 Fergus Falls.
Hills, Isabelle Marian,
 Minneapolis.
Hitchings, William Sidney, Jr.,
 Sutherland, Ia.
Hodgman, James Nelson,
 St. Paul.
Hofflin, Florence Louise,
 Hopkins.
Hoffman, Harold William,
 Minneapolis.
Holmberg, Edith Antonia,
 Renville.
Hopkins, Marian Belle,
 York, Neb.
Howard, Lewis Dascombe,
 St. Paul Park.
Hubbard, William Ayer,
 Minneapolis.
Huelster, Luella, St. Paul.
Hulett, Maud, St. Peter.
Hull, Mabel Beatrice,
 Litchfield.
Hunt, Walter James, Austin.
Hunter, DeKoven, Minneapolis.
Huntley, Earl Webster,
 Spring Valley.
Hutchinson, Lura Claire,
 Minneapolis.
Hyde, Lawrence Percy,
 Minneapolis.
Hyser, Alice Caroline,
 Breckenridge.
James, Frances, St. Paul.
Jedlicka, Alexander Ivan, Vesta.
Jenson, Anna Christine,
 Hopkins.
Jessup, Ruth, Tracy.
Johnson, Annie Marie,
 Minneapolis.
Jones, Myrtle Mary,
 Minneapolis.
Jones, Nina K., St. Paul.
Jones, Perrie, Wabasha.
Jones, William Moore,
 Lisbon, N. D.
Josephson, Chester Abraham,
 Red Wing.
Judd, Evelyn Ayers,
 Minneapolis.
Kahn, Robert William, Glencoe.
Kane, Adelia Stella, Lanesboro.
Keating, Monica Catherine,
 St. Paul.
Kelley, Esther Bernardine,
 St. Paul.
Kennedy, Augustus Hoeveler,
 St. Paul.
Kennedy, Edward Philip,
 Marshall.
Keyes, Louise, Minneapolis.

- Moir, Marian Walker,
Minneapolis.
- Moore, Harriet Dunbar,
St. Paul.
- Mordoff, Charles Espy,
Minneapolis.
- Morgan, Mary Brownson,
Minneapolis.
- Morgan, Ulmer Harry,
Minneapolis.
- Moulton, Dora H., Dawson.
- Moulton, Roy Jasper, Dawson.
- Muir, Robert Wheelock,
Hunter, N. D.
- Mundale, Helmer, Blue Earth.
- Murfin, Jennie, Minneapolis.
- Murphy, Ignatius, Lakefield.
- Myrum, Mertie, Louisberg.
- Nehls, Lewis F. E.,
Independence, Ia.
- Nelson, Charles Marion,
Humboldt, Ia.
- Nelson, Hattie Ruth,
Minneapolis.
- Nelson, Nels Louis,
Hutchinson.
- Nilson, Clifford Norman,
Morris.
- Norton, Clyde Wood,
Lisbon, N. D.
- O'Brien, Emma Flora, St. Paul.
- Oliver, Fred, Lisbon, N. D.
- O'Neil, Edward Joseph,
Graceville.
- Opp, Paul Alfred, Hegbert.
- Osborn, Eleanor, Mankato.
- Ostergren, Florence Caroline,
St. Paul.
- Ott, Hildergarde Louise E.,
Minneapolis.
- Oyen, Martin, Watson.
- Page, Wright Benton,
Minneapolis.
- Palmer, Harlan Guyan,
Le Roy.
- Palmer, Helen Brodrick,
St. Paul.
- Palmeter, Charles Coleman,
Clear Lake.
- Parker, Ross Morris,
Lisbon, N. D.
- Partridge, Jennie Wormington,
Minneapolis.
- Paulsen, Edward Ludwig,
Linden.
- Peck, Earl Arthur, Minneapolis.
- Pederson, I. Alice, Rothsay.
- Pennock, Alma Gertrude,
Minneapolis.
- Perkins, Claude Cecil,
Pine Island.
- Perry, Clarence George,
St. Paul.
- Peterson, Albert Victor,
Minneapolis.
- Peterson, Cora Anna,
Elbow Lake.
- Pfaff, Helen Elizabeth, St. Paul.
- Phalon, Henrietta M., Detroit.
- Phelps, Aura Idella,
Minneapolis.
- Phelps, Edith May,
Minneapolis.
- Piper, Monte Charles,
Mankato.
- Podlasky, Harry,
Milwaukee, Wis.
- Pohlmann, Edward John,
New Albin, Ia.
- Poppe, Walter Henry,
Minneapolis.
- Potter, Alden Archibald,
Minneapolis.
- Powers, Mary Naomi,
Granite Falls.
- Prouty, Mabel Alice,
Minneapolis.
- Pye, Mary Louise,
Minneapolis.
- Quackenbush, Harry Charles,
West Concord.
- Radichel, Paul Henry,
Lake Crystal.
- Randall, Claude David,
St. Paul.
- Randall, Harry Lawrence,
Mankato.
- Ransom, Albert Richardson,
Newton, Ill.
- Reed, Fred Barnum,
Decorah, Ia.
- Ressler, Maud Leonie,
Minneapolis.

- Rich, Elizabeth, Minneapolis.
 Ricker, Max Wilcox,
 Minneapolis.
 Rigg, Peter Magnus,
 Glenwood.
 Robb, Walter Clarence,
 Minneapolis.
 Robertson, Alvin John,
 Sleepy Eye.
 Rockwood, Ethel, Minneapolis.
 Rogers, Margaret,
 Independence, Ia.
 Ross, Clara Elizabeth,
 Springfield.
 Rossman, Arthur Gale, St. Paul.
 Rossman, Claud Willard,
 Minneapolis.
 Roth, Margaretta Edna,
 Robbinsdale.
 Ryan, Anna Cecilia, St. Paul.
 Ryan, Margaret Anne, Duluth.
 Sachs, Gustave Michael,
 New Prague.
 Sage, Lour Clarence,
 Denison, Ia.
 Schaller, Rose Marie,
 Hastings.
 Schuknecht, John Robert,
 Tripoli, Ia.
 Schummers, William Arthur,
 Caledonia.
 Schutz, Rolland Hunt,
 Marshall.
 Schuyler, Florence Theresa,
 Fargo, N. D.
 Schwartz, Louis Leon,
 Minneapolis.
 Seiter, Roy Charles, New Ulm.
 Shields, Ethel Evelyn, St. Paul.
 Siebke, George Bird, Beehyn.
 Sims, Hortense, White Bear.
 Skinner, Frances Eleanor,
 Minneapolis.
 Sly, Florence Albertta,
 Minneapolis.
 Smetana, Edward E., Hopkins.
 Smith, Daniel Dana, Caledonia.
 Smith, George Hill, Excelsior.
 Smith, Grace Isabelle,
 Minneapolis.
 Smith, Henry Albert,
 Westbrook.
 Smith, M. Irene,
 Miles City, Mont.
 Smith, Irma Potter,
 Minneapolis.
 Smith, Waldo Huntington,
 Minneapolis.
 Soboleski, Laura Charlotte,
 Winona.
 Solie, Simon, Delavan.
 Souba, Frederick Joseph,
 Hopkins.
 Sparks, Hannah Dorcas,
 Minneapolis.
 Spooner, Ethel Boynton,
 Minneapolis.
 Springer, Raymond D. N.,
 Anoka.
 Stadfield, Clayton Grube,
 St. Paul.
 Stamm, Frieda Louise, St. Paul.
 Stanford, Helen Gertrude,
 Kelso, N. D.
 Stansberry, Nellie, Willmar.
 Stebbins, Mary Somerby,
 Minneapolis.
 Stegner, Ezra Garfield,
 Minneapolis.
 Stenberg, Theodore, Ormsby.
 Stevens, Charlotte Isabelle,
 Faribault.
 Stevens, Helen, Minneapolis.
 Stevens, Lily Louise,
 Minneapolis.
 Stickney, Cynthia Irene,
 Sioux Falls, S. D.
 Stinchfield, Minnie, Rochester.
 Stough, Charlotte,
 Minneapolis.
 Stratton, Alice DeEtte,
 Minneapolis.
 Styve, G. B. Lauritz,
 Lake Mills, Ia.
 Svarstad, Ole J., Bath, S. D.
 Sweeney, John Edward,
 Norwood.
 Sweet, Earl, Blue Earth.
 Swenson, Edward Francis,
 Luverne.
 Swenson, Freda Emily,
 St. Paul.
 Swenson, Sabra Serene,
 New London.

- Swenson, Swen Warren,
Ellsworth, Ia.
- Switzer, Abbie D.,
Minneapolis.
- Switzer, Harriet Pearl,
Minneapolis.
- Switzer, Mabel Estelle,
Minneapolis.
- Taafe, Agnes Kathryn,
Minneapolis.
- Taney, Cora G., St. Paul.
- Tanner, William Roy,
Minneapolis.
- Taylor, Harold George,
Minneapolis.
- Teasdale, Frank Wallace,
St. Paul.
- Thayer, Frances Ellen,
Minneapolis.
- Theisen, Elnora Barbara,
Minneapolis.
- Thomas, Helen Mary,
Minneapolis.
- Thompson, Grace Elizabeth,
Minneapolis.
- Thompson, Herbert H.,
St. Paul.
- Thompson, Winnifred Eva,
Wayzata.
- Tillotson, Mary, Moorhead.
- Tomlinson, Mary, Le Sueur.
- Towler, Edna Elizabeth,
Minneapolis.
- Trielhoff, Alma Julia, Carver.
- Tripp, Gertrude Abbie,
Red Wing.
- Tubbs, Florence Maud,
Minneapolis.
- Tupper, Mary Lillian,
Minneapolis.
- Vance, Marjorie Evangeline,
Decorah, Ia.
- Van De Water, Marcus De
Otto,
Blue Earth.
- Van Vorst, Melvin J.,
New Paynesville.
- Vidger, Clare May, Fargo, N. D.
- Von Kuster, Edith,
Minneapolis.
- Wagen, Charles Henry,
Mankato.
- Wagner, Anna Elizabeth,
New Richland.
- Walker, Adele Frances,
Minneapolis.
- Walker, Gale Newell,
Pipestone.
- Wallace, Edna Vera,
Minneapolis.
- Wallace, Jennie Ethel,
Humboldt, Ia.
- Walston, Mary Genevieve,
Minneapolis.
- Weed, Mary Margaret,
Mankato.
- Weitzel, Grace Beatrice,
Minneapolis.
- Welch, Mary Louise, St. Paul.
- Welles, Denton Rudgers,
Center, N. D.
- Wells, William Raymond,
Aberdeen, S. D.
- Welsh, Arthur John Joseph,
St. Paul.
- Westphal, Gilbert Daniel,
Red Lake Falls.
- Whitney, Helen, Minneapolis.
- Wilk, Jacob, Minneapolis.
- Williams, Anna Elizabeth,
St. Paul.
- Williams, Fay Bailey, St. Paul.
- Williams, Gertrude Hannah,
Minneapolis.
- Williams, Hugh Owen,
Lake Crystal.
- Wilson, Lora Lee,
Hannibal, Mo.
- Wilson, Ray, Minneapolis.
- Wilson, Ruth Ellen,
Minneapolis.
- Wistrand, Frederick Allen,
Excelsior.
- Woodward, Herbert Starr,
Minneapolis.
- Yoerg, Martha Alma, St. Paul.
- Zoerb, Edward Franklin,
Algoma, Wis.

UNCLASSED STUDENTS—95.

- Bachtle, Carrie A., Mapleton.
 Backus, Mrs. Elizabeth H.,
 Minneapolis.
 Benson, Clarence H.,
 Minneapolis.
 Berget, Herman, Boyd.
 Bjelde, Peter A., Perley.
 Boo, Benjamin Carlton,
 Stillwater.
 Boyce, Ida Margaret,
 Minneapolis.
 Brewer, Catherine DeWolf,
 Marshall, Mich.
 Bruce, Ellen Mary,
 St. Anthony Park.
 Burnham, May D., Minneapolis.
 Burns, Maria, Minneapolis.
 Burwell, Louise, Minneapolis.
 Calhoun, Frederic David,
 Minneapolis.
 Cook, Mrs. Julia M., St. Paul.
 Craven, Jennie Grant,
 Faribault.
 Dart, Izella Mabel, Litchfield.
 Dodge, Dorothy Mary,
 Minneapolis.
 Dunn, Ella May, Minneapolis.
 Elskamp, Leo, Minneapolis.
 Erickson, Theodore August,
 Alexandria.
 Fagundus, Aimee Josephine,
 Minneapolis.
 Firestone, Emma Almira,
 Mankato.
 Frost, Edith L., Minneapolis.
 Getchell, Ella Gardiner,
 Minneapolis.
 Grant, William Wallace,
 St. Paul.
 Griswold, Agnes Albee,
 Minneapolis.
 Healy, Mary Eva, Minneapolis.
 Hellickson, Eva M.,
 Minneapolis.
 Hickok, Amy Elmina, St. Paul.
 Hills, Minnie Louisa, St. Paul.
 Hiscock, Jennie Isabelle,
 Minneapolis.
 Hodgson, Marie, Minneapolis.
 Holm, Nils Juul, Stewartville.
- Hubbard, Zeta Lorena, St. Paul.
 Hugo, Rene Trevanion, Duluth.
 Inglis, Rewey Belle,
 Minneapolis.
 Ives, Mrs. Ida S., Minneapolis.
 Jacobson, Mrs. Karen Miller,
 Alexandria.
 Johnson, Anna Carolyn,
 Minneapolis.
 Johnson, Maude Vivian,
 Minneapolis.
 Kibby, Adelaide Sypes,
 Granite Falls.
 Kingsley, Myra, Minneapolis.
 Knight, Louisa B., Minneapolis.
 Knoblauch, Louise,
 Minneapolis.
 Krienke, Lydia, Osseo.
 Lawrence, Hortense,
 Minneapolis.
 Lockman, Jessie Flavia,
 Minneapolis.
 Longyear, Nevada P.,
 Minneapolis.
 Lusk, Charles Faulkner,
 Minneapolis.
 McFarlane, Charlotte,
 Minneapolis.
 Michaelson, Klara M.,
 Minneapolis.
 Moen, Henry, Nelson.
 Nachtrieb, Mrs. Anna,
 Minneapolis.
 Nelson, Nels P. B., Rosendale.
 Neustadt, Berthold Robert,
 Minneapolis.
 Oliver, Amy Silver,
 Eau Claire, Wis.
 Patterson, Mabel Irene,
 Longbeach, California.
 Polley, Jessie Maria,
 Minneapolis.
 Prendergast, Mary Agnes,
 Minneapolis.
 Prouty, Florence E.,
 Minneapolis.
 Pullen, David S., Minneapolis.
 Quackenbush, Elizabeth Cebra,
 Le Sueur.
 Read, Carolyn, Minneapolis.

- Redfield, Alice W., Minneapolis.
 Ressler, Maud Leonie,
 Minneapolis.
 Riggs, Helen Georgina,
 Minneapolis.
 Robison, Carolyn May,
 Wessington Springs, S. D.
 Ruscoe, Mrs. Ella C.,
 Minneapolis.
 Ryerse, Lotta Louise,
 Minneapolis.
 Schaefer, William C. L.,
 St. Paul.
 Schain, Josephine,
 Browns Valley.
 Sherman, Dora, St. Paul.
 Simonson, Eda Sophya,
 Minneapolis.
 Southworth, Mira Morrison,
 Minneapolis.
 Sowden, Bessie Pearl,
 Minneapolis.
 Steele, Lucretia Grey,
 Princeton, Ill.
 Stephens, Stella Mae,
 Minneapolis.
 Steward, Maud H., Minneapolis
- Stilwell, Grace Elizabeth,
 Minneapolis.
 Sullivan, Hanna, Wadena.
 Thompson, Edith Belle,
 Houston.
 Timberlake, Mrs. Lilian Chat-
 terdon,
 Minneapolis.
 Ting, Joseph, St. Paul.
 Troutfether, Albert, Windom.
 Truesdell, Harriet May,
 Minneapolis.
 Tryon, Myrta Amanda,
 Minneapolis.
 Tuseth, Jeanette Lenora,
 Osseo.
 Van Cleve, Rebecca Wood-
 bridge,
 Minneapolis.
 Wallace, Lulu May, Lake Sarah.
 Webster, Mrs. Florence Payne,
 Minneapolis.
 Weston, Florence, Minneapolis.
 Wilcockson, Lillian May,
 St. Paul.
 Willford, Mabel, Minneapolis.
 Willoughby, Pearl, Minneapolis.
 Wood, Nancy Howe, St. Paul.

THE SCHOOL OF CHEMISTRY.

IN ANALYTICAL CHEMISTRY.

SENIORS—4.

- Grout, Frank Fitch,
 Rockford, Ill.
 Gutsche, Edward Jacob,
 Glencoe.
- Hopkins, Joseph Irwin,
 Bloomington.
 Rose, Anton Richard,
 Marine Mills.

JUNIORS—8.

- Borrowman, George L.,
 Stillwater.
 Dahlberg, Arnold Victor,
 Minneapolis.
 Frary, Francis Cowles,
 Minneapolis.
 Jackson, Myron Bangs, St. Paul.
- Le Beau, Henry Charles,
 Little Falls.
 Longworth, Fred James,
 Ortonville.
 Pennock, Edward McMaster,
 Minneapolis.
 Poore, Charles Delos,
 Bird Island.

SOPHOMORES—2.

- Bernhagen, Otto Lewis,
 Minneapolis.
- Huyck, Edgar Cecil,
 Minneapolis.

FRESHMEN—17.

Anderson, Edward, Minneapolis.	Neumann, John Xavier, New Ulm.
Cressy, Charles Royal, Minneapolis.	Nye, George Morton, Minneapolis.
Davies, Edwin Thomas, Minneapolis.	Porter, A. Harold, Minneapolis.
Doran, James Maurice, Rochester.	Powell, Archibald Olin, Jr., St. Paul.
Hill, Charles Warren, Hartley, Ia.	Schultz, Albert Fred, Sleepy Eye.
Ingberg, Simon H., Hendrum.	Schultz, Francis Benjamin, Sleepy Eye.
Kennedy, William Walker, Rochester.	Starrett, Edward Chamberlain, Minneapolis.
Lane, Cora Margaret, Minneapolis.	Stover, Charles Ernest, Minneapolis.
Manuel, Earle Vincent, Minneapolis.	

UNCLASSED—3.

Hills, Fred Robert, Menomonie, Wis.	Poore, Orson Birney, Bird Island.
	Sine, Charles, Minneapolis.

IN APPLIED CHEMISTRY.

SOPHOMORES—1.

Newton, Hjalmer Melville, Minneapolis.

FRESHMEN—1.

Neuman, John Xavier, New Ulm.

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS.

SENIOR CLASS—25.

CIVIL ENGINEERS—7.

Bogue, Nathan Herschel, Castle Rock.	Holland, Jay Clark, Minneapolis.
Downing, Frank E., St. Charles.	Nelson, Nels Bononi, Preston.
Fernald, Frank Osborne, St. Paul.	Rothi, Paul, Moland.
	Smith Raymond C., Rochester.

MECHANICAL ENGINEERS—5.

Andrews, George L., Green Valley.	Otto, Robert Walter, St Paul.
Davis, Gilbert N., Minneapolis.	Stanton, Raymond Edward, St. Paul.
Fager, Simon Rudolph, Minneapolis.	

ELECTRICAL ENGINEERS—12.

Bouman, Bernhard Martin, Murdock.	Manthey, Geo. H., Blue Earth.
Cheney, Edward Joseph, Keosauqua, Ia.	Morton, Harry Garfield, St. Paul.
Crabbe, George, Minneapolis.	Otto, Fred Arthur, St. Paul.
Goodwin, Victor Earl, Minneapolis.	Taplin, Robert Baird, Minneapolis.
Helms, Frank Charles, Everett, Wash.	Tomlinson, L. C., Glencoe.
Howatt, John, Lake City.	Wicks, John, Tyler.

SCIENCE AND TECHNOLOGY—1.

Gregg, Tresham D., Minneapolis.

JUNIOR CLASS—74.

CIVIL ENGINEERS—31.

Acton, Robert William, Madison.	Jensen, John Arthur, Fergus Falls.
Bisbee, Elmer, Madelia.	Johnson, Nels, Preston.
Bowen, Fred Pabst, St. Paul.	King, W. Eugene, Anoka.
Brockway, Roydon Ray, Luverne.	McMillan, Franklin R., Luverne.
Burke, Roy Latfourette, Minneapolis.	Malloy, Charles James, Red Wing.
Childs, Donald, Minneapolis.	Mattison, Oliver, Minneapolis.
Cram, Clyde Maxwell, Zumbrota.	Mueller, Henry John, Hamburg.
Cutler, Alvin S., Minneapolis.	Murphy, John, Litchfield.
Daley, Gustav Johann, Fertile.	Nelson, Oscar B., Minneapolis.
Doherty, Walter Anthony, St. Paul.	Ostvig, Richter Norman, Benson.
Feyder, William Henry, St. Paul.	Pagenhart, Edwin Herbert, Rochester.
Finley, Joseph Edward, Janessville.	Schuetz, Darwin, New Ulm.
Gillette, George Lewis, Minneapolis.	Smith, Donald Tidd, Chicago, Ill.
Hopeman, Albert M., Preston.	Wood, Sheldon, Minneapolis.
Hovde, Edward E., Wabasha.	Woolery, Mark Davis, Elmore.
	Yerxa, Dwight Keyes, Minneapolis.

MECHANICAL ENGINEERS—18.

Armstrong, Thomas S., Minneapolis.	Clipfell, Carroll D., Minneapolis.
Bates, Albert Henry, St. Louis Park.	Dunn, John William, Minneapolis.
Bradford, Henry B., Minneapolis.	Gerrish, Harry Eldon, Minneapolis.
Cannon, Fred Kendric, Green Bay, Wis.	Harris, Sigmund, Minneapolis.
	Johnson, Ernst P., Albert Lea.

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|--------------------------------------|--------------------------------------|
| Kinnard, Chester H.,
Minneapolis. | Sperry, Leonard Boyd, Wasioja. |
| Lewis, Edward Bunker,
Willmar. | Sutton, Frank Edgar,
Minneapolis. |
| Matteson, Frank Elmer, Eyota. | Tuck, George Albert,
Minneapolis. |
| Pancratz, Alexander J., Perham. | Wood, John William,
Stewartville. |
| Rose, Norman Webb, Duluth. | |

ELECTRICAL ENGINEERS—25.

- | | |
|--|---|
| Adams, William Charles,
Minneapolis. | Jones, Raymond Lasley,
Minneapolis. |
| Anderson, Emil, Farwell. | Kochendorfer, Milton J.,
South Park. |
| Avedovech, Meyer, Minneapolis. | Le Blond, Edmond Jean,
Minneapolis. |
| Billau, Lewis Scoville, St. Paul. | Le Tourneau, Edward Harold,
Duluth. |
| Boman, Carl Emanuel, Cokato. | Lundquist, Ruben A., Red Wing. |
| Bosworth, Verne Howard,
Utica. | Morris, Robert, Greenleafton. |
| Coleman, Frank D.,
Ellendale, N. D. | Ryan, Will, Joice, Ia. |
| Davis, Charles Asa,
Minneapolis. | Schow, Harry Albert,
Minneapolis. |
| Ely, Irving Robinson,
Milbank, S. D. | Shuck, Gordon Russell,
Rushmore. |
| Frankoviz, John Joseph,
Fergus Falls. | Simmon, Karl Albert, Jr.,
St. Paul. |
| Garber, Gabriel Emett,
Minneapolis. | Smith, Clinton Besley,
Minneapolis. |
| Gibson, Charles B., Minneapolis. | Stone, Harris Garfield, LeRoy. |
| Jackson, Earle Daniel,
Minneapolis. | |

SOPHOMORE CLASS—96.

CIVIL ENGINEERS—25.

- | | |
|---|---|
| Adams, Elmer Ellsworth,
Willmar. | Dunham, John A.,
Mason City, Ia. |
| Alrick, Bannona Gerhardt,
Zumbrota. | Enger, Norval, Decorah, Ia. |
| Alsop, Ernest Benbon,
Minneapolis. | Hanauer, Monroe, St. Paul. |
| Batson, Charles Drewry,
Bald Eagle Lake. | Hawley, Harry Garfield,
Worthington. |
| Brodrick, George Harry,
Minneapolis. | Hobart, Walter Beal,
Minneapolis. |
| Cary, Allan Gibbs, St. Paul. | Hustad, Andrew P.,
Granite Falls. |
| Childs, Hervey Butler,
Ortonville. | Huston, David B., Minneapolis. |
| Doeltz, William Fred,
Minneapolis. | Hyatt, Frank LeRoy,
Minneapolis. |
| Dorsett, Karl, Minneapolis. | Leland, Oscar Brace, Winona. |
| Dougan, Henry Knox,
Minneapolis. | Nelson, Elmer Julian,
Center City. |
| | Peterson, Arthur Andrew,
St. Paul. |

Reed, Arthur Lathrop, St. Paul.
Tondel, Mandel George,
Minneapolis.

Widell, Gust Fred, Mankato.
Wiesner, Frederick Edward,
Tracy.

MECHANICAL ENGINEERS—17.

Baer, Louis E., Kenyon.
Campbell, Lewis P., Duluth.
Craig, Gordon Matthew,
Portland, Ore.
Crawford, Wallace Tyler,
Faribault.
DeLong, Scott H., Nickerson.
Gunther, Albert Nelson,
St. Paul
Hartzell, James Hugh, St. Paul.
Johnson, Frank, Willmar.
McCartney, Elmer Barber,
Oakes, N. D.
Miller, Leslie Freeland,
Minneapolis.

Rawson, Ralph Harvey,
Faribault.
Ringsred, Arthur Christian,
Duluth.
Robinson, Charles Dudley,
St. Paul.
Roundy, Pearl Judson,
Wabasha.
Staples, Elmer, St. Paul.
Willford, Arthur Robert,
Minneapolis.
Woodward, Ernest A.,
Minneapolis.

ELECTRICAL ENGINEERS—51.

Albrecht, George Moritz,
St. Paul.
Allen, Elmer Augustus,
Lanesboro.
Anderson, Godfrey, Lake City.
Andrus, Raymond Joel,
Mason City, Ia.
Bergendahl, Harold Martin,
Ellendale, N. D.
Bullard, Oliver, Waseca.
Bunce, Paul Fay, Minneapolis.
Burwell, Fred Wendall,
Minneapolis.
Burwell, Loring Durham,
Minneapolis.
Calmeyer, John Peter,
Glenwood.
Carter, Robert J. S., Austin.
Cohen, Nathan, Minneapolis.
Converse, Clovis Miller,
St. Paul.
Cooper, Leo Henry,
Minneapolis.
Cornelius, Martin,
Roberts, Wis.
Dunn, Andrew Paul,
Winnebago City.
Easton, Ned, Stillwater.
Eddy, Lynne Walter, St. Paul.
Edwards, Frank, Fairmont.

Englin, Charles Frederic,
Stillwater.
Evans, Leon Rozelle,
Hutchinson.
Finchy, Jacob Oscar, Wabasha.
Griffith, Charles Arthur, Hector.
Haeberle, Elmer Harvey,
New Ulm.
Hanson, Oscar Sverdrup,
St. Paul.
Harris, Clayton J., Minneapolis.
Hoff, Christopher, Jr., St. Paul.
Hokanson, Clarence, Hector.
Hubbard, Robert T.,
Minneapolis.
Huff, Paul, Minneapolis.
Krag, Clarence Walter,
Hampton, Ia.
Lange, Charles Arthur,
Minneapolis.
Lee, James Ruthford, Stewart.
Milham, Roy Edward, St. Paul.
Nordine, Louis Ferdinand,
Lake City.
Payne, Harold Gould,
Minneapolis.
Pearce, John Henry, St. Paul.
Ramstead, George Henry,
Eau Claire, Wis.
Roberts, Robert, Lake Crystal.

Robison, Archer Roy, Windom.	Thornton, Edwin Burdette, Benson.
Roepke, Otto Bismark, Minneapolis.	Ungerma, Carl Mugg, Waseca.
Schwedes, Walter Fred, Wabasha.	Weber, Erwin Leo Franz, Helena, Mont.
Shepherd, Alfred Bowen, Mt. Vernon, S. D.	Wiggins, Gerald Graham, Minneapolis.
Stephenson, Oliver H., St. Anthony Park.	Woehler, William Louis, Arlington.
Sternberg, Carl, St. Paul.	Zimmer, William Arthur, Big Stone City, S. D.

SCIENCE AND TECHNOLOGY—3.

Clarke, Charles P., Elysian.	Van Cleve, Horatio Phillips, Minneapolis.
Swensen, Karl Phillmore, Minneapolis.	

FRESHMAN CLASS—164.

CIVIL ENGINEERS—43.

Ash, J. Wesley, Wendell.	Jones, Lewis Allen, Worthington.
Bakke, Peter, St. James.	Kelly, Earl Wallace, Aitkin.
Birmingham, Harry, St. Paul.	Knowlton, Herbert Hamilton, Minneapolis.
Blomquist, Hjalmer Frederick, Lake City.	Lawrence, Charles McClaren, Minneapolis.
Brower, Fenimore Vale, Faribault.	Loomis, Leon Elliott, Minneapolis.
Bueger, Albert Henry, St. Paul.	McKennett, Harry Evertt, Webster, S. D.
Burt, Roy Jay, Chokio.	Miller, Addison, St. Paul.
Carpenter, Leslie Frances, Minneapolis.	Mitchell, John Brewster, Zumbrota.
Clapp, Edwin Griffin, Fargo, N. D.	Olsen, Melvin Samuel, Minneapolis.
Dallimore, Arthur Norman, St. Paul.	Olson, Ernest Victor, Welch.
DePourtales, L. Frank, Northfield.	Paris, Clarence Hiram, Winona.
Dougherty, Joe, Litchfield.	Pemberton, John Gould, St. Paul.
Ellis, Bruce Bonthron, Duluth.	Peterson, William Arthur, Elbow Lake.
Fish, Horace Porter, Minneapolis.	Quayle, Fred Albert, Minneapolis.
Fleming, Douglas Reed, St. Paul.	Quinn, John, Minneapolis.
Gage, Hugh Newton, Winona.	Randall, Heman Ward, State Fair Grounds.
Glasgow, John Francis, Worthington.	Stinchfield, Mark, Fairmont.
Grant, James Allen, Windom.	Swenson, Alfred Marcy, St. Paul.
Green, Fred Hall, Rushford.	Swenson, Charles August, Winthrop.
Hammond, Phil Julian, Minneapolis.	Young, Andrew, Ashland, Wis.
Hayes, Albert Orion, Minneapolis.	
Herrman, Alvin, St. Paul.	
Houck, Stanley Buck, Minneapolis.	

MECHANICAL ENGINEERS—48.

- Beckjord, Jesse G., St. Paul.
 Bell, Maurice Dwight, Minneapolis.
 Bingham, Henry George, New Ulm.
 Birnberg, Henry Herman, St. Paul.
 Bjorge, Oscar Bernard, Underwood.
 Borrowman, Leroy, Stillwater.
 Boyce, Leonard F., Minneapolis.
 Buhl, Paul Stephens, Graceville.
 Campbell, Denison Gage, Alexandria.
 Cook, Harold Gottfried, Merriam Park.
 Cox, Richard Ferguson, Graceville.
 Dean, John Cotton, Minneapolis.
 Ellison, Jay T., St. Paul.
 Fee, E. Frank, Duluth.
 Geraghty, Herbert Aloysius, St. Paul.
 Gessert, George Richard, St. Paul.
 Gilman, Nicholas Albert, St. Cloud.
 Granzow, Ernest Frederick, Duluth.
 Harkee, Otto F., Mankato.
 Hastings, Russell Platt, Bermuda Islands.
 Holcomb, Myron Dustan, St. Paul.
 Holmgren, Charles Ernest, Breckenridge.
 Lewis, Robert Dudley, St. Paul.
 Lowey, Frank John, Brainerd.
 McDougal, Ralph Fritz, St. Paul.
 Matthewson, Jewett Ross, Minneapolis.
 Nicholl, George Ramsey, St. Paul.
 Northrop, Edwin Bercele, Minneapolis.
 Oppenheim, Greve, St. Paul.
 Pihlgren, Martin Nathaniel, Stark.
 Rosentel, Maurice, Crookston.
 Ruff, DeWitt Clinton, St. Paul.
 Scofield, Russell Boyd, Winona.
 Shepard, David C., St. Paul.
 Shepherd, Franklin Moody, Maquoketa, Ia.
 Smith, Albert Bicknell, Minneapolis.
 Smith, Kenneth Claire, St. Paul.
 Souba, William Henry, Hopkins.
 Stacy, Elmer Neil, Eden Prairie.
 Strane, Ray Cort, St. Paul.
 Sullworth, Herbert Arthur, St. Paul.
 Tileston, Arthur, St. Cloud.
 Trabert, William Henry, Minneapolis.
 Tubby, Oliver George, St. Paul.
 Vande, Bogart Jay, Zumbrota.
 Wagner, Otto Henry, New Richmond, Wis.
 Waite, Ernest Rienzi, Winona.
 Wodrich, Oscar Frederick, Dubuque, Ia.

ELECTRICAL ENGINEERS—68.

- Alton, Herbert Dennett, Ceylon.
 Bachrach, Alfred, Faribault.
 Bartholomew, Clarence W., New Hampton, Ia.
 Bieter, Frank Edward, Faribault.
 Broderson, Clarence Christian, Winona.
 Brown, Oliver L., Minneapolis.
 Butson, John Thomas, Marshall.
 Campbell, Ralph Wallace, Anoka.
 Carman, Curtis Ray, Little Falls.
 Chelgren, Frank E. Leonard, Hastings.
 Christie, Morris Wood, Ottumwa, Ia.
 Corser, Caleb, Minneapolis.

- Cotter, Clarence Joseph,
Minneapolis.
- Countryman, Peter Frederick,
Appleton.
- Dirimple, George, Jr.,
Minneapolis.
- Fitts, Joel Archer,
Minneapolis.
- Garrison, Henry Norman,
Minneapolis.
- Gausemel, Arthur Nicholai,
Kenyon.
- Geil, Harry Festus, Bemidji.
- Gray, Carl William,
Sioux Falls, S. D.
- Greene, Curtiss, St. Paul.
- Hampson, Henry Oscar, Ada.
- Hartney, John James,
Maynard.
- Haynes, Jack Ellis, St. Paul.
- Higgins, Harry Getcnell,
Minneapolis.
- Hoppin, Glenn, Northfield.
- Hubbard, Herbert Glass,
New Ulm.
- Johnson, John Clinton,
Fargo, N. D.
- Kelly, Truman Lee,
Muskegon, Mich.
- Kerns, Ralph Waldo,
Eagle Bend.
- Kjelland, Joseph Almon,
Rushford.
- Kremer, George Everett,
Minneapolis.
- Langland, George, Marshall.
- Larson, Olaf, Houston.
- Lovgren, Harry M., Red Wing.
- McAfee, Allan Lindsay,
St. Paul.
- McMonagle, Clyde Vernon,
Breckenridge.
- Marvin, Claude Rowcliffe,
Fargo, N. D.
- Meany, James, Lake City.
- Montgomery, Grant, St. Paul.
- Morris, William Bernard,
Winona.
- Mowry, Harry Wheelock,
Minneapolis.
- Muller, George Rippman,
No. St. Paul.
- Nekola, John, LaCrosse, Wis.
- Neuman, Conrad, Lewiston.
- Noble, Henry Field,
Aberdeen, S. D.
- Norcross, Arthur Floyd,
Minneapolis.
- Noyes, Harold Arthur,
St. Vincent.
- Oech, George Fred, Wilson.
- Peck, Lee Wallace, Argyle.
- Raetz, Stephen James, Hastings.
- Rezab, John Joseph, Winona.
- Scofield, Frank E.,
Minneapolis.
- Severson, Peter Hadwald,
Canby.
- Simpson, William Lord,
Minneapolis.
- Slade, Charles William, Adrian.
- Smith, Byron E., Minneapolis.
- Smithson, John Edward,
Hawick.
- Spring, Willis Ware,
Minneapolis.
- Sturtevant, Percy, Detroit.
- Swenson, Edward,
Menomonie, Wis.
- Taylor, Clarence B.,
St. Thomas, N. D.
- Thompson, Herbert Leslie,
Minneapolis.
- Thuemmler, Alexander,
Mankato.
- Tone, Thomas, Gilman, Ia.
- Uzzell, George Walter,
Minneapolis.
- Vireen, Nels John, Minneapolis.
- Zimmerman, Louis Peter,
Waseca.

SCIENCE AND TECHNOLOGY--5.

- Anderson, Edward,
Minneapolis.
- Councilman, Halstad P.,
Minneapolis.
- Hall, Ralph Waldo, LeRoy.
- Powell, Frederick Channing,
St. Paul.
- Smith, Alfred Nelson,
Wheatland, N. D.

UNCLASSED ENGINEERS—36.

Adams, Alfred Ashley, Minneapolis.	Johnson, Austin G., Minneapolis.
Baldwin, Ralph H., Mankato.	Kells, Laurel Lucas, Sauk Center.
Boyd, Leon Morello, Alexandria.	Kreger, Alanson James, Le Sueur.
Brunsell, Albert, Minneapolis.	Larson, Swann Alfred, Minneapolis.
Childs, John Chauncey, Minneapolis.	Lawton, Harry Conegys, St. Paul.
Collins, Stewart Garfield, St. Cloud.	McDougall, Alexander Miller, Duluth.
Cutter, Frank C., St. Paul.	Morse, Gordon V., Sauk Centre.
Drum, Andrew Boggs, Waseca.	Rasmussen, Alfred Johannes, Houston.
Elston, Fred Carroll, Duluth.	Rydeen, Francis G. A., Gibbon.
Erickson, Otto Hjalmar, Minneapolis.	Sainsbury, Charles E., La Moille.
Fairchild, Albert Royal, Minneapolis.	Steenerson, Steener, Climax.
Foss, Lota Alice, Minneapolis.	Stone, Glen Allen, Marietta.
Glasscock, Henry Hopson, Minneapolis.	Streissguth, William Christ, Arlington.
Groth, William Charles, Preston.	Thomas, Evan, Lake Crystal.
Gunderson, Alfred L., Minneapolis.	Tomm, Luther Eugene, Pekin, Ill.
Hovelson, Henry, Minneapolis.	Walker, Archie Dean, Minneapolis.
Huff, Benjamin Long, Tonowanda, N. Y.	Williams, Homer A., Minneapolis.
Hull, George Keats, St. Paul.	
Jardine, John Alexander, Minneapolis.	

THE SCHOOL OF MINES

SENIORS—12.

Bass, Samuel Thayer, St. Paul.	Kingston, Merton Stephen, Eveleth.
Bowman, Frank Atherton, Minneapolis.	Kuehn, Amor Frederick, Minneapolis.
Brosious, Harold Irving, Stillwater.	McCarty, Andrew Leonard, Good Thunder.
Devereaux, Francis Cyril, Minneapolis.	Merritt, Lucien, Duluth.
Hale, Will Hammond, Minneapolis.	Shonts, Sydney Latham, Fergus Falls.
Houlton, Lewis Kendal, Elk River.	Squyer, Dewey Charles, Minneapolis.

JUNIORS—18.

Angst, Harry Hugo, Minneapolis.	Keller, Orrin Edwin Martin, Minneapolis.
Boyd, Robert Russell, St. Charles.	Lytzen, Walter William, St. Paul.
Cadwell, W. Chauncey, Le Sueur.	McKay, Henry Sinclair, Brainerd.
Colhoun, Allan Banatyne, Minneapolis.	Merriam, Robert Stanley, Minneapolis.
Curry, Duncan Ellsworth Howard, Spring Valley, Wis.	Minder, Emil George, St. James.
Donaldson, Alexander Hasseltine, Minneapolis.	Neustadt, Berthold Robert, La Salle, Ill.
Edmonds, Frank Norman, Minneapolis.	Schrader, Erich Julius, St. Paul.
Field, Thorold Farrar, New York City.	Sherman, Ira Washington, Fergus Falls.
Gulick, James Hervey, Oronoco.	Ziesmer, Ralph A., Fergus Falls.

SOPHOMORES—31.

Bottenfield, Drake, Minneapolis.	O'Connor, Edward Silvester, Highwood.
Brandt, John, St. Paul.	Olund, Henning Ekstrom, St. Paul.
Clement, Lester Latham, Winona.	Parks, Edgar Kay, Brainerd.
Dorr, William Grey, Minneapolis.	Penhoel, Louis, St. Paul.
Fisher, Frank Loring, Duluth.	Rawson, Horace Cole, Fergus Falls.
Harrington, Guy Pembroke, Hutchinson.	Roed, Olaf, Minneapolis.
Howes, Frank Twombly, St. Paul.	Rose, William Anderson, Duluth.
Kilpatrick, Raymond Lewis, St. Paul.	Smith, Edward Wilson, Minneapolis.
Kurtzman, Paul Starr, Rochester.	Snyder, Sidney Olmstead, Minneapolis.
Maynard, Major John Hum- phrey, Minneapolis.	Steele, Charles Whyte, Minneapolis.
Mella, Ralph, St. Paul.	Wallace, George Watson, Jr., Duluth.
Millspaugh, Mark Gillespie, Little Falls.	Weisel, George Ferdinand, Minneapolis.
Moenke, William Fred, Joel.	Wheeler, Walter Hall, Minneapolis.
Morgan Charles, Zumbrota.	Wiest, Michael Andrew, New Rome.
Noehl, Bartley F., Kasson.	Yates, Ralph Pierce, Jr., Tracy.
Nye, Charles Wheeler, Minneapolis.	

COLLEGE OF AGRICULTURE.

SENIORS—4

Gaumnutz, Daniel Asher, St. Cloud.	McGuire, Arthur James, Hegbert.
Hoagland, Ralph, St. Anthony Park.	Matthews, Mary Lockwood, Cambridge City, Ind.

JUNIORS—7.

Boerner, Emil Godlieb, Buffalo.	Thompson, Anna Adele, Cottage Grove.
Cuzner, Harold, Minneapolis	Tierney, Charles Nicholas, Farmington.
Jehle, Robert Andrew, St. Paul.	Widmoyer, Leslie Rudolph, Dresbach.
Parker, Edward Cary, St. Anthony Park.	

SOPHOMORES—6.

Carnine, Philip K., Aberdeen, S. D.	Peck, William Argalus, St. Anthony Park.
Hall, Mary J., Winnebago.	Tierney, Dillon Parnell, Farmington.
Mowry, Herbert Hager, Minneapolis.	Wilson, Archie Dell, St. Anthony Park.

FRESHMEN—13.

Allen, Philip Torrey, Marquette, Mich.	Peterson, William Arnold, Olivia.
Blair, Donald Scripture, St. Paul.	Pfaender, Max, New Ulm.
Cox, William Thomas, Lowry.	Rose, John DeCew, Detroit.
Gaumnitz, Amos John, St. Cloud.	Soares, Alberto Gualter, Minneapolis.
Leager, Marc Carl, Aberdeen, S. D.	Tomhave, William Henry, Fergus Falls.
Olson, Oscar Milton, Montevideo.	Torrance, James Benjamin, Minneapolis.
	Winther, William Martin, Fergus Falls.

THE SCHOOL OF AGRICULTURE.

INTERMEDIATE YEAR. 10.

Alexander, Fannie P., Brownton.	Paterson, Thomas G., St. Cloud, R. 2.
Boss, John, Zumbro Falls.	Tyson, Robert E., Redwood Falls.
Johnston, Christine M., Robbinsdale, R. 2.	White, Hall B., Winnebago City.
Jonson, Axel E., Rockford, Ill.	Whitney, June D., Minneapolis.
McLaren, Harley E., Buffalo Lake, R. 1.	Wilkins, Annie L., Minneapolis.

"A" CLASS—90.

Amidon, Perry N., Houston.	Goodall, Archie J., Bathgate, N. D.
Anderson, Andrew D., Wadena.	Graham, Ralph M., Rochester, R. 1.
Andrews, John K., Faribault.	Grant, Geo. H., Faribault, R. 7.
Atkins, Frederick W., Columbia, S. D.	Gregg, Victor H., Austin, R. 1.
Blair, Ruby I., Lewiston, R. I.	Hacking, Earl L., Forest Lake, R. 28.
Bradford, Albert N., Empire.	Hagerman, Wm. F., Morris.
Brueck, Charles F., Battle Creek, Iowa.	Hall, Frank W., Fairmont, R. 1.
Bunker, Bessie I., Minneapolis, R. 5.	Henderson, George, Halstad.
Burggren, David C., Cannon Falls, R. 5.	Hendrickson, Katherine, Grant.
Campbell, Helen M., Merriam Park.	Hohle, Ola A., Hector, R. 1.
Chermak, Emma, Chatfield, R. 4.	Holland, Rasmus, Hanley Falls.
Chesley, Fred, Anoka.	Holmberg, Ruth H., Renville.
Cin, Clara, Donnelly.	Horton, Thomas J., North Branch, R. 2.
Cody, Ella F., Minneapolis.	Hovde, Minnie L., Godahl.
Cooper, Lee E., Adrian.	Hoverstad, Emeline, Dennison, R. 2.
Crandall, Chas. N., Rockford.	Howe, Lizzie R., Kellogg, R. 1.
Dean, Wm. L., St. Anthony Park.	Jensen, Andrew, Kanaranzi.
Dick, Ethel M., Afton, R. 20.	Johnson, Ida M., Louisberg, R. 1.
Dickinson, Wesley A., Buffalo, R. 4.	King, Curtain A., Spring Valley, R. 4.
Dinsmoor, Charles D., Austin, R. 3.	Kinyon, Wallace W., Norcross.
Emerson, Rudolph, W. Concord, R. 2.	Kjos, Elvin A., Rushford, R. 3.
Ericson, Alfred L., Hector, R. 1.	Knorr, Frederick, St. Anthony Park.
Ferch, Sarah E., Eureka, Cal.	Lampson, Stella M., Lampson, Wis.
Finseth, Arthur K., Kenyon, R. 2.	Ley, Bertha H., Minnetonka, R. 1.
Frear, Dana W., Minnetonka.	Ley, Lizzie L., Kellogg, R. 2.
Gillis, James R., Cedar.	McCabe, Lulu M., Minneapolis, R. 1.
Gleason, Minnie E., Northfield, R. 4.	McEwen Wright A., Hutchinson.

- Mallett, Angie A., Minneapolis.
 Marple, Ernest E., Wendell.
 Mather, Sophie M.,
 Faribault, R. 3.
 Maxcy, Nannie,
 Curran, Ill., R. 11.
 Mayland, Edwin,
 Rushford, R. 3.
 Miller, Edwin B.,
 Minneapolis, Station F. R. 1.
 Moak, Clarence B.,
 Minneapolis.
 Muir, Harry S.,
 Winnebago City.
 Nygren, Herman J.,
 Lake City, R. 3.
 Orton, Geo. E., Marietta.
 Ostergren, Reuben G.,
 St. Paul, R. 7.
 Ouren, Alfred, Hanska.
 Parker, Edward C.,
 St. Anthony Park.
 Pearson, Matilda,
 Louisburg, R. 1.
 Peterson, Carl H., Lynd, R. 1.
 Pond, Harold H.,
 Minneapolis, Station F. R. 1.
 Rochrs, Wm., Ceylon.
 Rollefson, Carl O.,
 Clarkfield, R. 1.
 Rose, Maud, Detroit, Minn.
 Schrepel, Minnie, A.,
 Le Sueur, R. 1.
 Sheldon, Louis J., Paynesville.
 Smith, Elizabeth,
 Farmington, R. 2.
 Squire, Ernest P.,
 Kenmare, N. D.
 Stangeland, Arthur W.,
 Marathon, Iowa.
 Stewart, Charles D., Sherburne.
 Stimpson, Herbert E.,
 Albert Lea.
 Svarstad, Anne, Bath, S. D.
 Swenson, Edward,
 Willmar, R. 1.
 Tanner, Alice V., Brownsdale.
 Washburn, Edson D.,
 Monticello, R. 2.
 Wasson, Harris B., Belview.
 Watson, Edwin J., Morris.
 Wedge, R. C., Albert Lea.
 Wells, Zoe A., Hensler, N. D.
 Wilder, Davis E., Austin.
 Wood, Augusta A., Waseca.

"B" CLASS—162.

- Ainslie, Geo. G., Rochester.
 Angell, James B.,
 White Bear Lake.
 Apitz, Robert H., Amboy.
 Atkins, Arthur D.,
 Columbia, S. D.
 Bailey, Clyde H., Minneapolis.
 Barker, Emil V., Atwater.
 Beeson, C. M., Breckenridge.
 Betts, Alice G., Fairmont.
 Bleecker, Mary E.,
 Mantorville, R. 2.
 Bleecker, Wm. L.,
 Mantorville, R. 2.
 Bredvold, August J., Belview.
 Burkholder, Amy C.,
 Winnebago City.
 Burtman, Edor, Lester Prairie.
 Burtness, Carl, Caledonia, R. 1.
 Burton, Hazel, Deep Haven.
 Bush, Harvey M., Dover.
 Carleton, Lizzie A.,
 Plainview, R. 1.
 Carlton, Mabel M.,
 Medford, R. 1.
 Carr, Linnie M.,
 Long Lake, R. 1.
 Carroll, Harry B., St. Paul.
 Carter, Bessie J., St. Peter.
 Carver, Archie L.,
 Faribault, R. 1.
 Chapman, Lula E., Osseo, R. 4.
 Chase, Clement G., Farmington.
 Cole, Marcus C., Davies.
 Cooley, Fanny A.,
 Alexandria, R. 2.
 Cram, Myrtle I.,
 St. Anthony Park.
 Crozier, John B., Minneapolis.
 Curtis, Jay L.,
 Alexandria, R. 3.
 Cutlar, Lester B., Sumter.

- Dailey, Lawrence E.,
Pipestone.
- Davenport, Emelyn L.,
Western.
- Day, Harry A., Cedar, R. 2.
- Detwiler, Samuel B.,
St. Anthony Park.
- Dike, Geo. E., Northfield.
- Dixon, Helen C., Mora.
- Dodds, Mabel, Wheaton.
- Doehne, Lulu E., New Ulm.
- Donovan, Raymond L., Dundas.
- Downie, Hector,
Wawanesa, Man.
- Downie, Jennette E.,
Faribault, R. 1.
- Downing, Laura, St. Charles.
- Dunn, Catherine A.,
Lakeville, R. 1.
- Edwards, June A.,
Spring Valley.
- Ellsworth, Horace W.,
Cannon Falls.
- Ely, Herbert I.,
St. Croix Falls, Wis.
- Engelbert, Anna R., Kennedy.
- Evenson, Nels O., Strout.
- Fischer, Joseph, Lynd, R. 1.
- Fish, Gertrude B., Utica.
- Flom, Joseph O.,
Dennison, R. 2.
- Frenn, Albert E.,
Red Wing, R. 1.
- Gammon, Inez E.,
Excelsior, R. 3.
- Gardner, Harriet R., Bigstone.
- Garrett, Harry D.,
New Brighton, R. 1.
- Gaumnitz, Florence,
St. Cloud, R. 1.
- Gibson, Blossom E.,
St. Anthony Park.
- Gilson, Forrest W., Fort Ripley.
- Gove, Albert S.,
Bingham Lake, R. 1.
- Greaves, Harold A., Northfield.
- Grey, Arthur B.,
North Branch, R. 3.
- Gudal, Jorgen O., Bricelyn.
- Gudal, Nellie B., Bricelyn.
- Hall, Avis C., St. Anthony Park.
- Hall, Chas. E., Fairmont, R. 1.
- Hammer, Ir J., Utica.
- Hanson, Almon J., Big Lake.
- Hanson, Fred W.,
Superior, Wis.
- Hanson, Henry, Norseland.
- Harper, Roy S., St. Paul.
- Hathaway, Floyd C.,
Winnebago City.
- Haugen, Olai, Zumbrota, R. 1.
- Hilgeson, Halge, Minneapolis.
- Hoagland, Jessie M.,
Minnetonka Mills, R. 2.
- Hodgson, Victor A., Luverne.
- Holmquist, Alice W.,
Providence.
- Holtmeier, Theodore J.,
St. Bonifacius, R. 1.
- Houser, Clarkson W.,
Louisville, Ky.
- Hulst, Geo. W., Fair Haven.
- Hunt, Robert J.,
River Falls, Wis., R. 1.
- Jenkins, Wm. G., Minneapolis.
- Jernell, Jennie S., Minneapolis.
- Johnson, Charles N.,
Northfield, R. 4.
- Johnson, Clara M.,
Baldwin, Wis., R. 4.
- Johnson, Emil A., Willmar.
- Johnson, John S., St. Paul Park.
- Johnson, Mary M., Sherburne.
- Johnson, Sydney H., Gibbon.
- Kanten, Iver C., Milan, R. 1.
- Keller, Peter J.,
Merriam Park, R. 1.
- Kern, Harry F., Lake Elmo.
- Kingsbury, Victor H.,
Monticello.
- Kloos, John D., Chaska, R. 3.
- Langness, Lena, Baltic, S. D.
- Langseth, Oscar H.,
Worthington, R. 2.
- Larson, John S., Ulen, R. 1.
- Lathrop, Mabel A., Forest Lake.
- Lathrop, E. A., Forest Lake.
- Leavitt, Geo. D.,
Red Wing, R. 1.
- Le Gro, Emma, Bertha.
- Lydon, Edward, Kellogg.
- Maass, Wm. H., St. Bonifacius.
- McClure, Irvin D.,
Manhattan, Ill.
- McNelly, Chester L.,
Caledonia, R. 1.

- McNelly, Mabelle,
Caledonia, R. 1.
- Mallett, Gertrude M.,
Minneapolis.
- Martin, Nathaniel, Clear Lake.
- Martinson, Henry R.,
Sacred Heart.
- Mattice, Norman L.,
Minneapolis, Station D. R. 1.
- Merrill, Alfred S., Minneapolis.
- Mills, Rodney N., Buffalo, R. 3.
- Monson Eva D.,
Elbow Lake, R. 2.
- Moore, Harry C., Hutchinson.
- Moore, David S., Big Lake.
- Murdock, Harry L.,
Worthington.
- Murphy, Hazel I., Hamline.
- Nelson, Josie E., Minneapolis.
- Nodell, Benjamin A.,
Minneapolis, R. 5.
- Norskog, Caroline M.,
Eddsville.
- Norman, Hilma, Kandiyohi.
- Nugent, Marie A., Hegbert.
- Ott, Robert L., Albert Lea, R. 4.
- Palmer, Ernest G.,
Minneapolis, R. 5.
- Palmer, Vincent J.,
Minneapolis, R. 5.
- Parten, Lillie T., Minneapolis.
- Pedersen, Jens C., Minneapolis.
- Pepin, Jos P., Minneapolis, R. 1.
- Peterson, Laura C.,
Minneapolis, R. 4.
- Perkins, Bert B.,
Monticello, R. 4.
- Powell, Leonard H., Marshall.
- Putnam, Fayette H., Big Lake.
- Quam, Stella, New London.
- Ramsland, Rudolph J.,
Sacred Heart.
- Ray, Mary L., St. Paul.
- Retzlaff, Minnie B., New Ulm.
- Rich, Ralph W.,
St. Anthony Park.
- Richardson, Horace E.,
Faribault.
- Robertson, Lynn S., London.
- Rose, Myrtle I.,
New Brighton, R. 9.
- Sanborn, Hubert H.,
Minneapolis.
- Sargent, Forrest H.,
Red Wing, R. 2.
- Sauby, Julia T.,
Elbow Lake, R. 2.
- Sherman, Etta L.,
Merriam Park.
- Sorenson, Arthur M.,
Albert Lea.
- Strand, Lars K., Ada.
- Swenson, David, Willmar.
- Swenson, Edgar B.,
Louisburg, R. 1.
- Talle, Marie B., Kenyon.
- Talle, Peder O., Kenyon.
- Thayer, Roy C., Manhattan, Ill.
- Trondson, Albert O., Lakefield.
- Tuttle, Lucius P., St. Charles.
- Ville, Henrietta M.,
Echo, R. F. D.
- Webster, Alfred A.,
Lafayette, R. 1.
- Welch, Horace L., Corvuso.
- West, Ralph L., Minneapolis.
- Wildner, Clarence L., Superior.
- Wilhelmson, Wilhelm,
Spring Grove, R. 2.
- Wilkus, August J., St. Paul.
- Winslow, Fay B.,
Chatfield, R. 4.
- Winther, Wm. M., Fergus Falls.
- Wood, Frank G., Waseca.

"C" CLASS—260.

- Aanes, Susanna, Clarkfield, R. 1.
- Anderson, Albert B.,
White Willow.
- Anderson, Henry W., Starbuck.
- Anderson, Martha, Mattson.
- Anderson, Theodore,
Hazel Run.
- Anderson, Wm. A., Highwood.
- Austin, Reed S., Minneapolis.
- Babcock, Genevieve, St. Paul.
- Bailey, Phoebe G.,
West Duluth.
- Bartholomew, Ross,
Richfield, R. 3.
- Bauch, Ernest E. W.,
Glogan, Germany.

- Bauch, Richard M.,
 Glogan, Germany.
 Beaulieu, Francis D.,
 White Earth.
 Bellinger, Frederick W.,
 Cannon Falls.
 Benham, Kenneth R.,
 St. Paul.
 Bergh, Edmund C., Hendrum.
 Berg, Lena M., Tronjem.
 Betts, Roy W., Fairmont.
 Bingham, James O., St. Paul.
 Blase, Arthur,
 North St. Paul, R. 3.
 Bond, LeRoy M., St. Paul.
 Borgendale, Charles,
 Lac Qui Parle.
 Bork, Albert, New Paynesville.
 Borlaug, Helen M., Kenyon.
 Bowen, Ray R., Kanaranzi.
 Bowman, May V., Minneapolis.
 Brekke, Andrea J.,
 Kenyon, R. 4.
 Briggs, Lyman H., Houston.
 Brown, Neil J., Whalan, R. 3.
 Brush, Elbert P., Angus.
 Burger, Irene E., Staples.
 Busse, Walter E.,
 Merriam Park, R. 1.
 Calderwood, Ralph, Newport.
 Carlson, Lillian, Minneapolis.
 Charles, Fred M., Minneapolis.
 Chermak, Mabel C.,
 Chatfield, R. 4.
 Churchill, Lucian A.,
 Wilmot, S. D.
 Cin, Sarah, Donnelly.
 Clapp, Harry H., Roberts, Wis.
 Clark, Edward K., Minneapolis.
 Clay Burton M., Minneapolis.
 Cooley, Harvey W.,
 St. Anthony Falls Station,
 Minneapolis.
 Corser, Frederick, Minneapolis.
 Cummings, Elmer F.,
 Beaver Creek.
 Dahlberg, Anna E.,
 Fergus Falls.
 Dahlquist, Henry D., Warren.
 Davenport, Lelia G., Western.
 Davis, Mortimer,
 Monticello, R. 1.
 Dedon, Denton, Taylor s Falls.
 DeMars, Stuart, Minneapolis.
 Denzer, Frank J.,
 West St. Paul, R. 1.
 Dickerman, Claude S., Elgin.
 Dixon, Samuel C.,
 North St. Paul.
 Downie, John, Wawanesa, Man.
 Doyle, John B., Wayzata.
 Dukleth, Oscar, Hendrum.
 Dunn, Samuel W., Minneapolis.
 Dusschee, James T., Lanesboro.
 Dyr Dahl, H. K., Hazel Run.
 Eckblom, Theodore V.,
 St. Paul.
 Elwell, Chester, Minneapolis.
 Enright, Thomas S.,
 Rose Creek, R. 1.
 Erickson, Hannah, Nelson.
 Eustis, Murray S.,
 Forest Lake, R. 26.
 Evensen, Edwin N.,
 Spring Grove, R. 2.
 Evenson, John, Jr., Gibbon.
 Evenson, Otto T.,
 Sacred Heart, R. 3.
 Fawcett, Charles R., Superior.
 Feroe, Peter J.,
 Granite Falls, R. 1.
 Flom, Halvor A., Nansen.
 Follingstad, Louis M.,
 Zumbrota, R. 6.
 Forbes, Lee S., Worthington.
 Frear, Aureline J.,
 Minnetonka Mills.
 Fulford, Willard, Minneapolis.
 Gammell, Myrtie A.,
 Grand Meadow, R. 1.
 Garrett, Walter C.,
 New Brighton, R. 1.
 Getchell, Leslie G., Morris.
 Gilles, DeWitt C., Minneapolis.
 Graham, William B., Freeport.
 Green, Frank E., Minneapolis.
 Greenwalt, Dorothy A.,
 Withrow, R. 21.
 Greenwalt, Lillian C.,
 Withrow, R. 21.
 Hall, Jessie M., Minneapolis.
 Hall, Ray N., Winnebago City.
 Halvorsen, Magnus,
 Norway Lake.
 Halverson, Oscar,
 Spring Grove, R. 2.

- Hanson, Minnie, Henning.
 Hanson, Victor H., Herman.
 Harris, John S., St. Paul.
 Hattenstein, Edw. C.,
 St. Paul Park.
 Hastay, Clifford T.,
 Minneapolis.
 Haugen, Clara, Clarkfield.
 Hefty, Oliver,
 Spring Grove, R. 2.
 Heimark, Andrew H.,
 Granite Falls, R. 1.
 Heimark, Carrie J., Clarkfield.
 Heimark, Ole J., Clarkfield.
 Herreid, Bert A., Hills.
 Heywood, Ralph M.,
 Minneapolis.
 Hilden, Hans A., Watson.
 Hille, Hans O., Webster.
 Hille, Jens, Webster.
 Hjermstad, Morten, Norseland.
 Hospes, Marion T., St. Paul.
 Howard, Minnie F., St. Paul.
 Hunstad, Peter N., Bath, R. 1.
 Iverson, Andrew,
 Zumbrota, R. 1.
 Jacobson, Oscar P., Elmdale.
 Jaquith, Roy E.,
 Minnetonka, R. 1.
 Jensen, Emma F.,
 New Ulm, R. 3.
 Johnson, Adolph G., Kron.
 Johnson, Anna G.,
 Casselton, N. D.
 Johnson, Ferdinand A.,
 Sacred Heart, R. 1.
 Johnson, Frank A., Herman.
 Johnson, Herbert M.,
 Cambridge.
 Johnson, Theodore J.,
 Northfield, R. 4.
 Johnson, Tosten E.,
 Spring Grove, R. 2.
 Kacerovsky, Josephine,
 St. Paul.
 Kartrude, Eilert H., Hardwick.
 Kaske, Albert, Anoka, R. 3.
 King, Mary I.,
 Spring Valley, R. 4.
 Kelmer, Edgar L., Faribault.
- Klinkhammer, Annie,
 Heidelberg, R. 2.
 Knutsen, Salmer, Lanesboro.
 Kordell, Frank H.,
 Merriam Park, R. 1.
 Kreher, Jennie M., Minneapolis.
 Lane, Dwight J.,
 Minnetonka, R. 1.
 Langer, Jos. F.,
 Plainview, R. 3.
 Lathrop, Orley K., Forest Lake.
 Laugen, John, Houston, R. 1.
 Lenhart, Ella M.,
 Merriam Park, R. 8.
 Linder, Leopold S., Mankato.
 Lindgren, Nancy H., Mattson.
 Lloyd, Roy, Minneapolis.
 Long, Ralph W.,
 Luverne, Minn.
 Lund, Emil, Vining.
 Lunde, Sigrid,
 Spring Grove, R. 2.
 McArthur, Graham S.,
 Hancock.
 McLean, Wm.,
 St. Anthony Park.
 McNallan, Michael J., Kellogg.
 Mackin, Levi, Wheaton, R. 1.
 Madsen, Nettie C., Hutchinson.
 Maring, Gina, Nansen.
 Marple, Ruth L., Wendell.
 Matz, Louis T., St. Paul.
 Mayne, James C.,
 St. Anthony Park.
 Meisch, Henry A., Rollingstone.
 Melsnes, Martin,
 Sacred Heart, R. 1.
 Monson, Orville J., Elbow Lake.
 Murphy, Harley F., Hamline.
 Myhre, Carl A., Caledonia, R. 1.
 Myhre, Ole A., Caledonia, R. 1.
 Myhre, Rena, Audubon.
 *Nesbitt, Norman, Minneapolis.
 Nielsen, Agnes E., Evansville.
 Noltmier, Mark, Hamline.
 Noltmier, Zoa E., St. Paul.
 Norskog, Conrad B., Eddsville.
 Nussbaumer, Alfred, St. Paul.
 O'Connell, Florence E.,
 Minneapolis.
 O'Connell, Jennie B.,
 Minneapolis.

*Deceased.

- Tostevin, James F.,
West Superior.
- Tostevin, Leslie W.,
West Superior.
- Torkelson, Emil H.,
St. James, R. 3.
- Townsend, Elmer C.,
Cottonwood.
- Trieloff, Erich C., Carver.
- Troseth, Pearl M., Nerstrand.
- Trovatten, Louis H.,
Hanley Falls, R. 1.
- Turner, Elmo, St. Paul.
- Tyrrell, Talcott T.,
St. Anthony Park.
- Ulrich, Edward, Biscay.
- Ulvestad, Peter,
Lanesboro, R. 1.
- Urness, Elizabeth M.,
Kenyon, R. 1.
- Varley, Aloysius J.,
Clear Lake.
- Veeder, Geo. F., Minneapolis.
- Veldey, Henry M.,
Hanley Falls.
- Vinje, Svein, Dalton.
- Volz, Louis W., Claremont.
- Von Wald, Herbert C.,
Nerstrand, R. 2.
- Voxland, Halvor, Kenyon, R. 4.
- White, Frank W., Marshall.
- White, Paul R., St. Paul.
- Wickstrom, Lizzie B.,
Anoka, No. 1.
- Wilkins, Chester A.,
Minneapolis.
- Wilkins, Stanley D.,
Minneapolis.
- Wille, Fred H., Hancock, R. 2.
- Wille, Henry, Morris.
- Wilson, Cora,
Granite Falls, No. 1.
- Wilson, Clarence O.,
Clarkfield, R. 1.
- Wilzbacher, Wm. M.,
Merriam Park, R. 1.
- Winters, Chester J.,
Mazeppa, R. 3.
- Zimmerman, Bessie J.,
Lampson, Wis.

SHORT COURSE CLASS.—47.

- Anderson, Theodore,
Hazel Run.
- Atkinson, Jesse J., Minneapolis.
- Barsness, Ole N.,
Glenwood, R. 2.
- Bitzer, Balthas F.,
Cologne, R. 2.
- Bond, Le Roy M., St. Paul.
- Boyer, Martin L., Jr., Ansel.
- Brattland, Albert, Hendrum.
- Browver, Bert, Wilkin.
- Carlson, Carl O., Erskine.
- Connolly, Martin, Clontarf.
- Cook, S. Ray, Morrison.
- Eddy, Wm. D., Farwell.
- Deal, August, Campbell.
- Davidson, Adolph F.,
Carver, R. 2.
- Edstrom, Arthur,
Goodhue, R. 1.
- Fuehrer, H. W., Newell.
- Graham, W. B., Freeport.
- Greene, Frank E., Minneapolis.
- Heifort, Carl L., Stillwater, R. 3.
- Hjille, Ole, West Valley.
- Holmes, Paul L., Chicago, Ill.
- Johnson, Oscar E.,
Galuchutt, N. D.
- Kern, Albert E., Lake Elmo.
- Kern, Oscar J. A.,
Stillwater, R. 6.
- Knutson, Carl L., McIntosh.
- Knudson, Knud K., Hartland.
- Larson, Albert, Goodhue R. 6.
- Linner, Ole L., Elizabeth.
- McFarlane, Thomas J.,
Alexandria, R. 4.
- MacKenzie, Wm., Cedarville.
- McMillan, John A., Beltrami.
- Mjolsness, Louis, Hendrum.
- Munson, Otto T., Cokato, R. 1.
- Muedeking, George F., Tracy.
- Nelson, Chas. F., Braham.
- Newland, John G., Hendrum.
- Olson Chester, Adelaide.
- Olson, Eric O., Cambridge.
- Pederson, P. A., Benson, R. 4.
- Reinardy, Nicholas A.,
New Trier.

Siebenaler, Mathias F.,
New Trier.
Skaug, Gilbert, Albert Lea, R. 2.
Titrud, Emil, Cokato, R. 2.

Westberg, John A., Grandy.
Wilking, Willie F., Nicollet.
Woolery, Roy, Elmore.
Woolsey, Harvey G., St. Paul.

DAIRY SCHOOL—106.

Allison, E., Lone Tree.
Anderson, Wm., Waverly.
Baskin, Clayton,
Stoop, Wis.
Bendickson, N. O.,
Minneapolis.
Berggren, M. O., Forest Lake.
Blume, Clem, Jr.,
Monticello.
Brado, Martin, Renville.
Bradt, Robb.,
Lewistown, R. R. 1.
Brown, John, Annandale.
Brown, Nels C., Grove City.
Brunner, F. H., St. George.
Boerner, Geo., Buffalo.
Boulden, R. S., Walnut Grove.
Cashman, J. J.,
Blooming Prairie.
Christensen, F. C., Florita.
Cockrel, J. H., Hewitt.
Domes, Aaron, Blue Earth.
Drivdahl, Christ,
New Sweden.
Ellingwood, M. W.,
Spencer Brook.
Enderle, Edw. M.,
Eden Valley.
Esse Clarence, Hayward.
Finch, Bernard A., Montevideo.
Frank, A. T., Buffalo.
Frieler, James, New Munich.
Gardhammer, Harry,
Norway Lake.
Gustafson, Ivar, Minneapolis.
Gerland, Harry, Sleepy Eye.
Gillstad, Peter,
Deer Park, Wis.
Haberstich, A. C., Ziegler, Wis.
Halls, Albert, Hills.
Hanson, Fred, Alden.
Hartz, Fred, Moscow.
Hawkinson, Arthur, Stark.
Hedtke, Henry F., Bird Island.
Hellevang, Christ A.,
Webster, S. D.

Hogan, Jno., Mansfield.
John, Frank, Zion.
Killgren, Ed., Carver.
Kielty, Jno. F., Watkins.
Kinney, H. R., Nicollet.
Kral, Robt. H., Leader.
Kvale, Peter, Emmons.
Larson, Harry, Irving.
Lee, Ole O., Gary.
Lundahl, Henry, Alpha.
Lunow, H. H., St. George.
Madson, Andrew, Cosmos.
Marquardt, A. T.,
Misha Mokwa, Wis.
Marquardt, H. A., Echo.
Melius, Guy, Deer Creek.
Miller, Wallace F.,
West Concord.
Miller, Fred,
West Concord, R. 1.
Mittelstadt, David,
Bellingham.
McDougall, P. A., Royalton.
McGuire, A. J.,
St. Anthony Park.
Moe, Thos., Winthrop.
Moonan, Wm., Waseca.
Morris, H. B., West Concord.
Molkintin, Otto, Carver.
Morrett, C. D., Watkins.
Nelson, Ralph, Baldwin, Wis.
Nelson, Anton H., Stark.
Nelson, Arthue, Dunnfries.
Norskog, Ole J., Eddsville.
Noss, Henry, Rindal.
Olson, Allie, Plato.
Olson, Alvin M., Ashby.
Olson, Peter J., Cokato.
Olson, Siblon, Davies.
O'Mara, Eugene, Duluth.
Ornes, Jens, Bristol, S. D.
Palmer, Jos., Browns, Ill.
Panzer, U. J., Owatonna.
Parkhurst, L. D., Huron, S. D.
Peterson, Erick, Long Prairie.
Pier, Godlieb, West Concord.

Peterson, Arthur, Sleepy Eye.	Stalke, Wm., Waconia.
Plackner, Jno., Carver.	Stensgaard, A. B., Ada.
Pond, H. S., Muscoda.	Strand, Alvin P., Chisago City.
Powell, D. W., Warsaw.	Stunteback, John, St. Anthony.
Pundy, Jno. P., Baldwin, Wis.	Swenson, C. A., Otisville.
Rand, Robt. R., Winnebago City.	Tommervik, H. O., Gary.
Rishoff, Oliver, Gary.	Tuman, G. A., Litchfield.
Rydeen, Jno. A., Olberg.	Ulring, Edw., Webster.
Sanvik, Ole, Weggeland.	Vanderhyde, C. E., West Concord.
Schulte, H. C., Freeport.	Vrooman, H. E., Kasson.
Scripture, B. B., Dodge Center.	Wallace, W. W., Howard Lake.
Shrewsbury, F., Long Lake.	Weise, Otto, Lakefield.
Shafer, Frank J., Florida.	Woodworth, Chas. L., West Concord.
Smith, Mrs. A. Ripley, Minneapolis.	Young, Geo., Ottawa.
Smith, Frank A., Ridgeway.	
Sondugaard, M., Ridgeway.	

THE COLLEGE OF LAW.

FOR DOCTOR OF CIVIL LAW—6.

Bates, William Earl, LL. M., Minneapolis.	Mercer, Hugh Victor, LL. M., Minneapolis.
Denegre, James D., LL. M., St. Paul.	Moore, Albert R., LL. M., St. Paul.
Hermann, Arthur L., LL. M., Minneapolis.	Willis, Hugh E., LL. M., Minneapolis.

FOR MASTER OF LAWS—14.

Albee, William E., LL. B., Minneapolis.	Jordan, Michael Alfred, LL. B., Minneapolis.
Baldwin, Matthias, LL. B., Minneapolis.	Lundquist, Charles O., LL. B., Minneapolis.
Bardwell, Winfield W., LL. B., Minneapolis.	Mitton, William B., LL. B., Brown's Valley.
Buell, Charles J., LL. B., North Hudson, Wis.	O'Brien, Edward J., LL. B., Minneapolis.
Campbell, Walter H., LL. B., St. Paul.	Porter, Gardner H., LL. B., Minneapolis.
Headly, Lucius A., LL. B., Luverne.	Scares, Victor, LL. B., Minneapolis.
Jarman, Thomas J., LL. B., Minneapolis.	Stephanus, Charles J., LL. B., Minneapolis.

SENIOR DAY—79.

Alcott, Robert Kerr, Minneapolis.	Barney, Harry C., Mankato.
Alexander, Fred A., Kasson.	Baudler, Carl, Austin.
Anderson, Oliver Sverre, Minneapolis.	Beagle, Charles D., St. Paul.
Barnard, Robert T., Minneapolis.	Burdick, Usher Lloyd, Minneapolis.
	Bushfield, H. J., Miller, S. D.
	Campbell, H. Don, St. Paul.

- Carman, William Brainerd,
Detroit.
- Clapp, Harvey S., St. Paul.
- Closner, Edward G.,
Pine Island.
- Clough, Eugene D., Fosston.
- Diepenbrock, Clarence Perry,
Red Wing.
- Dieson, O. Elmer, Heron Lake.
- Dousman, Charles J., Northfield.
- Dredge, George, Lake Crystal.
- Eaton, Julian Stiles,
Minneapolis.
- Ellefson, Edward K., Dawson.
- Erickson, August Geo.,
Comfrey.
- Evans, M. V., Mankato.
- Flannery, Henry Clay,
Minneapolis.
- Fowler, Arthur W., Fargo, N. D.
- Frankberg, George Walter,
Fergus Falls.
- Frissell, E. Robert,
New Richmond.
- Gilbert, Trygve O., Willmar.
- Gislason, Haldor B.,
Minneapolis.
- Glassner, Louis M., Biwabik.
- Goff, Hiram S., Mapleton.
- Gorman, F. L., Rushford.
- Greer, Dorance Dorman,
Lake City.
- Guthrie, M. M. Zell,
Pierre, S. D.
- Hanson, Walter Harry,
New Lisbon, Wis.
- Haroldson, Hans B., Duluth.
- Harrington, Michael J., Avoca.
- Hosford, P., Minneapolis.
- Hudson, Guy H., Thorpe, Wis.
- Johnson, Carl Arvid, Mankato.
- Jones, George P., Luverne.
- Jones, Harry Kimball,
Minneapolis.
- Kercher, Alice Louise, St. Cloud.
- Klasen, Albert Herman,
Freeport.
- Kuehne, August E.,
Rock Valley, Ia.
- Lamoreaux, Addison Elmer,
Minneapolis.
- Maloney, Albinus S., Waseca.
- Mark, John H., Osage, Ia.
- Marshall, Allan K.,
Westfield, Mass.
- Martin, Charles,
Spring Valley, S. D.
- Maurin, Francis J., Elizabeth.
- McAlpine, Donald B.,
Two Harbors.
- McGarry, John H., N. St. Paul.
- Medbury, Frederick Wm.,
Dexter.
- Mitton, William B.,
Brown's Valley.
- Nichols, John Freeman,
Rice Lake, Wis.
- Olson, John, Two Harbors.
- O'Marr, Louis J.,
White Sulphur Springs, Mont.
- Oppenheimer, Wm. Henry,
St. Paul.
- Ostrom, Oscar W.,
New Sweden.
- Payne, Byron S.,
Vermillion, S. D.
- Power, Victor Leo, Hibbing.
- Praxel, Anthony J.,
Lamberton.
- Reed, F. E., Glencoe.
- Ruble, Edwin Carl, Willmar.
- Ryan, Patrick Joseph, St. Paul.
- Sayre, Abraham Maxon,
Ben Clare, S. D.
- Shea, William Henry, Jr.,
Eveleth.
- Smith, John W.,
Chippewa Falls, Wis.
- Sullivan, D. P., Mapleton.
- Taylor, James D.,
Red Lake Falls.
- Thompson, John Benjamin,
Fergus Falls.
- Thompson, Porteous Isaac,
Houston.
- Thorpe, Walton Willard,
Britton, S. D.
- Volk, Henry William,
Lake Washington.
- Wederath, F. C., Morton.
- Weld, Lyman P., Minneapolis.
- Wildes, Frank A., Hibbing.
- Williams, Charles Spencer,
Fairmount, N. D.
- Wood, Benjamin William,
New Richland.

SENIOR NIGHT—46.

Adler, Berndt Olson, St. Paul.	Mehan, James Edward, Minneapolis.
Akers, Walter Leslie, Minneapolis.	Murfin, Arthur M., Sleepy Eye.
Anderson, Sydney L., Little Falls.	O'Donnell, John T., Minneapolis.
Bartlett, Joseph B., Minneapolis.	Ogden, Leslie Solomon, Minneapolis.
Bartlett, Lester, Minneapolis.	O'Hare, Herbert F., Hammond, Wis.
Bridgeman, Raymond, Vermillion, S. D.	Peter, Henry, Minneapolis.
Bruce, Olaf Ludwig, Minneapolis.	Plummer, Frank L., Anoka.
Cotton, J. Frank, Washua, Ia.	Porter, Gardner H., Minneapolis.
Curtis, Elias B., Minneapolis.	Rice, William Albert, Lake City.
Dowdall, Augustus S., Minneapolis.	Ripley, Edwin Arthur, Oakfield, Wis.
Evans, A. D., Minneapolis.	Rogers, Edward Lowell, Aitkin.
Felberbaum Harry, Northfield.	Rossman, Willard Allen, Minneapolis.
Frankel, Hiram David, St. Paul.	Rundell, Edwin Albert, Earville, Ia.
Furber, Fred N., Minneapolis.	Schall, Anthony X., Minneapolis.
Gardner, Augustine Vincent, Jr., Hastings.	Solem, Ludwig Oliver, Minneapolis.
Grady, Thomas E., Chippewa Falls, Wis.	Stenson, Jesse G., Eden Prairie.
Hanson, Hans Adolph, Fergus Falls.	Stephanus, Charles J. S., St. Paul.
Hanson, H. Stanley, Minneapolis.	Thomas, Harry Hugh, Minneapolis.
Harrington, Curtis Lyman, Hayward, Wis.	Ware, J. Roland, Minneapolis.
Keohane, John, Minneapolis.	Wearne, Royer Grose, Minneapolis.
Kerr, Harold C., St. Paul.	Wyatt, George Oliver, Clinton, Ia.
La Du, Charles W., Waseca.	
Landon, Clio Grant, Minneapolis.	
LeBell, Austin Ozias, Bellingham.	
MacVicar, Earl Angus, Eau Claire, Wis.	

MIDDLE DAY—52.

Aaker, Caspar D., Ridgeway, Ia.	Austin, Harry Hart, Minneapolis.
Albertson, Charles N., St. Paul.	Baird, Roy, River Falls, Wis.
Anderson, Alvin Ferdinand, New Richmond, Wis.	Barrows, Earl Marsh, Herman.
Anderson, Don Cameron, Minneapolis.	Brady, Harry Louis, Blue Earth.
Anderson, William Howard, Estherville, Ia.	Brown, Robert Renshaw, Janesville.
	Burns, Leo A., Wells.

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|---------------------------|---------------------|--------------------------|--------------------|
| Carpenter, Fred J., | Parker, S. D. | Manderfeld, Hilger H., | New Ulm. |
| Carroll, Charles | Millbourne, | McGivern, Frank Charles, | Brainerd. |
| | Miller, S. D. | McWhorter, Harry, | St. Paul. |
| Chinnock, James | Thornton, | Morken, G. T., | Krognos. |
| | Portland, Ore. | Nevers, John Ralph, | Brainerd. |
| Corcoran, John | Hayes, | Ober, Bernard Antony, | Minneapolis. |
| | Minneapolis. | Patten, Ephraim | McMurtrie, |
| Cutting, Ellsworth A., | Sleepy Eye. | | Le Sueur. |
| Drake, Benjamin, Jr., | Maple Plain. | Peck, Harold J., | Shakopee. |
| Eckstrom, Andrew N., | St. Peter. | Peterson, Harry Denzil, | Glenwood. |
| Fahnestock, Otto, | Graettinger, Ia. | Randall, Clarence | Brewster, |
| | | | Hamline. |
| Fosmark, Alexander, | Fergus Falls. | Sanford, Roland G., | Faribault. |
| Gardner, Geo. Harold, | Brainerd. | Schendel, Julius, | Campbell. |
| Horrigan, Bartholomew B., | Minneapolis. | Semling, C. Knute, | Halstead. |
| Janousek, Joseph, | Veseleyville, N. D. | Sinness, Torger, | Minnewaukan, N. D. |
| Johnson, J. O. E., | Minneapolis. | Stamm, Albert, | St. Paul. |
| Johnson, S. O., | Cloquet. | Stoughton, Herbert | Leonard, |
| Kay, Bryant S., | St. Paul. | | Osage, Ia. |
| Keith, M. R., | Minneapolis. | Sullivan, John Francis, | Estherville, Ia. |
| Lamb, Manton J., | Grundy Center, Ia. | Thompson, Arthur M., | Deerpark, Wis. |
| Livesey, George, | St. Paul. | Von Williams, James, | Marshall. |
| Lunn, James B., | Sioux Falls, S. D. | Werring, Wayne | Richard, |
| | | | Sleepy Eye. |
| | | Witter, Emmett, | Minneapolis. |
| | | Zielke, John, | Oakfield, Wis. |

MIDDLE NIGHT—40.

- | | | | |
|----------------------|-------------------|-------------------------|----------------|
| Aproberts, Gwlyn, | River Falls, Wis. | Current, J. R., | Sleepy Eye. |
| Bailey, Seavey M., | Minneapolis. | Farmer, James D., | Spring Valley. |
| Bollom, Carl O., | Red Wing. | Gillman, Charles Lewis, | St. Cloud. |
| Bowe, Denis E., | Waseca. | Ives, Henry Swift, | St. Peter. |
| Boyd, Leon, | St. Paul. | Johnson, Vigo Herman, | Glenwood. |
| Chase, Josiah H., | Minneapolis. | La Du, Blanche, | Minneapolis. |
| Clarno, Elmer | Richard, | Lemen, Denny Price, | Minneapolis. |
| | Parkers Prairie. | Lundeen, Ernest C. A., | Northfield. |
| Crouley, William D., | Redwood Falls. | Lyons, Patrick Henry, | Danvers, Mass. |
| Cook, Paul, | Minneapolis. | Montgomery, George D., | Minneapolis. |
| Couper, W. F., | Minneapolis. | | |
| Courtney, Harry A., | Forest City. | | |
| Courtney, Thomas | Francis, | | |
| | Minneapolis. | | |

Morris, William Robert, Slayton.
 Minneapolis.
 Pierce, Joseph A., Duluth.
 Ricks, William, Iowa Falls, Ia.
 Sanford, Edw., Minneapolis.
 Schweitzer, Fred R., Ray, N. D.
 Smiley, Henry L., Minneapolis.
 Soderberg, Nathan F., Dawson.
 Stanbery, Ralph S.,
 Mason City, Ia.
 Stephens, Ralph Brown,
 Minneapolis.
 Sterrett, Lillian Josepha,
 Minneapolis.
 Stine, David Lowe,
 Struthers, James Andrew,
 Minneapolis.
 Stuart, Robert Kincaide,
 Minneapolis.
 Thoreson, Ole, Woodville, Wis.
 Waddington, Fernando Samuel,
 Minneapolis.
 Wartenbe, Charles Sumner,
 Minneapolis.
 White, Clyde Roy, Minneapolis.
 Willoughby, H. A.,
 Colbourne, Ontario.

JUNIOR DAY—124.

Anderson, Victor E., Wheaton.
 Arnston, Arthur Emanuel,
 Red Wing.
 Arper, William B., Hastings.
 Barrager, Fred LeRoy,
 Sheldon, Ia.
 Bazille, Chester Arthur,
 St. Paul.
 Bell, John Bliss, Minneapolis.
 Binford, Loubie Bailey,
 Estherville, Ia.
 Bradley, Ralph Dawson,
 Duluth.
 Brown, Garfield W.,
 Minneapolis.
 Brush, Percy Porter, St. Paul.
 Burns, Carl Elmore,
 Mason City, Ia.
 Burrel, Fred R., Princeton.
 Carey, William, Mapleton.
 Charles, Herbert John, St. Paul.
 Chase, Raymond Parks, Anoka.
 Chismore, E. T., Coggan, Ia.
 Clark, Percy Moon, Ortonville.
 Collins, Thomas Bernard,
 New Ulm.
 Crosman, Charles Nye,
 Milwaukee, Wis.
 Curtis, Guy L., Fergus Falls.
 Davies, Robert William,
 Minneapolis.
 Davin, Edward H., Beloit, Wis.
 Davis, Avery J., St. Paul.
 Dickinson, Burr Andrew,
 St. Paul.
 Douglas, Harold B., St. Paul.
 Eberhart, Axel Albert, Mankato.
 Edquist, Reuben, Minneapolis.
 Eide, Carl John, Duluth.
 Ellingson, Severt J., Norway, Ia.
 Fellows, Fred Page, St. Paul.
 Field, John Bertram, Renville.
 Finch, Eldon E., Winnebago.
 Fitchette, Elwood D.,
 Minneapolis.
 Fitzgerald, Francis Gerald,
 Lake City.
 Foley, Thomas Robert, Aitkin.
 Foote, Wallace Clyde,
 Estherville, Ia.
 Frantz, Charles Andrew,
 Sleepy Eye.
 Freimuth, David Charles,
 Duluth.
 Funck, Richard Maurice,
 Minneapolis.
 Gilham, Lynn, Luverne.
 Gilman, H., Minneapolis.
 Griffith, Henry Lee,
 Minneapolis.
 Hagen, Louis Theodore,
 Glenville.
 Hamel, Charles Dennis,
 Grafton, N. D.
 Hamlin, Lyle Alonzo,
 Spring Valley.
 Hanson, Hans A., Fergus Falls.
 Hanson, Hans B., Faribault.
 Hansen, Thorwald, Benson.
 Harder, Worth C.,
 Minneapolis.
 Hewitt, Clyde Ackley, Nassau.
 Hilger, John Bernard, St. Paul.
 Hill, Knute, Creston, Ill.

- Hinkley, Wm. Benj., Luverne.
 Homnes, George Paul, Caledonia.
 Castle Rock, Wis.
 Hosp, Joseph Abraham, Elk River.
 Hopkins, St. Paul.
 Houston, Claude Ross, Nora Springs, Ia.
 Minneapolis.
 Huntington, Carl Walter, Mitchell, Ralph H., Minneapolis.
 Minneapolis.
 Hurley, Martin J., Pine City.
 Johnson, Andrew, O'Neill, Charles Price, Sherburne.
 Valley City, N. D.
 Johnson, A. V., Alexandria.
 Alexandria.
 Jones, Carl Ross, Parker, S D.
 Johnson, Joseph, Kasota.
 Keeley, William Edward, Barnesville.
 Barnesville.
 King, Willis Warren, Decorah, Ia.
 Minneapolis.
 Klancke, Albert Charles, Winona.
 Norwood.
 Knapp, Cleon Talboys, Northfield.
 St. Paul.
 Koeford, Sigvord Marius, Ashby.
 Ashby.
 Lane, Charles, St. Anthony Park.
 St. Anthony Park.
 Lewis, John Chester, Hutchinson.
 Hutchinson.
 Lewis, Roy Vivian, Worthington.
 Worthington.
 Linde, Henry J., Ridgeway, Ia.
 Lindgren, Joseph Raymond, St. Paul.
 St. Paul.
 Adrian.
 Linehan, James Daniel, River Falls, Wis.
 River Falls, Wis.
 Loevinger, Gustavus, Mitchell, S. D.
 Mitchell, S. D.
 Lovell, Oliver Herbert, Minneapolis.
 Minneapolis.
 Luce, Earl David, Minneapolis.
 Lundquist, Seth, Minneapolis.
 McCanna, Charles David, Minneapolis.
 Minneapolis.
 McDougall, Hugh Duncan, Waseca.
 Waseca.
 McGregor, Charles, St. Paul.
 McGreery, John Matthew, Minneapolis.
 Minneapolis.
 McHugh, Edward Everett, Zumbrota.
 Zumbrota.
 McNeice, Leroy, Sauk Center.
 Sauk Center.
 McNelly, William Oscar, Caledonia.
 Caledonia.
 Menz, Clifford John, St. Paul.
 Merrifield, Herbert, Elk River.
 Miller, Ray Othello, St. Paul.
 Mitchell, Lynn Burgess, Nora Springs, Ia.
 Nora Springs, Ia.
 Mitchell, Ralph H., Minneapolis.
 Nordlin, George, St. Paul.
 St. Paul.
 O'Neill, Charles Price, Sherburne.
 Sherburne.
 Padden, William Henry, Glenwood.
 Glenwood.
 Phelps, Victor Edward, Huntington, W. Va.
 Huntington, W. Va.
 Phillips, Charles Earl, Larabee, Ia.
 Larabee, Ia.
 Preus, Jacob A. O., Decorah, Ia.
 Decorah, Ia.
 Pryor, William Hammond, Winona.
 Winona.
 Pye, Charles Richard, Northfield.
 Northfield.
 Radcliffe, Amos, Eagle River, Wis.
 Eagle River, Wis.
 Radichel, Paul Henry, Lake Crystal.
 Lake Crystal.
 Redman, Henry C., Windom, S. D.
 Windom, S. D.
 Reed, Albert P., Minneapolis.
 Ryczek, Gerard, New Ulm.
 New Ulm.
 Scharschug, George Joseph, St. Paul.
 St. Paul.
 Schull, Harold, Minneapolis.
 Minneapolis.
 Shedd, Frank Woodworth, Minneapolis.
 Minneapolis.
 Smith, George David, Redwood Falls.
 Redwood Falls.
 Stradley, John Woodcock, Cresco, Ia.
 Cresco, Ia.
 Sweeney, William Bernard, Norwood.
 Norwood.
 Swendiman, John, Jr., Dodge Center.
 Dodge Center.
 Taylor, Stella Edell, Minneapolis.
 Minneapolis.
 Teasdale, Frank Wallace, St. Paul.
 St. Paul.
 Thompson, Albert C., Minneapolis.
 Minneapolis.
 Thompson, James Arthur, Minneapolis.
 Minneapolis.

Town, Robert Chancy, Worthington.	Von Ende, Victor Henry, Minneapolis.
Truax, June Jay, Mantorville.	Waters, Sam Matthew, Minneapolis.
Turnquist, Ralph Albert Eugene, Minneapolis.	Weiskopf, Robert George, Minneapolis.
Tyler, George Harvey, Willmar.	Wheaton, Charles, Elk River.
VanDusen, George Cross, Minneapolis.	Winston, Fendall G., Minneapolis.
	Woodrow, Carl Jay, Luverne.

JUNIOR NIGHT—60.

Alm, Arvid Gothard, Minneapolis.	Kimball, Edward Lincoln, Duluth.
Aygarn, Martin H., Choice.	King, Francis Leroy, Ellendale, N. D.
Blanchar, Clarence Leroy, Fox Lake.	Kleinschnitz, Henry George, Eau Claire, Wis.
Breding, A. Melvin, Minneapolis.	Kranz, Joseph Philip, Hastings.
Brooks, Paul Andros, Minneapolis.	Langlois, Victor Seabury, Minneapolis.
Churchill, Irving Allen, Rochester.	Larson, Edward John, Irving.
Clayton, Chas. Cameron, Pipestone.	Lavik, Peter R., Minneapolis.
Collins, Louis Loren, St. Cloud.	Leach, Hugh Ellis, Spring Valley.
Danforth, James A., Parker, S. D.	Lofffield, Gabriel, Minneapolis.
Domes, Fred Sam, Blue Earth.	Lund, Wm. Oscar, Minneapolis.
Dow, Don Carlos, Worthington.	Lyons, Dennis Francis, Merriam Park.
Drake, Clarence E., Minneapolis.	McGrath, William H., Milward.
Dyer, Howard Vance, Pipestone.	McManigal, W. Allison, Minneapolis.
Edison, Harry James, Kasson.	Merrill, Ezra Birdette, Minneapolis.
Furbar, Angier Garfield, Minneapolis.	Needham, John Harold, St. Paul.
Gallagher, Richard, Minneapolis.	Newhall, Norman Leslie, Minneapolis.
Goldsbury, Joseph W., St. Anthony Park.	Norton, Frank E., Minneapolis.
Goodsell, Clarence W., Flandreau, S. D.	Norton, Willis Irving, Minneapolis.
Gruber, J. Henry, St. Paul.	Noyes, Edgar L., Minnetonka.
Hoke, George Edward, Minneapolis.	Pattee, Richard S., Minneapolis.
Irsfield, James B., Minneapolis.	Peterson, Horace, Pillager.
Joss, Louis H., Minneapolis.	Ready, Thomas Francis, Minneapolis.
Kells, Lucas Carlisle, Sauk Center.	Remele, Albert C., Sleepy Eye.
	Robinson, Bernard, New York City.
	Rosenmeier, Christian, Thorpe.

- Sellars, Ernest Francis,
St. Paul.
Shuck, Warren E., Rushmore.
Smith, Chas. Elmer, Wadena.
Tanner, Clarence L., Little Falls.
Veldey, Ledlef A.,
Honey Falls.
Webster, George Burbank,
Minneapolis.
- Welles, Albert B., Centre, N. D.
Wells, Homer DeVern, Duluth.
Wold, Carl J., Minneapolis.
Wright, Chas. Rolla,
Fergus Falls.
Young, Margaret Agnes,
Minneapolis.
Youngquist, Chas., Minneapolis.

SPECIAL STUDENTS—114.

- Abrahamson, George Leroy,
Auburn, Wis.
Allen, Gustavus Wilhelm,
Minneapolis.
Anderson, Fanry Carl, Wheaton.
Anderson, Peter Augustus,
Sturgeon Bay, Wis.
Andre, Charles Johnson,
Prairie Farm, Wis.
Ashley, Wells M., Minneapolis.
Baily, George R., Minneapolis.
Barnard, George W.,
Spencer, Ia.
Brackett, Frank Hoyt,
Minneapolis.
Brown, Frank A.,
Aberdeen, S. D.
Burns, Peter M., Minneapolis.
Caldwell, Frank Arthur,
Moorhead.
Campbell, James, Jackson.
Cassidy, Charles A., Hull, Ia.
Caswell, Irving A., Anoka.
Catlin, Alva George, Delano.
Clark, Arthur H., Minneapolis.
Condon, Edward St. J.,
Minneapolis.
Culver, Miles K., St. Ansgar, Ia.
Curtis, Horace F., Minneapolis.
Davies, Otto Nelson, Winona.
Davis, Homer C., Minneapolis.
Dawley, Carroll H.,
Minneapolis.
De Courcy, John Charles,
St. Paul.
Doran, James Daniel,
Grand Rapids.
Doran, James Edwin, Rochester.
Eckholt, Irving Lans, Rochester.
- Freeman, Clarence K., St. Paul.
Gibson, Wm. James Boyd,
Sedan.
Giss, Richard Louis,
Sauk City, Wis.
Gray, Thomas J., Minneapolis.
Gregg, Kenneth Philbrick,
Minneapolis.
Griggs, Orrin Harold, Virginia.
Griswold, Harry Adams,
Minneapolis.
Haagenson, John N., Carlisle.
Hamley, Ira O., Minneapolis.
Hannay, Norman Bond,
St. Hilaire.
Hanson, D. E., Minneapolis.
Henderson, Jess Gideon,
Minneapolis.
Hendryx, James Beardsley,
Sauk Centre.
Herz, Gregor H.,
Minneapolis.
Hinman, Walter Clifford,
Brainerd.
Hoff, Enock Arnold, Ashby.
Horswell, Barton Alavern,
Minneapolis.
Houska, Charles H.,
Veseleyville, N. D.
Humphrey, H., Minneapolis.
Hunter, Fred R., Minneapolis.
Kay, John Henry, St. Paul.
Kelly, Thomas Robson,
Owatonna.
Kennedy, John P., Minneapolis.
Kennedy, Roger Emmet,
St. Paul.
Kerrick, Fred B., Minneapolis.

- Keune, Fred Henry,
Minneapolis.
- Knight, Harold Morris,
Sisseton, N. D.
- Kopplin, Frederick W., St. Paul.
- Larson, Fred. A., Willmar.
- Larson, John C., St. Cloud.
- Layne, John A., Rushford.
- Leverson, Oliver, Hawley.
- Lusk, Chas., Minneapolis.
- Mani, Thomas E.,
Sisseton, S. D.
- Margulis, Chas. A., Minneapolis.
- Marshall, Robert Wells,
Minneapolis.
- Matoushek, Frank, Minneapolis.
- Murphy, Francis James,
Kenmare, N. D.
- Murphy, Joseph E.,
New Richmond, Wis.
- Myers, Raymond H.,
Minneapolis.
- Newcomb, Albert Schirley,
Hallock.
- Newmyer, George Philip,
Minneapolis.
- Newton, Walter H.,
Minneapolis.
- Nuessle, Albert Gustav,
Springfield.
- Orth, James B., Minneapolis.
- Osterberg, Arthur G., Cokato.
- Paddock, George A.,
Minneapolis.
- Peterson, Ira C., Tacoma, Wash.
- Powers, George Gordon,
Montevideo.
- Prueher, Joseph G.,
Bloomer, Wis.
- Redding, Jno. G., Windom.
- Richards, Mahlon Warde,
Duluth.
- Riley, Henry John, Minneapolis.
- Riley, Lester Aloyius,
Minneapolis.
- Robb, James A., Minneapolis.
- Robbins, Harry Miller, St. Paul.
- Robinson, Howard Edward,
Minneapolis.
- Roth, Bert Henry, Arlington.
- Royhl, Albert Adam,
Arlington, S. D.
- Russell, George Herman,
Augusta, Wis.
- Sasse, Carl A., Vienna, S. D.
- Schmidt, Albert James, Chokio.
- Shillock, John C., Minneapolis.
- Slattery, Ruby E.,
Eagle River, Wis.
- Smith, Brayton, Ezra, St. Paul.
- Smith, Harold B., St. Paul.
- Smith, Harry Adams,
Minneapolis.
- Smith, J. LeRoy, Minneapolis.
- Stafne, Albert Julius J.,
Galchutt, N. D.
- Stevens, Homer W.,
Minneapolis.
- Swanson, Emil Theodore,
Minneapolis.
- Swee, John Peter, Roscoe.
- Swinland, John, Halstad.
- Thayer, Whitman, Minneapolis.
- Thelan, John N., Stillwater.
- Thomas, David Richard,
Minneapolis.
- Ulness, Carl Oscar,
Wilton, N. D.
- Van Metre, Ricker,
Waterloo, Ia.
- Verge, Walter L., Minneapolis.
- Waller, Lucky Samuel,
Minneapolis.
- Warren, John Beaumont,
White Earth.
- Wetterlin, Charles, Farmington.
- Willey, Herbert L.,
Anamoose, Ia.
- Willmert, Alfred Elmer,
Minneapolis.
- Winthrop, Max S.,
Minneapolis.
- Wright, George Aldro,
Wahpeton, N. D.
- Yerxa, Howard White,
Minneapolis.

THE COLLEGE OF MEDICINE AND SURGERY.

GRADUATE STUDENTS—3.

Dr. F. L. Adair, Anamosa, Ia.	Dr. F. E. Schacnt, Univ. of
Dr. A. K. Bliven, Gross Medical,	Minn.,
Denver, Col.,	Minneapolis.

FOURTH YEAR—75.

Abbott, Claude U., Minneapolis.	Gallup, Glen D., Hudson, Wis.
Anderson, Arnt G., Minneapolis.	Gates, Chester E., Rochester.
Anderson, Walmer L.,	Gowenlock, Harry Joseph,
Minneapolis.	Barnesville.
Belden, George, Spokane, Wash.	Gunz, Abe Nathan, Minneapolis.
Benson, Theodor J.,	Higgins, Irving W.,
Minneapolis.	Hutchinson.
Biederman, Jacob,	Hoffman, Walter Frederick,
Somerset, Wis.	Minneapolis.
Bigelow, Charles Edward,	Hoffman, Wm. F., B. A. '00, Ia.,
Dodge Center.	Sioux Falls, S. D.
Birnberg, Tobias, St. Paul.	Hoidale, Andrew, Dawson.
Blais, Charles, Cohoes, N. Y.	Hutchinson, Henry John,
Boeckmann, Egil, St. Paul.	Hutchinson.
Brand, William Algernon,	Hynes, John E.,
Big Stone City, N. D.	Winnebago City.
Brown, Charles E.,	Johnson, Hans, Willmar.
Highland, Kan.	Johnsson, Gunlauger F., B. A.
Campbell, Lorne A.,	'00, Univ. of N. D.,
Waba, Ont.	Grand Forks, N. D.
Campbell, Robert A., Tracy.	Kearney, Percy F., Minneapolis.
Coffin, Samuel D., Lyndale.	Kelly, Thomas C., Duluth.
Coria, Leon, Minneapolis.	Kiefer, Michael A., Sleepy Eye.
Crossette, George Dart,	Klemer, Carl A., Faribault.
Minneapolis.	Knutson, Ole, Little Cobb.
Devine, John Leo, St. Paul.	Kuth, Joseph R., Minneapolis.
Dittman, George C., St. Paul.	Lundmark, Lambert,
Dix, George Edwin,	Cumberland, Wis.
Rochester.	Mattson, John Albert, Dassel.
Dougherty, Edwin B., Duluth.	Maurer, Edward L., St. Paul.
Dougherty, Louis E., Duluth.	McKibben, Harry E.,
Dunn, John T., Waseca.	Webster, S. D.
Emmerson, William S.,	Morey, Charles Berry,
Port Perry, Ont.	Winona.
Freeburg, Harry M.,	Movius, Arthur J.,
Charles City, Ia.	Lidgerwood, N. D.
Freeman, Charles D., St. Paul.	Nickerson, Margaret L., M. A.,
Frost, William S., B. A. '01,	Smith and Radcliffe Colleges,
Minnesota,	Minneapolis.
Willmar.	Nyquist, Jacob E., B. A., '99,
Gaard, Rasmus, Roland, Ia.	Gus Adolp.,
Gallagher, Patrick Joseph,	Hopkins.
Graceville.	

- Olander, Edwin E., A. B. '96,
Minneapolis.
- Olson, George, Minneapolis.
- Preisinger, Joseph W.,
New Ulm.
- Ransom, Edward M.,
Minneapolis.
- Reynolds, James S.,
New Hampton, Ia.
- Ribble, George B., B. A., '01,
Minnesota, St. Peter.
- Richards, William George,
Minneapolis.
- Robbins, Ray P., Sauk Centre.
- Rosen, Samuel, Minneapolis.
- Schulze, Albert G., Duluth.
- Tebbitt, Robert L., Minneapolis.
- Thomas, George E., B. A., '01,
Minnesota, St. Paul.
- Thomson, Arthur, Minneapolis.
- Titus, William S., Tracy.
- Wallace, Charles J.,
West Superior, Wis.
- Warner, Eugene F., St. Paul.
- Webster, Albert M., B. A., '91,
Minnesota, Minneapolis.
- Wheeler, Frederick L., B. A. '01,
Minnesota, Minneapolis.
- Willson, Hugh S.,
Bathgate, N. D.
- Williams, Stephen E.,
River Falls, Wis.

THIRD YEAR—91

- Alley, Albert G., Buffalo.
- Anderson, Carl A., Deer Creek.
- Argue, Hiram Septimus,
Bathgate, N. D.
- Arneson, Arne O.,
Beaver Creek.
- Aronsohn, David M., St. Paul.
- Arzt, Phillip G., St. Paul.
- Arneberg, John G.,
Grand Forks, N. D.
- Austin, Wilford J.,
Milbank, S. D.
- Benoit, Frank T., Crookston.
- Benson, Oscar Theodor,
Appleton.
- Berg, Sigurd A.,
Granite Falls.
- Blakely, Clement C.,
Neenah, Wis.
- Brandt, Albert M.,
Forest City.
- Branton, Berton J., Minneapolis.
- Brigham, Frank T., St. Cloud.
- Brown, Paul F., B. A. '02,
Minnesota, Pipestone.
- Brush, Fred H., Amboy.
- Bryant, Oliver P., Minneapolis.
- Burns, Robert N., St. Paul.
- Campbell, Daniel R., St. Paul.
- Castle, Harry E., Dewey.
- Chambers, Winslow C., B. A.,
'00, Minnesota, Owatonna.
- Chase, Frank E., Greeley, Ia.
- Churchill, James Patrick,
Minneapolis.
- Collins, Arthur N., B. A. '02,
Minnesota, Minneapolis.
- Dawson, Albert M.,
Minneapolis.
- Durand, Jay I., B. A. '02,
Minnesota, Crookston.
- Dyar, Bury A., St. Charles.
- Frasier, George W.,
Minneapolis.
- Freeman, George N., Hector.
- Gans, Edward M., St. Cloud.
- Gauger, Edward, St. Paul.
- Goehrs, Henry, Minneapolis.
- Greaves, Jay J., Glencoe.
- Griffin, Miriam E., B. A. '00,
Minnesota, St. Paul.
- Hammerel, Ambrose,
Minneapolis.
- Haugen, Gilbert, Maynard.
- Helland, John W., Minneapolis.
- Hendrickson, John F., B. A. '00,
Augsburg, Montevideo.
- Hilger, Andrew W., St. Paul.
- Hilger, David D., St. Paul.
- Hoyt, John E., Hoyt, Ia.
- Jacobs, Johannes C., Spicer.
- Jacobson, Leonard H., Luverne.
- James, Ralph C., Mankato.
- Johnson, John A., Minneapolis.
- Johnson, Martin A., A. B., '00,
Gust. Adolph., Duluth.

- Johnson, Nelius J., Mabel.
 Johnson, Nimrod A., Winthrop.
 Johnson, Oscar V., Carver.
 Kane, Joseph P., Minneapolis.
 Kelly, Severin M., Madelia.
 Kibbe, Orel A., Hampton, Iowa.
 Klein, Henry N., St. Paul.
 Kranz, Martin, Lake Crystal.
 Kuhlman, August, Melrose.
 Larson, Leonard A.,
 Minneapolis.
 Ludemann, Alfred H., Buffalo.
 Lynde, Roy, Ellendale, N. D.
 Maschger, Albert P., St. Paul.
 Mathews, Gustav A.,
 Lester Prairie.
 Matthews, Justus Abner,
 Ortonville.
 Metcalf, James N., Minneapolis.
 Meyer, Ette L., Minneapolis.
 Moir, William W., Minneapolis.
 Morrill, Robert, Byron.
 Nicholson, Elmer, Strout.
 Nickerson, W. S., B. S., Har-
 vard,
 Minneapolis.
 O'Brien, Henry C., St. Paul.
 Parsons, George E., Elk River.
- Pearce, Nay O., Duluth.
 Peterson, Olaus L., Cokato.
 Porter, Oliver M., Willmar.
 Pratt, Chelsea Carrol,
 Minneapolis.
 Ramaley, Louis, St. Paul.
 Richmond, Charles D.,
 Windom.
 Rogers, James L., Minneapolis.
 Rothschild, Harold J., St. Paul.
 Rosseau, Victor, French Lake.
 Seaberg, Simon P., B. A., Carle-
 ton,
 Olivia.
 Smith, Arthur E., Minneapolis.
 Smith, Frank D., Rochester.
 Sogge, Ludwig L., Jackson.
 Thompson, Albert,
 Sacred Heart.
 Trutna, Thomas J., Silver Lake.
 Tuohy, Edward L., B. A., '02,
 Minnesota,
 Chatfield.
 Walker, J. Frank, Minneapolis.
 Walter, Guy F., Minneapolis.
 Weishaar, Charles J., Osseo.
 Whitman, Luther O., St. Cloud.
 Will, William W., Mapleton.
 Zimmerman, Albert E., St. Paul.

SECOND YEAR—48.

- Abbott, William P., Faribault.
 Ashley, Edward M.,
 Pembina, N. D.
 Aspelund, Joseph, A. B., Luther,
 '01,
 Mondovi, Wis.
 Brown, John C., B. S., Stanford,
 Minneapolis.
 Bartron, Harry J., Lake City.
 Bergh, Luther V., Audubon.
 Bray, Edwin R., A. B., Univ. of
 Minn., '03,
 Biwabik.
 Brede, Wm. G., Minneapolis.
 Bulkley, Nathan C.,
 Danbury, Conn.
 Callerstrom, Gottfried W., A.
 B., Minnesota,
 Gowrie, Ia.
 Canfield, Harry E., St. Charles.
 Carlsen, Edwin L., Albert Lea.
 Chapman, Winthrop S.,
 St. James.
 Cheleen, Sigfrid J.,
 Rock Island, Ill.
 Colp, Donald G., B. D., Yale,
 Minneapolis.
- Conway, Steven V., Graceville.
 Cosgrove, Joseph H.,
 Montevideo.
 Ely, Orriman,
 West Superior, Wis.
 Foster, Bainbridge W., Ph. B.,
 Hamline,
 Hector.
 Green, George H., A. B., Min-
 nesota,
 St. Peter.
 Hagen, Olag J., A. M.,
 Abercrombie, N. D.
 Hammes, Ernest M., Hampton.
 Haney, Claude I., A. B., Minne-
 sota, '03,
 Minneapolis.
 Holm, John H.
 Iverson, Anton B., A. B., St.
 Olaf, '01,
 El Paso.
 Knight, Ray R., A. B., Minne-
 sota, '03,
 Minneapolis.
 Lemke, George F., St. Paul.
 Lund, Axel B., Dawson.
 McLaughlin, Jerome E.,
 Granada.
 McMahon, Charles, Adrian.

- Miller, Harry W.,
Wahpeton, N. D.
Moren, Edward, Minneapolis.
Nelson, Arne, Willmar.
Nielsen, Niels, Denmark.
Pederson, Reuben M.,
Hanley Falls.
Peters, Le Roy,
St. Joseph, Mich.
Peterson, Victor N., Cokato.
Ridley, William A.,
Minneapolis.
Rudell, Gustaf L., A. B. Minne-
sota, '03, Winthrop.
- Smith, Fred L., A. B. Minne-
sota, '03, Sioux Falls, S. D.
Smith, Margaret L.,
Minneapolis
Swanson, Cephas, East Union.
Teisberg, Carl B., Ashby.
Tyrrell, C. C., Ph. B., Hamline.
Tyler, Frank A., Brainerd.
Verne, Victor E., Minneapolis.
Vistaunet, Peder, Fargo. N. D.
Witham, Carl A.,
Rock Elm, Wis.

FIRST YEAR—49.

- Barclay, Alexander, Jr.,
St. Paul.
Beede, Ethel R., Minneapolis.
Boyum, Peter A., Rushford.
Current, Earl H., Sleepy Eye.
Cutts, George, Minneapolis.
Downey, Hal (Special),
Minneapolis.
Egan, John M., Osseo.
Eklund, Elmer J.,
Young America.
Emanuel, Henry J.,
Milnor, N. D.
Estrem, Carl O., New London.
Fortier, Edward L.,
Little Falls.
Gronvold, Marie (Special),
Minneapolis.
Herman, Moses B., St. Paul.
Jennings, George, A. B., '03,
Univ. N. D., Cavalier, N. D.
Jones, Elmer M., Minneapolis.
Judson, William E., Ph. B.,
Hamline, '99, Medford.
Karn, Bert A., Ortonville.
Kelsey, Carleton G.,
Minneapolis.
Kvittum, Joseph M.,
Minneapolis.
Knudtson, Albert, Minneapolis.
Labbitt, Roy H., Sheldon, N. D.
Loomis, Earl H., Owatonna.
Lemstrom, Jarl Ferd,
Minneapolis.
Matson, Jessie A. (Special),
Minneapolis.
- Martin, Thomas R.,
Mantorville.
MacMillan, Mary, St. Peter.
Maland, Clarence, Rushford.
McGroarty, John J., Rosemount.
Oyen, Rrynjolf, Warson.
Pederson, Harold, A. B., St.
Olaf, Grand Forks, N. D.
Poppe, Frederick H.,
Minneapolis.
Quist, Henry W., Chisago City.
Rodgers, Charles L.,
Minneapolis.
Rosenthal, Ignatius P., St. Paul.
Sanborn, Courtland B.,
Faribault.
Scace, Lee A., Pringhar, Iowa.
Seeley, Lora F. (Special),
Minneapolis.
Smith, Clarke S., Brainerd.
Smith, Ernest V., Minneapolis.
Stevens, Charles S.,
Farmington.
Strang, David M., B. S., Carle-
ton, Duluth.
Strathern, Moses L.,
Rich Valley.
Torrens, Aaron S., Austin.
Varco, Raymond A., Austin.
Week, John S., St. Paul.
Wells, Amos S., A. B., New-
berry, N. C., Newberry, N. C.
Wylie, Arthur R. T., Ph. D.,
Wooster, '98, Faribault.
Young, Alfred H., Minneapolis.
Zalesky, Rose E., St. Paul.

THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY.

SENIOR CLASS—6.

Ballard, James Allen,	St. Paul.	Mackeen, Mrs. Ida Frances,	Minneapolis.
Cole, Carl Vincent,	Minneapolis.	Tibbetts, Mrs. Flora V. W.,	St. Paul.
Holmes, Charles Franklin,	Aberdeen, S. D.	Wilkowski, Conrad William,	Morristown.

JUNIOR CLASS—5.

Ballou, Henry Burchard,	Minneapolis.	King, Herbert V.,	St. Paul.
Hickman, Carl E.,	Minneapolis.	Waller, Joseph Dawes,	Minneapolis.
Jordan, Michael Matthew,	Wayzata.		

SOPHOMORE CLASS—1.

Newkirk, Bertha G., Minneapolis.

FRESHMAN CLASS—2.

May, Wayne Hamilton,	Moorhead.	Pond, Samuel Benjamin,	Minneapolis.
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THE COLLEGE OF DENTISTRY.

GRADUATES—CLASS 1903.

Ahlstrom, Joseph Theodore,	St. Peter.	Davies, Norman Llewellyn,	Minneapolis.
*Amundson, C. LaDue,	St. Peter.	Day, Judson Lcroy,	Clinton Falls.
Bosel, Albert Christian,	Henderson.	Foster, Albert Ray,	Winona.
Burns, Jay Hugh, Stewart.		Frankoviz, Frank Anton,	Fergus Falls.
Cain, James Robert,	West Concord.	Gholz, Lewis Ralph,	Roscoe.
*Crane, Emory Saxe,	Minneapolis.	Goodspeed, Henry Erwin,	New Richland.
Cole, Claude Lynn,	Fergus Falls.	Hektner, Hans Christian,	Mooretown, N. D.
Conley, Samuel Lewis,	Cannon Falls.	Hourn, George Edwin,	Minneapolis.
Cook, Michael Francis,	Faribault.	Huestis, Walter Clyde,	Minneapolis.

*Diplomas granted by the Board of Regents upon completion of work.

Kuncke, Gustavus Adolphus, Henderson.	Sparrow, Cecil Chester, Ortonville.
*Lafans, Walter Scott, Minneapolis.	Spring, William John, Madison.
Lasby, William Frederick, Northfield.	Trench, James Francis, Denison.
Moorhouse, Franklin Elmer, Minneapolis.	*Tuck, Lewis Edward, Minneapolis.
Pattison, George J., Herman.	Werring, Oscar Sidney, Sleepy Eye.
Peterson, Ernest Francis, Minneapolis.	Whitcomb, Harold Warren, Alexandria.
Pike, Jay Nelson, Lake City.	Williams, George Davis, Willmar.
Prendergast, Frank, St. Paul.	Wood, Orlando Bigelow, Blue Earth.
Smith, Clayton Mills, Minneapolis.	Yaeger, Frederick Spencer, Helena, Mont.
*Smith, George Dwight, Minneapolis.	

THIRD YEAR CLASS—26.

Bell, Charles Ulysses, Cedar Mills.	Mihleis, Edwin Wm. Geo., Ellsworth, Wis.
Barney, Paul Wood, Mankato.	Montelius, George Alfred, Sweden.
Bennett, David William, St. Peter.	Nelson, Albert Carlos, Litchfield.
Braafadt, Theodore Olaf, Belview.	Reed, Albert Alonzo, Humboldt, Iowa.
Cox, Arthur Henry, Wasioja.	Rice, Arthur Nelson, Adrian.
Cullum, Walter Cornell, St. Paul.	Rider, Don DuVello, Minneapolis.
Freeburg, Jay Monroe, Charles City, Iowa.	Schacht, Joseph August, Minneapolis.
Green, Robert O., Florence.	Steadman, Guy Benjamin, Anoka.
Grey, William Alexander, Cadott, Wis.	Strong, William Henry, Graceville.
Johnson, Leonard James, Cedar, Mills.	Sture, Walmer Turner, Center City.
Leffek, William Joseph, Ellendale, N. D.	Swenson, Carl August, Ubet P. O., Wis.
Lillehei, Axel Olai, Luverne.	Waiste, Charles Edgar, Minneapolis.
McNeil, Walter Hill, Alexandria.	
McRae, Duncan Adrian, Sleepy Eye.	

*Diplomas granted by the Board of Regents upon completion of work.

SECOND YEAR CLASS—58.

- †Agern, Arthur Cornelius,
Fergus Falls.
- Baker, Henry W., Wells.
- Bancroft, Merton Eugene,
Delton, Wis.
- Barnett, Harvey Dwight,
St. Paul.
- Barton, Harry Elijah,
Flint, Mich.
- Bennett, Charles Edward,
Granite Falls.
- Bittner, Arthur Hugo,
St. Peter.
- Borgendale, Edward,
Lac Qui Parle.
- Bowe, John Francis, Waseca.
- Brastad, Olaf, Minneapolis.
- Brown, Thos. Andrew,
Lake City.
- Bugbee, Clyde Sereno,
Minneapolis.
- Burgan Frederick, Preston,
Minneapolis.
- Burt, Leonard Henry, Chokio.
- Bush, Charles Arthur,
Northfield.
- Casselman, Don, Tracy.
- Corson, Walter Hartley, Ada.
- Crouch, David Charles, Tracy.
- Curtin, James, Henderson.
- Deering, Joseph Wm.,
West Superior., Wis.
- Dittmarsen, John Elias, Irving.
- Doyle, Milo Hayden,
Winnebago City.
- Foster, Charles White,
St. Paul.
- Gillam, Clarence Gifford,
Windom.
- Glimme, Knute Arthur,
Kenyon.
- Hamlon, Chauncy Wilfred,
Jackson.
- Hanson, Henry Alexander,
Fergus Falls.
- Ihle, Edward Anthony,
Eau Claire, Wis.
- Ingalls, Raymond Eugene,
St. Paul.
- Johnson, Alfred C.,
Winthrop.
- Kubat, William,
Blooming Prairie.
- LaDue, Thomas Irving,
Fertile.
- Lukkason, Joseph, Bratsberg.
- Lyon, Harry David,
Minneapolis.
- Maves, Herman Albert,
St. Peter.
- McIntyre, Ralph Emerson,
River Falls, Wis.
- Miller, Charles Warren,
St. Peter.
- Moskau, Gilbert,
Mayville, N. D.
- Nelson, Charles, Glencoe.
- Nelson, Elo, Amor.
- Nelson, Geo. Andrew, Kasson.
- Newgord, Harry Clarence,
Minneapolis.
- Olson, Theodore John,
St. James.
- Porter, Harold Ferdinand,
Willmar.
- Putney, Charles A., Moorhead.
- Remele, Henry William,
Sleepy Eye.
- Sheehan, Thomas Vincent,
Laverne.
- ‡Sheldon, Charles Henry,
Groton, S. D.
- Shellman, Joseph Frederick,
Fergus Falls.
- Staples, Forest Edward,
Howard Lake.
- Strang, Cassius Clinton,
Duluth.
- Sweeney, Eugene Sylvester,
Garfield.
- Taylor, William Knox,
Minneapolis.
- Twidt, Oliver, Farmington.
- Vandersaal, William,
Pomeroy, Pa.
- Wallace, Robert, Minneapolis.
- White, Frank Denton,
Minneapolis.
- Youngberg, Everett LeRoy,
Cannon Falls.

†First semester.

‡Not in attendance.

FIRST YEAR CLASS—45.

- Alrick, Owen Kinnie,
Minneapolis.
- Amundson, Frederick Arthur,
St. Peter.
- Anderson, Carl Ernrid,
Kennedy.
- Baker, Harry Jacob,
Rose Creek.
- Barringer, Paul Ernest,
St. Paul.
- Bjorge, Oscar, Lake Park.
- Blix, Adolph Leonard, Bagley.
- Blondel, Louis Dale,
Spencer, Iowa.
- Boerner, Wm. Frederick Ernest
Buffalo.
- Corser, Wayne Bliss,
St. Paul.
- Fortier, Stephen, Little Falls.
- Frederickson, Marcus,
Lakefield.
- Gilder, James Keirl, Jr.,
Newberry, S. C.
- Heddy, Ula Emil, Minneapolis.
- Huntington, Walter Sandberg,
Marion, Iowa.
- Jung, William Richard,
Fergus Falls.
- Jungclaus, Edward Henry,
Glencoe.
- Kingsley, Royal John,
Anaconda, Mont.
- Korfhage, Louis William,
St. Paul.
- Layne, James Thomas,
Rushford.
- Lestico, Alexander Cameron,
Glencoe.
- Lier, Emil Hjalmar, Ashby.
- McBroom, Samuel, Danville.
- Melvin, Merton Rueben,
Dumont.
- Monten, Albin Swan,
Fargo, N. D.
- Morstain, William Basil,
Minneapolis.
- Niemi, William, Superior, Wis.
- Nilsson, Verner Hjalmar,
St. Paul.
- Olsen, Carlton Percy,
Minneapolis.
- Rexford, Luther Addison,
Minneapolis.
- Rollin, Claus Albin, Sweden.
- Rowe, Arthur Taylor,
Casselton, N. D.
- Selvig, Carlus, Minneapolis.
- Smith, Walter Herbert,
Minneapolis.
- Strachauer, Arthur Clarence,
Minneapolis.
- Styer, Matthias Lafayette,
Caledonia.
- Tomasek, Joseph Leo,
Jackson Junction, Iowa.
- Turner, George Chester,
Canton.
- Wahlstrom, Isidore John,
Minneapolis.
- Weaver, Mortimer Ralph,
Spencer, Iowa.
- Williams, Walter John,
Minneapolis.
- Winter, Wilber McKelvey,
Hamline.
- Winther, Conrad Peter,
New Paynesville.
- Woodbury, Leslie Maley,
Zumbrota.
- Zierold, Arthur Adelbert,
Granite Falls.

UNCLASSED STUDENTS—8.

- Britzius, Harry Adam,
Minneapolis.
- Carr, Alvin Eugene,
Minneapolis.
- Froelich, George Henry,
Winnebago City.
- Kendall, Earnest Clayton,
Merrillan, Wis.
- Spurr, (M. D.) Stephen Howard,
St. Paul.
- Thomas, Howard Weed,
Ellendale, N. D.
- Washburn, Reuben Jesse,
Monticello.
- Zanner, Frank Millspaugh,
Omaha, Neb.

THE COLLEGE OF PHARMACY.

SENIORS, 25.

- Bradley, Linn, Camp Point, Ill.
 Barnes, Helen J.,
 Carrington, N. D.
 Cleveland, Zina N., Wabasha.
 Cutler, Herbert W.,
 Park Rapids.
 Gash, Thos. C., Wadena.
 Graves, Claude W.,
 Lake Benton.
 Harms, Fred J., Norwood.
 Hanson, Geo. A., Crookston.
 Hartman, Bert F., Alma, Wis.
 Hubbard, Floyd H., Rochester.
 Minn.
 Irwin, Geo. W., Minneapolis.
 Jamieson, Roy R.,
 Drayton, N. D.
- Kelly, Paul H., St. Paul.
 Kelly, John V., St. Paul.
 Lyders, Edward O.,
 Sacred Heart.
 Mead, Wallace E., Marshall.
 Noer, F. J., Colfax, Wis.
 Passer, W. F.,
 New Paynesville.
 Peterson, Harvie O.,
 Colfax, Wis.
 Richard, Henry J., Little Falls.
 Rood, Adolph F., St. Cloud.
 Sladek, A. C., St. Paul.
 Tilson, Frank H., Duluth.
 Todd, Alice M., Minneapolis.
 Vaughn, Patrick H., Morris.

JUNIORS 43.

- Adams, Chauncy C., Elgin.
 Aker, Emil C., Montevideo.
 Anderson, Edith M., Motley.
 Arnegard, Andrew,
 Hillsboro, N. D.
 Berger, William, St. Paul.
 Bockoven, Wm. H., Clark, S. D.
 Bowman, Edgar S.,
 Hawleyville, Iowa.
 Bowman, Fred M.,
 Browns Valley.
 Chelgren, Victor D. E.,
 Cannon Falls.
 Chisholm, Daniel B.,
 New Paynesville.
 Caldwell, Phaon J., St. Paul.
 Crowe, John W.,
 Clermont, Iowa.
 Day, Benjamin H., St. Paul.
 Desmond, Emmet R., Rushford.
 Essen, Anton E., Renville.
 Fitch, F. C., Hurley, S. D.
 Foote, Florence,
 Cumberland, Wis.
 Frise, D. Curtis,
 Hamilton, N. D.
 Granberg, Leonard,
 Minneapolis.
 Herbert, Miner L.,
 Sauk Center.
 Haines, Geo. E.,
 New Paynesville.
- Hoffman, Ed. L., Rochester,
 Minn.
 Holton, Vincent, Elgin.
 Hanson, Geo. A., Crookston.
 Hanscome, Geo. S., Willmar.
 Jones, W. Mulford,
 Spencer, Iowa.
 Kohlhoff, Emil C., Hendricks.
 Levine, Theodore, Cokato.
 Larson, Ned LeRoy, Atwater.
 Maurier, David L., Brainerd.
 Mitton, Arthur L.,
 Browns Valley.
 Milne, Geo. W., Minneapolis.
 Milne, Henry J., Canton, Minn.
 Mueller, Albert R.,
 Springfield.
 Ostrander, Arthur B.,
 Wadena.
 O'Brien, Giles, Brainerd.
 Peterson, A. E., Cokato.
 Robitshek, Irving H.,
 Minneapolis.
 Schreiter, Norman,
 Red Lake Falls.
 Shaffer, Geo. C., Elkton, S. D.
 Smith, Carolyn, Minneapolis.
 Swenseid, R. E.,
 Petersburg, N. D.
 Wiley, Ross A., Tracy.

SUMMER SCHOOL, 1903.

UNIVERSITY SECTION—265.

OMITTING DUPLICATES—212.

- Aaberg, Arne O., Glenwood.
 Alden, Mary, Minneapolis.
 Alexander, Wm. A., Hendrum.
 Anderson, Alybertina C.,
 Minneapolis.
 Anderson, Louis, Adrian.
 Anderson, Medora Christine,
 Maple Plain.
 Anderson, Nettie, St. James.
 Anderson, Serena, Houston.
 Angier, Carroll Waite,
 Litchfield.
 Baker, Augusta Emma,
 Austin.
 Baker, C. C., Sherburne.
 Baker, George Marshall,
 Minnetonka Mills.
 Baker, Helen May, Brownton.
 Baker, Minnie Helene,
 Minneapolis.
 Bakken, Linda, Dundee.
 Baldy, Frederick Carrol,
 St. Paul.
 Ball, William, Minneapolis.
 Bank, Albert Meyer,
 Minneapolis.
 Bapp, Nettie J.,
 Sioux Falls, S. D.
 Basilia, Sister, St. Cloud.
 Beach, Alice Marie,
 St. Anthony Park.
 Beal, Edward M., Maple Plain.
 Beane, G. S., Minneapolis.
 Beardsley, Richard S.,
 Mason City, Ia.
 Bergendahl, Harold Marton,
 Ellendale, N. D.
 Bittner, Alma Ruth, St. Peter.
 Blauvelt, Kath. Riker,
 Minneapolis.
 Bowers, Ethel Florence,
 Redwood Falls.
 Bowler, Katherine Clara,
 Minneapolis.
 Bradford, Fanny Paine,
 Minneapolis.
 Brady, Eva Willoughby, Averill.
 Brown, Sara, Minneapolis.
 Burns, John A., St. Paul.
 Buns, Peter, Minneapolis.
 Burton, Beulah Isabel,
 Minneapolis.
 Burwell, Fred Wendell,
 Minneapolis.
 Butler, George E., Winthrop.
 Cahill, Thomas, Mabel.
 Campbell, Peter Philip, Mayer.
 Carlman, Hattie A., Hopkins.
 Cartwright, William Holman,
 Claremont.
 Cary, Charles Aaron, St. Paul.
 Chase, Celia M., Minneapolis.
 Christenson, Emma,
 Minneapolis.
 Cinclair, Effie A., Montevideo.
 Cole, Majorie Helen,
 Minneapolis.
 Collins, Etta D.,
 Charles City, Ia.
 Conser, Charles Calvin,
 Robbinsdale.
 Costello Catherine Marie,
 St. Paul.
 Daly, Alice Lorraine, St. Paul.
 Davidson, Mary Isabelle,
 Minneapolis.
 Davis, Margaret, Courtland.
 Devaney, Mary, Minneapolis.
 Diamond, Frances,
 Eagle River, Wis.
 Dominica, Sister, Stillwater.
 Donaldson, A. H., Minneapolis.
 Donohue, Elizabeth May,
 Claremont.
 Dorsett, Harriet Ann,
 Minneapolis.
 Dougherty, Elizabeth M.,
 St. Paul.
 Doyle, Mary, St. Paul.
 Durrell, Jessie Jerusha,
 Renville.
 Eaton, Mabelle, Minneapolis.
 Eddy, Lynn Walter, St. Paul.

- Edmunds, Mabel Ann,
Manchester, Ia.
- Eggen, Halsten O.,
Lake Benton.
- Eggensperger, Adolph Rudolph,
Hanska.
- Emiliana, Sister, Melrose.
- Esser, Frank F., Ellsworth.
- Fadner, Lydia, Superior, Wis.
- Fairbanks, Olive, Hokah.
- Farrington, Mabel Idell,
Mondovi, Wis.
- Feeny, Agnes E., St. Paul.
- Feeny, Julia Marion, St. Paul.
- Feroe, Helmer M.,
Granite Falls.
- Ferraby, Mary, Grove Lake.
- Finke, William F.,
St. Paul Park.
- Foote, Nellie Louise, Preston.
- Foss, Ruth M., Minneapolis.
- Fosseen, Mabelle, Minneapolis.
- Foulke, Edith, St. Paul.
- Fowble, Louise Stuart,
Hamline.
- Fowler, Alice J., Minneapolis.
- Franklin Laura Germaine,
Blue Earth.
- Frederickson, William D.,
Glenwood.
- Freeman, Charles Jefferson,
Franklin.
- Frisch, Ephraim,
Union Hill, N. J.
- Garbett, Louise, Minneapolis.
- Gaumon, Clara, Minneapolis.
- Gehrt, Amand H., St. Paul.
- Geist, John Marie, St. Paul.
- Giasson, Eugenia La Valla,
LaCrosse, Wis.
- Gilman, Glenora L.,
Minneapolis.
- Gleason, Leo P., Minneapolis.
- Goodrich Florence Eva,
Minneapolis.
- Graves, Maud, Adrian.
- Greaves, George Raymond,
Spencer, Ia.
- Green, Florence E.,
Forest Lake.
- Guptil, Ethel M., Rockford.
- Haas, Grace, Sioux Falls, S. D.
- Hagen, John, Dawson.
- Haggerty, Statia, Mendota.
- Hall, Ethelyn W., Janesville.
- Hall, Hannah Elizabeth,
Minneapolis.
- Hall, Mildred Frances, St. Paul.
- Hansen, Ida L., Waseca.
- Hanson, Ella C., Crookston.
- Harcey, Mabel, Minneapolis.
- Hatch, Samuel Atherton,
Pipestone.
- Healey, Mary E., Austin.
- Hellner, Emma M., St. Paul.
- Hendershott, Carl S., Brooten.
- Henderson, Josephine,
Oshkosh, Wis.
- Hickey, Dennis E.,
Brillion, Wis.
- Hill, Jessie Bennett,
Minneapolis.
- Hitchcock, Agnes G.,
Redwood Falls.
- Hocanzon, H. Esther, St. Paul.
- Hodgemire, Floy E.,
Minneapolis.
- Hoefner, Florence Geneva,
Charles City, Ia.
- Hoffert, Henry John,
St. Paul Park.
- Hopkins, Marion Belle,
Minneapolis.
- Horton, Charles W., Starbuck.
- Hubbard, Robert Thorold,
Lake Elmo.
- Huff, Paul, Minneapolis.
- Huie, Jennie, Dunlap, Ia.
- Hulse, Seward W., Minneapolis.
- Hunter, Arthur A., Granada.
- Ingberg, Simon H., Hendrum.
- Jacobson, Clara M.,
Moose Lake, Minn.
- Jacobson, Katherine, St. Paul.
- Jacobson, Mrs. Karen Miller,
Alexandria.
- Johnson, A. Carolyn,
Minneapolis.
- Johnson, Arthur M.,
Minneapolis.
- Johnson, Bessie, Minneapolis.
- Johnson, Edith Louise,
Minneapolis.
- Johnson, Effie Matilda,
St. Peter.
- Johnson, Hannah, Willmar.
- Johnson, Jennie Mara, Dadger.
- Jones, Ammon V., Sparta.

- Jordan, John Henry, Wayzata.
 Kelsey, Nellie Carrie, Anoka.
 King, Drusilla, Cloquet.
 King, Lillian Virginia, St. Paul.
 Kipp, Alice May, Minneapolis.
 Kovarik, Alois F., Minneapolis.
 Krogstadt, Marie, Minneapolis.
 Krom, Marion, Redfield, S. D.
 Lafin, Ethel L., Minneapolis.
 Lambert, Mamie E.,
 Young America.
 Lange, Mary R., Minneapolis.
 Levens, Belle, Albert Lea.
 Lilley, Emmogene, Minneapolis.
 Linden, Margaret M.,
 Pierre, S. D.
 Liskowski, Joseph, St. Paul.
 Lommen, Minnie, Crookston.
 Long, Mary S., Minneapolis.
 Lundgren, Alma Marie,
 Alexandria.
 Lyon, Winifred L., Hastings.
 McBean, Mrs. Annie,
 Minneapolis.
 McCormack, Mabel,
 Maple Plain.
 McCormick, Nellie, Austin.
 MacDonald, Julia Etta,
 Willmar.
 McDougall, Ralph Fritz,
 St. Paul.
 McFadden, Esther,
 Fergus Falls.
 McGork, Mary, Minneapolis.
 McKeehan, Irene P.,
 Minneapolis.
 McKittrick, Elizabeth,
 Minneapolis.
 Madden, Nora, Grandin, N. D.
 Mahleen, Millicent V., Brainerd.
 Mahony, Mary, Minneapolis.
 Malmo, Eva Hermine Lydia,
 Owatonna.
 Malmo, Irene H. L., Owatonna.
 Mapes, Addie Mary,
 Watertown.
 Meek, Georgia E., Minneapolis.
 Miles, Worel C., Hibbing.
 Miller, Thomas B., Morristown.
 Mollet, Marie Elizabeth,
 St. Paul.
 Monroe, Jennie Ruth, Waseca.
 Moody, Cora L., Minneapolis.
 Morgan, Oregon F., Elysian.
 Mowatt, Emma M., Delano.
 Muller, Clara, Westbrook.
 Nelson, Axel E., McKinley.
 Nelson, Jennie, Hopkins.
 Nelson, Mildred Rachel,
 Waverly Mills.
 Newton, Hjalmar Melville,
 Minneapolis.
 Nickerson, Alice M., Elk River.
 Niven, Agnes M., Minneapolis.
 Norton, Frank E., Minneapolis.
 Obert, Lois, Minneapolis.
 Olberg, Clara M., Minneapolis.
 Older Frank E., Luverne.
 Olson, Adolph, Hopkins.
 O'Neill, Gertrude, St. Paul.
 Opsahl, Anne, Albert Lea.
 Ouren, Marie, Hanska.
 Palmer, Ethel Gillette,
 Minneapolis.
 Payette, Charles Theodore,
 Minneapolis.
 Penfound, Rena,
 West Superior, Wis.
 Pennington, Georginia,
 Minneapolis.
 Perusse, Esther A., Cologne.
 Pierce, Ernest B., St. Paul.
 Raetz, Josephine C., Hastings.
 Reed, Flora, Hillsboro, N. D.
 Reichert, Joseph Edward,
 Crystal Lake.
 Reid, Eva Christie, Minneapolis.
 Rittle, Rose Dolores, St. Paul.
 Robison, Arch R., Windom.
 Rogers, Lena H., Minneapolis.
 Rose, Norman W., Duluth.
 Rosenmeier, Christian,
 Lake Lillian.
 Rowe, Delbert L., Springfield.
 Sage, Chas W., Minneapolis.
 Saucer, Pearle, Ackley, Ia.
 Sawyer, Dalza,
 Menomonie, Mich.
 Scales, Kate M., Madelia.
 Schaefer, William C. L.,
 St. Paul.
 Schumacher, Nicholas W.,
 Minneapolis.
 Sellers, Livingston L.,
 Minneapolis.
 Shaw, Grace Winnifred,
 Huron, S. D.

- Shogren, Esther Emily,
Stillwater.
- Simis, Grace Elizabeth,
Minneapolis.
- Skow, Peter, Springfield.
- Smith, Clinton Besley,
Minneapolis.
- Smith, Emmett Wilbur,
Minneapolis.
- Smith, Florence H., Minneapolis.
- Smith, Harriet, Minneapolis.
- Smith, Harriet Helen,
Minneapolis.
- Smith, Walter Herbert, Fairfax.
- Sprague, Manville, Grafton, N D.
- Stack, Nora Marion, Winona.
- Stephens, Stella M.,
Minneapolis.
- Stuart, Isabella, St. Paul.
- Stubstad, Anna, Winona.
- Svendsen, Frances W.,
Minneapolis.
- Sweeney, Katherine,
Minneapolis.
- Swenson, Karl Phillmore,
Minneapolis.
- Taylor, William James, Preston.
- Thomas, Anna Belle,
Minneapolis.
- Thompson, Thorwald S.,
Decorah, Ia.
- Thomson, Eva F., St. Paul.
- Tillotson, Frances Margaret,
Sauk Center.
- Tone, Thomas, Minneapolis.
- Tracy, Matilda, Rochester.
- Treubel, Lena Sophia,
Minneapolis.
- Truesdell, Almeda, Austin.
- Van Bergen, Margaret P.,
Minneapolis.
- Vaughan, James P., Eyota.
- Verne, Victor E., Minneapolis.
- Walker, Archie D., Minneapolis.
- Wallace, Lulu May, Lake Sarah.
- Walshe, James, Northfield.
- Weum, Thurston William,
Minneapolis.
- Whalen, Nellie Gertrude,
Stillwater.
- Wheeler, Lillian, Farmington.
- Whipple, Vadelma I.,
St. Louis Park.
- White, Myrtle E.,
Winnebago City.
- Whited, Oric Ogilvie,
Minneapolis.
- Wiggins, Gerald Graham,
Minneapolis.
- Williams, Maud M.,
Minneapolis.
- Winchell, L. Louise,
Minneapolis.
- Woodruff, May E., Minneapolis.
- Wright, Daisy Mabel, St. Paul.
- Wynn, Charlotte, Minneapolis.
- Yttri, Christina, Minneapolis.
- Zieski, Benjamin N., Courtland.

Summary of Students

THE GRADUATE DEPARTMENT.

	Men.	Women.	Total.	
Candidates for the degree of doctor of philosophy	33	6	45	
doctor of civil law.	6	.....	6	
master of laws....	14	.....	14	
master of arts.....	26	21	47	
master of science..	2	.....	2	
Others doing graduate work.....	15	8	23	
Total	102	35	137	137

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

	Men.	Women.	Total.	
Senior class	70	114	184	
Junior class	90	145	235	
Sophomore class	106	179	285	
Freshman class	195	258	453	
Unclassed students	18	77	95	
Total	479	773	1,252	1,252

SCHOOL OF CHEMISTRY

	Men.	Women.	Total.	
Senior class	4	.....	4	
Junior class	8	.....	8	
Sophomore class	3	.....	3	
Freshman class	18	.....	18	
Unclassed students	3	.....	3	
Total	36	.....	36	36

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS.

	Men.	Women.	Total.	
Senior class—				
Civil engineering section.....	7	.....	7	
Mechanical engineering section.....	6	.....	6	
Electrical engineering section.....	12	.....	12	
Science and technology.....	1	.....	1	26
Junior class—				
Civil engineering section.....	29	.....	29	
Mechanical engineering section.....	19	.....	19	
Electrical engineering.....	26	.....	26	74

Sophomore class—				
Civil engineering section.....	25	.....	25	
Mechanical engineering section.....	17	.....	17	
Electrical engineering section.....	51	.....	51	
Science and technology	3	.....	3	96
Freshman class—				
Civil engineering section.....	43	.....	43	
Mechanical engineering section.....	48	.....	48	
Electrical engineering section.....	68	.....	68	
Science and Technology.....	5	.....	5	164
Unclassed students	35	1	36	36
Total	395	1	396	396

THE SCHOOL OF MINES.

	Men.	Women.	Total.	
Senior class	12	.....	12
Junior class	18	.....	18
Sophomore class	31	.....	31
Freshman class	57	.....	57
Total	118	118	118

THE DEPARTMENT OF AGRICULTURE.

	Men.	Women.	Total.	
College of agriculture—				
Senior class	3	1	4	
Junior class	7	.....	7
Sophomore class	5	1	6	
Freshman class	13	13	30
Intermediate course	7	3	10	10
The school of agriculture—				
Class A	60	30	90	
Class B	110	52	162	
Class C	199	61	260	512
The dairy school	106	106	106
Short course for farmers.....	47	47	47
Total	557	148	705	705

COLLEGE OF LAW.

	Men.	Women.	Total.	
Graduate students—for doctor of civil law.....	6	.....	6
Graduate students—for master of laws.....	14	.....	14
Senior class	124	1	125	
Middle class	90	2	92	
Junior class	181	3	184	
Special students	114	114	
Total	529	6	535	535

Summary of Students.

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THE DEPARTMENT OF MEDICINE.

	Men.	Women.	Total.	
The college of medicine and surgery—				
Graduate students	3	.....	3	
Senior class	74	1	75	
Junior class	90	1	91	
Sophomore class	47	1	48	
Freshman class	44	5	49	
Total	258	8	266	266
The college of homeopathic medicine and surgery—				
Senior class	4	2	6	
Junior class	5	.....	5	
Sophomore class .....	.....	1	1	
Freshman class	2	.....	2	
Total	11	3	14	14
The college of dentistry—				
Senior class	26	.....	26	
Junior class	58	.....	58	
Freshman class	45	.....	45	
Unclassed students	8	.....	8	
Total	137	.....	137	137
The college of pharmacy—				
Senior class	23	2	25	
Junior class	40	3	43	
Total	63	5	68	68
Summer school for teachers—				
University section	52	160	212	212

SUMMARY OF TOTALS.

	Men.	Women.	Total.	
Graduate students	102	35	137	
The college of science, literature and arts.....	479	773	1,252	
School of chemistry.....	36	.....	36	
The college of engineering and the mechanic arts	395	1	396	
The school of mines.....	118	.....	118	
Department of agriculture.....	557	148	705	
The college of law	529	6	535	
The department of medicine.....	469	16	485	
The summer school—University section, less duplicates	52	160	212	
Total	2,737	1,139	3,876	3,877
Duplicates	28	3	31	
Total, excluding duplicates.....	2,709	1,136	3,845	3,845

Appendix A.

The following is a list of high schools, in the State of Minnesota, accredited to the University of Minnesota:

Ada.	Faribault.	Luverne.
Adrian.	Farmington.	Madelia.
Aitkin.	Fergus Falls.	Madison.
Albert Lea.	Fertile.	Mankato.
Alexandria.	Fosston.	Mantorville.
Anoka.	Fulda.	Mapleton.
Appleton.	Gaylord.	Marshall.
Argyle.	Glencoe.	Milaca.
Arlington.	Glenwood.	Minneapolis
Atwater.	Graceville.	Central.
Austin.	Grand Rapids.	East Side.
Barnesville.	Granite Falls.	North Side.
Bemidji.	Hallock.	South Side.
Benson.	Harmony.	Minneota.
Blooming Prairie.	Hastings.	Montevideo.
Blue Earth City.	Hector.	Montgomery.
Brainerd.	Henderson.	Monticello.
Breckenridge.	Herman.	Moorhead.
Browns Valley.	Heron Lake.	Morris.
Caledonia.	Hibbing.	New Paynesville.
Canby.	Hopkins.	New Richland.
Cannon Falls.	Howard Lake.	New Ulm.
Chatfield.	Hutchinson.	Northfield.
Cloquet.	Jackson.	Olivia.
Cokato.	Janesville.	Ortonville.
Crookston.	Kasson.	Owatonna.
Dawson.	Kenyon.	Park Rapids.
Delano.	Lake Benton.	Pelican Rapids.
Detroit.	Lake City.	Perham.
Dodge Center.	Lake Crystal.	Pine City.
Duluth.	Lakefield.	Pine Island.
East Grand Forks.	Lamberton.	Pipestone.
Elbow Lake.	Lanesboro.	Plainview.
Elgin.	Le Roy.	Preston.
Elk River.	Le Sueur.	Princeton.
Ely.	Litchfield.	Red Lake Falls.
Excelsior.	Little Falls.	Red Wing.
Fairmont.	Long Prairie.	Redwood Falls.

Renville.	Sauk Center.	Wadena.
Rochester.	Shakopee.	Warren.
Royalton.	Sherburne.	Waseca.
Rush City.	Slayton.	Waterville.
Rushford.	Sleepy Eye.	Wells.
St. Charles.	Springfield.	Wheaton.
St. Cloud.	Spring Valley	White Bear.
St. James.	Stewartville.	Willmar.
St. Louis Park.	Stillwater.	Windom.
St. Paul	Thief River Falls.	Winnebago.
Central.	Tracy.	Winona.
Cleveland.	Two Harbors.	Winthrop.
Humboldt.	Virginia.	Worthington.
Mechanic Arts.	Wabasha.	Zumbrota.
St. Peter.		

The following private schools are also accredited to the University:

Saint Mary's Hall, Faribault.	Concordia College, Moorhead.
Shattuck Military Academy, Faribault.	Pillsbury Academy, Owatonna.
Stanley Hall, Minneapolis.	St. Joseph's Academy, St. Paul.
Windom Institute, Montevideo.	St. Paul's College, St. Paul Park.

Appendix B.

UNIVERSITY SUMMER SCHOOL.

This school will open late in June and continue in session six weeks, closing early in August. This school is organized under the authority of the Department of Public Instruction, in the interest of the teachers of the State. Instruction is given in two sections.

I. THE UNIVERSITY SECTION.

This section provides for special and graduate work in University subjects, especially for high school teachers. Instruction is given by members of the University faculty or under their supervision, and as the work is completed credit is allowed upon the books of the University. All the advantages of the laboratories, museums and library of the University are open to the classes of this section.

II. THE ELEMENTARY SECTION.

This section provides for the needs of the teachers of the primary and elementary grades. The subjects taught 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 registrar of the University.

Appendix C.

SPECIAL PRIZES IN ORATORY AND DEBATE.

The Department of Rhetoric has been enabled to offer, through the generosity of friends of the University, numerous cash prizes amounting in all to four hundred thirty dollars. This in addition to the regular annual prizes offered for special excellence of work in that department. The names of the donors, and the amounts contributed by each, follow: George H. Partridge, '79, \$100; Charles S. Pillsbury, '00, \$75; John S. Pillsbury, '00, \$75; Edward Backus, \$40; C. A. Smith, \$25; The H. W. Wilson Company, \$25; Fred Snyder, '81, \$10; D. P. Jones, '83, \$10; Asa Payne, \$10; H. B. Avery, '93, \$5; Russell Spicer, '97, \$5; Christopher Graham, '87, \$5.