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1906 - 1907

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THE REGISTRAR,
The University of Minnesota,
Minneapolis, Minnesota.

THE UNIVERSITY OF MINNESOTA

CATALOGUE

FOR THE YEAR

1906-1907

AND

ANNOUNCEMENTS

FOR THE YEAR

1907-1908

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MINNEAPOLIS
1907

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1908

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MAY

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JUNE

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University Calendar, 1907-1908

THE UNIVERSITY YEAR

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

Classes will meet for the first time Tuesday, September 17th. Monday, Wednesday, and Friday classes will meet during the first half of the regular periods of recitation, and the Tuesday, Thursday, and Saturday classes will meet during the second half of the period. Announcements and assignments of work will be made by instructors at the time specified.

FIRST SEMESTER

SEPTEMBER	9	M	Entrance examinations and registration	
	10	T	Entrance examinations and registration	
	11	W	Entrance examinations and registration	
	12	Th	Entrance examinations and registration	
	13	F	Entrance examinations and registration	
	14	S	Examinations end and registration completed	1 w
	17	T	Classes called for regular work (First College classes organized, 1869)	
	21	S		2 w
	28	S		3 w
OCTOBER	5	S		4 w
	12	S		5 w
	18	F	Governor John S. Pillsbury died, 1901	
	19	S		6 w
	26	S		7 w
NOVEMBER	2	S		8 w
	9	S		9 w
	16	S		10 w
	23	S		11 w
	28	T	Thanksgiving Day. Recess three days	
	30	S		12 w
DECEMBER	7	S		13 w
	14	S		14 w
	21	S	Holiday recess begins (no classes)	15 w
	25	W	Christmas Day	
JANUARY	1	W	New Year's Day	
	7	T	Work resumed in all departments	
	11	S		16 w
	18	S		17 w
	25	S	Semester examinations VII and VIII hour classes	18 w
	27	M	Semester examinations I hour classes	
	28	T	Semester examinations II hour classes	
	29	W	Semester examinations III hour classes	
	30	Th	Semester examinations IV hour classes	
	31	F	Semester examinations V hour classes	
FEBRUARY	1	S	Semester examinations VI hour classes	
	4	T	Second semester begins—Classes called for regular work	
	8	S		1 w
	12	W	Lincoln's birthday—Holiday	

	15 S			2 w
	18 T	University Charter, 1868		
	22 S	Washington's birthday—Holiday		3 w
	29 S			4 w
MARCH	7 S			5 w
	14 S			6 w
	21 S			7 w
	28 S			8 w
APRIL	4 S			9 w
	11 S			10 w
	18 S			11 w
	25 S			12 w
MAY	2 S			13 w
	9 S			14 w
	16 S			15 w
	23 S			16 w
	30 S	Semester examinations	VII and VIII hour classes	17 w
JUNE	1 M	Semester examinations	I hour classes	
	2 T	Semester examinations	II hour classes	
	3 W	Semester examinations	III hour classes	
	4 Th	Semester examinations	IV hour classes	
	5 F	Semester examinations	V hour classes	
	6 S	Semester examinations	VI hour classes	18 w

COMMENCEMENT WEEK, 1908

SUNDAY	June 7	Baccalaureate Service
MONDAY	June 8	Senior Class Exercises
TUESDAY	June 9	Phi Beta Kappa Address. Senior Promenade
WEDNESDAY	June 10	Alumni Day
THURSDAY	June 11	Commencement Day—The Thirty-sixth Annual Commencement
FRIDAY	June 12	Summer Vacation Begins

PROGRAM OF ENTRANCE EXAMINATIONS

MONDAY,	September 9,	9 A. M.	3 Botany
			3 Zoology
			1 Astronomy
			3 Geology
		2 P. M.	2 American Government
			2 Political Economy
TUESDAY,	September 10,	9 A. M.	2 History
			5 Physics
		2 P. M.	4 Chemistry
			3 Physiography
WEDNESDAY,	September 11,	9 A. M.	1 English
		2 P. M.	1 German
			1 French
			1 Latin
			1 Scandinavian
THURSDAY,	September 12,	9 A. M.	6 Elementary Algebra
			3 Commercial Geography
		2 P. M.	6 Higher Algebra
FRIDAY,	September 13,	9 A. M.	6 Plane Geometry
		2 P. M.	6 Solid Geometry

1 Folwell Hall, 2 Library Building, 3 Pillsbury Hall, 4 Chemical Laboratory, 5 Physics Building, 6 Mechanic Arts Building

Historical

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 be appointed by the Governor, by and with the advice and consent of the Senate. Whenever a vacancy occurs therein, for any cause, the same shall be filled for the unexpired term in the same manner. Of the Regents thus appointed, two shall be commissioned and hold their offices for one year, and two for two years, and three for three years. Their successors shall be appointed in 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

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

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

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

Sec. 8. And in order to effect a settlement of all remaining indebtedness of the University, all the powers and authorities given by Chapter 18 of the laws of 1864, entitled "An act relating to the University of Minnesota." and Chapter 11 of the laws of 1866, entitled "An act to

amend an act relating to the University of Minnesota, approved March 4, 1864," to the Regents therein mentioned, are hereby given to and conferred upon the Board of Regents of the University of Minnesota aforesaid, and the said acts are hereby continued and shall be in force until such outstanding indebtedness is fully liquidated.

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

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

Sec. 11. The said Board of Regents shall succeed to and have control of the books, records, 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 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 pre-

vious 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 University

The University of Minnesota comprises the following named schools, colleges, and departments:

THE COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

THE DEPARTMENT OF AGRICULTURE, including—

- The College of Agriculture
- The School of Agriculture
- Short Course for Farmers
- The Dairy School
- The Crookston School of Agriculture

THE COLLEGE OF LAW

THE COLLEGE OF MEDICINE AND SURGERY

THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY

THE COLLEGE OF DENTISTRY

THE COLLEGE OF PHARMACY

THE SCHOOL OF MINES

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY

THE COLLEGE OF EDUCATION

THE GRADUATE SCHOOL

The Regents of the University have also entrusted to their charge:

The Experiment Stations, 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

Bulletins of these schools, colleges and departments may be obtained upon application to the University Registrar.

In the COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS, there is a four-year course of study leading to the degree, Bachelor of Arts. The work of the first year is elective within certain limitations as to the range of subjects from which the electives may be chosen. The remaining work of the course is entirely elective, with the provision that a certain number of long courses be selected. The course is so elastic that it permits the student to make the general scope of his course classic, scientific or literary, to suit his individual purpose.

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, and Electrical Engineer. This college offers a four-year 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 four-year courses of study in mining and metallurgy upon completion of which the degrees, Engineer of Mines and Metallurgical Engineer, are conferred.

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY, leading to the degrees, Bachelor of Science in Chemistry, and Bachelor of Science in Chemical Engineering, offers two courses of study of four years each in analytical and applied chemistry.

THE COLLEGE OF EDUCATION receives students who have completed two years of college work, and offers them a three-year course leading to the master's degree. At the end of the second year students may receive the bachelor's degree and the University teacher's certificate. Graduates of other colleges, who have pursued an equivalent course in education, may enter for the master's degree.

THE GRADUATE SCHOOL gathers into a single organization and unites for the purposes of administration all the activities of the University in all its schools and colleges in so far as they relate to advanced instruction offered for the second or higher degrees, viz.; Master of Arts and Doctor of Philosophy conferred for advanced, non-technical study; Master of Science and Doctor of Science for technical study; Master of Laws and Doctor of Civil Law for advanced legal studies. The privileges of this school are in general open to all Bachelors of Arts, of Science, pure and applied, and of Laws, from reputable colleges and universities having courses substantially equivalent to those at this University.

THE UNIVERSITY SUMMER SCHOOL is organized for a six weeks' session in June and July under the direction of the State Department of Public Instruction. In the elementary section courses are given for teachers in all the common school branches and in preparation for the state teacher's certificates. In the college section courses are given for high school teachers and in preparation for the state professional certificate. Students who desire University entrance credits and credits toward the bachelor's degree may secure these by pursuing not more than two full courses at each session.

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

EXTENSION LECTURES. Professors in the University are prepared to give a limited number of extension lectures from time to time. For subjects,

speakers, terms and dates, application should be made to the Chairman of the Committee on University Extension.

THE COLLEGE OF AGRICULTURE offers a four-year course in agriculture. The degree of Bachelor of Science, in Agriculture, is conferred upon completion of the course. Students in this College may specialize along the line of forestry or of home economics and secure the degree, Bachelor of Science (in Forestry, or in Home Economics).

THE SCHOOL OF AGRICULTURE offers a three-year 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, specially designed for 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 Crookston State School of Agriculture offers a course of study quite similar to that given in the School of Agriculture.

THE COLLEGE OF LAW offers a three-year course of instruction leading to the degree of Bachelor of Laws. Graduate work leading to the degrees, Master of Laws, and Doctor of Civil Law, is offered. An evening class is provided in this college.

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 of Homeopathic Medicine and Surgery, there has been established a combined course of six years, leading to the degrees, Bachelor of Science, and Doctor of Medicine.

THE COLLEGE OF DENTISTRY offers a three-year course of study, of nine months each. Upon completion of the prescribed course the degree of Doctor of Dental Surgery is conferred.

THE COLLEGE OF PHARMACY offers a two or three-year 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.

The Board of Regents

CYRUS NORTHROP, LL.D., MINNEAPOLIS . . . . *Ex-Officio*
The President of the University.

The HON. JAMES T. WYMAN, MINNEAPOLIS 1908
The President of the Board.

The HON. JOHN A. JOHNSON, ST. PETER . . . . *Ex-Officio*
The Governor of the State.

The HON. JOHN W. OLSEN, ALBERT LEA . . . . . *Ex-Officio*
The State Superintendent of Public Instruction.

The Hon. S. G. COMSTOCK, MOORHEAD 1908
The HON. THOMAS WILSON, ST. PAUL 1909
The HON. B. F. NELSON, MINNEAPOLIS 1909
The HON. A. E. RICE, WILLMAR 1909
The HON. PIERCE BUTLER, ST. PAUL 1910
The HON. DANIEL R. NOYES, ST. PAUL 1910
The HON. S. M. OWEN, MINNEAPOLIS 1913
The HON. W. J. MAYO, ROCHESTER 1913

C. D. DECKER, AUSTIN,
Secretary of the Board.

Executive Officers

THE UNIVERSITY

CYRUS NORTHROP, LL. D., *President*

ERNEST B. PIERCE, B. A., *Registrar*

JAMES T. GEROULD, B. A., *Librarian*

C. D. DECKER, *Purchasing Agent*

THE COLLEGES

JOHN F. DOWNEY, M.A., C.E., *Dean of the College of Science, Literature, and the Arts*

FREDERICK S. JONES, M.A., *Dean of the College of Engineering and the Mechanic Arts*

EUGENE W. RANDALL, *Dean and Director of the Department of Agriculture.*

WILLIAM S. PATTEE, LL. D., *Dean of the College of Law*

FRANK FAIRCHILD WESBROOK, M.A., M.D., C.M., *Dean of the College of Medicine and Surgery*

EUGENE L. MANN, B.A., M.D., *Dean of the College of Homeopathic Medicine and Surgery*

ALFRED OWRE, D.M.D., M.D., *Dean of the College of Dentistry*

FREDERICK J. WULLING, Phm.D., LL.M., *Dean of the College of Pharmacy*

WILLIAM R. APPLEBY, M.A., *Dean of the School of Mines*

GEORGE B. FRANKFORTER, Ph.D., *Dean of the School of Chemistry*

GEORGE F. JAMES, Ph.D., *Dean of the School of Education*

HENRY T. EDDY, C.E., Ph.D., LL.D., *Dean of the Graduate School*

ADA L. COMSTOCK, M.A., *Dean of Women.*

The University Council

At the regular meeting of the Board of Regents of the University, May 31st, 1905, a University Council was established according to the following plan:

I. The name of the body shall be The University Council. It shall consist of the President of the University, the Deans of the various colleges and schools, one elected representative from each college or school for each 400 students or major fraction thereof, and one representative of the general alumni association.

II. The elected members shall serve for a period of one year. They shall be chosen from the various faculties at the time of the selection of standing committees. The representative of the general alumni association shall be chosen by that body at its annual meeting from among the alumni who are not members of the University.

III. The Council shall be authorized to—

a) Appoint the following committees or the faculty representation thereon:

The University auditing committee
The University press committee
The committee on athletics
The committee on University relations to other institutions of higher learning
The committee on health and sanitation
The committee on commencement and other University functions
The committee on catalogue, programs and courses of study
The committee on student entertainments and social affairs
And such other committees as the general University interests may require

b) Receive reports from such committees and to make such recommendations as may be required.

c) Consider and act upon any matter of general University interest beyond the province of a single faculty which may be referred to it by the President of the University or any faculty.

IV. The Council shall hold stated meetings upon the first Monday of October, December, April and June, and such other meetings as the President of the University may call.

Representatives to the Council

The College of Science, Literature and the Arts

Dean John F. Downey
Professor William Watts Folwell
Professor J. C. Hutchinson
Professor H. F. Nachtrieb
Professor Norman Wilde

The College of Engineering and the Mechanic Arts

Dean Frederick S. Jones
Professor George D. Shepardson

The School of Mines

Dean William R. Appleby

The School of Chemistry

Dean George B. Frankforter

The College of Education

Dean George F. James

The Graduate School

Dean Henry T. Eddy

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E. K. GREEN, A.B., M.D. — Minneapolis
Clinical Assistant in Medicine.

FRANK F. GROUT, B.S. — Minneapolis
Instructor in Mineralogy.

GEORGE D. HAGGARD, M.D. — Pillsbury Building
Instructor in Physiology.

ALEXANDER R. HALL, M.D. — Moore Building, St. Paul
Clinical Assistant in Medicine.

ARTHUR S. HAMILTON, B.S., M.D. — 600 Washington Ave. S. E.
Instructor in Pathology of the Nervous System.

JOHN A. HANDY, Ph.C. — 124 State St. S. E.
Instructor in Chemistry.

EARLE R. HARE, B.S., M.D. — 327 Fourteenth Ave. S. E.
Prosector in Anatomy.

MARY V. HARTZELL, D.M.D. — Andrus Building
Instructor in Comparative Dental Anatomy.

*ROWLAND HAYNES, M.A. — Minneapolis
Instructor in Psychology.

GEORGE DOUGLAS HEAD, B.S., M.D. — Andrus Building
Instructor in Clinical Microscopy.

P. A. HOFF, M.D. — Lowry Arcade, St. Paul
Clinical Instructor in Medicine.

CHARLES M. HOLT, B.A., — Waverly Hotel
Instructor in Education.

OLAF HOVDA, B.S. — Minneapolis
Instructor in Engineering Mathematics.

NED L. HUFF, M.A. — 3905 Sixth St. N.
Instructor in Botany.

ANNAH H. HURD, Phm.D., M.D. — Pillsbury Building
Lecturer on Diseases of the Blood and Ductless Glands.

JOHN E. HYNES, M.D. — 3404 University Ave. S. E.
Clinical Assistant in Medicine.

ETHEL S. HURD, M.D. — Pillsbury Building
Lecturer on Electro-Therapeutics.

ADOLPH W. JOHNSON — Minneapolis
Lecturer on Pharmacy.

*CHARLES E. JOHNSON — Minneapolis
Instructor in Animal Biology.

†EDWARD C. JOHNSON, B.A. — 520 Thirteenth Ave. S. E.
Instructor in Botany.

H. W. JONES, M.D. — 2418 W. Twenty-Second St.
Clinical Instructor in Nervous and Mental Diseases.

LEULAH H. JUDSON, B.A. — 901 Sixth St. S. E.
Instructor in History.

MARGARET KOCH, M.D. — Masonic Temple
Assistant in Pedology.

ALOIS F. KOVARIK, M.A. — 1523 Seventh St. S. E.
Instructor in Physics.

DAVID LANDO, M.D. — Moore Building, St. Paul
Clinical Instructor in Medicine.

ARTHUR A. LAW, M.D. — Pillsbury Building
Instructor in Operative Surgery.

A. E. LOBERG, M.D. — 1909 Washington Ave. S.
Clinical Assistant in Nervous and Mental Diseases.

CHARLES N. MCCLOUD, Phm.D., M.D. — 965 Selby Ave., St. Paul
Lecturer on First Aids to the Injured.

OWEN P. MCELMEEL, LL.B. — 616 Twelfth Ave. S. E.
Instructor in Rhetoric.

JEANETTE M. MCLAREN, M.D. — 441 Selby Ave., St. Paul
Clinical Instructor in Obstetrics.

J. S. MACNIE, M.D. — Pillsbury Building
Clinical Assistant in Diseases of the Eye and Ear.

LINDA H. MALEY, B.L. — 613 Washington Ave. S. E.
Instructor in Rhetoric.

JAMES E. MANCHESTER, Sc.D. — 405 Oak St. S. E.
Instructor in Mathematics.

JOHN V. MARTENIS, M.E. — Minneapolis
Instructor in Machine Design.

HERMAN A. MAVES, D.D.S. — Minneapolis
Instructor in Operative Dentistry.

CARL M. MELOM, M.A. — 506 Fifteenth Ave. S. E.
Instructor in French and Spanish.

HUGH V. MERCER, LL.D. — 327 Sixth Ave. S. E.
Lecturer on Jurisprudence.

WILLIAM H. MERRIMAN — 608 Seventh St. S. E.
Instructor in Machine Work.

R. H. MULLIN, B.A., M.D. — 306 Tenth Ave. S. E.
Senior Demonstrator in Pathology and Bacteriology.

HAROLD M. NEWTON — Minneapolis
Instructor in Chemistry.

CHARLES W. NICHOLS, M.A. — Minneapolis
Instructor in Rhetoric.

MARGARET L. NICKERSON, M.A., M.D. — 217 Beacon St. S. E.
Instructor in Histology.

E. C. PARKER, B.Agr. — St. Anthony Park
Instructor in Agriculture.

PETER PETERSON — 710 Nineteenth Ave. S.
Instructor in Foundry Practice.

*Raymond V. Phelan, Ph.B. — Minneapolis
Instructor in Economics.

A. G. Phelps, M.D. — 118 Minnehaha Pkwy.
Assistant in Clinical Medicine and Physical Diagnosis.

Jay N. Pike, D.D.S. — Masonic Temple
Instructor in Prosthetic Dentistry and Dental Anatomy.

Chelsea C. Pratt, M.D. — 223 Howard St.
Junior Demonstrator in Pathology and Bacteriology.

Walter R. Ramsey, M.D. — 115 Lowry Arcade, St. Paul
Clinical Instructor in Diseases of Children.

†Ralph H. Rawson, M.E. — 1625 University Ave. S. E.
Instructor in Drawing.

Soren P. Rees, B.S., M.D. — Andrus Building
Instructor in Physical Diagnosis and Clinical Medicine.

H. M. Reid, D.D.S. — 2014 Queen Ave. S.
Instructor in Prosthetic Dentistry.

Harry P. Ritchie, Ph.B., M.D. — Lowry Arcade, St. Paul
Clinical Instructor in Diseases of Women.

Bert A. Rose — 41 S. Sixth St.
Instructor of Cadet Band.

Norman W. Rose, M.E. — 209 State St. S. E.
Instructor in Drawing.

A. G. Ruggles, M.A. — St. Anthony Park
Instructor in Entomology.

William Ryan, E.E. — Minneapolis
Instructor in Electrical Engineering.

J. Francis Schefcik, B.S., Ph.G., M.D., C.M. — Masonic Temple
Instructor in Materia Medica

Theophilus Schroedel — Minneapolis
Instructor in German.

Julius Parker Sedgwick, B.S., M.D. — Andrus Building
Instructor in Physiological Chemistry.

W. D. Sheldon, M.D. — Andrus Building
Clinical Instructor in Medicine, and Instructor in Therapeutics.

Juniata Shepperd, M.A. — St. Anthony Park
Instructor in Cooking, Laundering and Home Economics.

Charles F. Shoop, B.S. — 209 State St. S. E.
Instructor in Mechanical Engineering.

Royal R. Shumway, B.A. — 602 Essex St. S. E.
Instructor in Mathematics.

Norman M. Smith — 3000 Hennepin Ave.
Assistant in Clinical Medicine and Physical Diagnosis.

Edw. D. Solenberger, Ph.B. — 1920 Columbus Ave.
Lecturer in Economics.

Thomas W. Stumm, M.D. — 394 Selby Ave., St. Paul
Clinical Instructor in Medicine.

Samuel E. Sweitzer, M.D. — 1729 Irving Ave. S.
Clinical Assistant in Dermatology and Genito-Urinary Diseases.

†James M. Tatem — 124 State St. S. E.
Instructor in Carpentry and Pattern Making.

Henry Ulrich — Minneapolis
Instructor in Carpentry.

Henry L. Ulrich, M.D. — 519 First Ave. S.
Assistant in Clinical Microscopy.

J. A. Vye — St. Anthony Park
Instructor in Penmanship, Accounts and Business Methods, and Secretary of the Experiment Station.

James M. Walls, D.M.D. — Germania Life Building, St. Paul
Instructor in Operative Technics, and Demonstrator of Operative Dentistry.

AMOS C. WELLS, B.A., D.D.S. — Andrus Block
Instructor in Prosthetic Dentistry and Dental Anatomy.

H. JOURNEY WELLS, M.D. — 1916 Park Ave.
Clinical Assistant in Diseases of Eye and Ear.

ANDREW J. WEISS — 3705 Stevens Ave.
Instructor in Technics.

RODNEY WEST, B.A. — 1314 Sixth St. S. E.
Instructor in Chemistry.

ARCHA WILCOX, M.D. — 2416 Nicollet Ave.
Clinical Assistant in Surgery.

VAN H. WILCOX, M.D. — 812 Pillsbury Building
Instructor in Operative Surgery.

A. D. WILHOIT, M.S. — Minneapolis
Instructor in Soils.

CHARLES WILLIAMS, M.A. — 312 Union St. S. E.
Instructor in German.

ARCHIE D. WILSON, B. Agr. — St. Anthony Park
Instructor in Agriculture.

CHARLES B. WRIGHT, A.B., M.D. — Andrus Building
Clinical Assistant in Diseases of Children.

FRANK R. WRIGHT, D.D.S., M.D. — 713 Pillsbury Building
Clinical Instructor in Dermatology and Genito-Urinary Diseases.

FRED S. YEAGER, D.D.S. — Minneapolis
Instructor in Crown and Bridge Work .

JAMES ZIMMERMAN — Minneapolis
Instructor in Chemistry.

† To retire June, 1907.
* Appointed May, 1907.

Equipment

GROUNDS AND BUILDINGS

The University campus comprises about fifty-five acres lying between University avenue and the river and between Eleventh and Nineteenth avenues Southeast. The campus is well wooded with a fine growth of native oaks and commands a beautiful view of St. Anthony Falls and the city, but is sufficiently removed from the business center of the city to insure desirable quiet and retirement. The buildings upon the campus number twenty-three, and are valued at over $1,475,000. A special clinical building for the use of the department of medicine is located in the southern part of the city, where there is an abundance of clinical material, and within easy reach of the University. The campus is valued at about $275,000 and the equipment of the buildings at about $300,000.

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 seventy acres of very valuable land, half way between the twin cities and within a thirty-minutes' ride of either city. The farm with its buildings is valued at $900,000, and the sub-stations located at Crookston and Grand Rapids, at $40,000 more. The buildings and equipment of the department of agriculture are valued at over $400,000.

NEW BUILDINGS

Folwell Hall, the new main building for the College of Science, Literature and Arts, has been completed and will be ready for occupancy at the commencement of the fall term. Three hundred fifty thousand dollars was appropriated by the legislature for the erection of this building. This amount was supplemented by $60,000 received from insurance on the old main building destroyed by fire in September, 1904. This will give a total for building and equipment of $410,000. This building is 322 feet in length and three stories in height above the basement, with rooms arranged on both sides of straight halls extending through the length of the building. It provides class and seminar rooms, and offices for the departments of Astronomy, Mathematics, Greek, Latin, German, French and Spanish, Scandina-

vian, Comparative Philology, Rhetoric and Oratory, Philosophy and Psychology, and Education. It also contains the Scandinavian Museum, German Museum, Psychological Laboratory, Dean's Office, Faculty Parlor, Postoffice, Hall for Literary Societies, Men's Study Hall, Women's Study Hall, Minnesota Daily, Minnesota Magazine, Gopher, Cloak Rooms, Janitors' Rooms, Toilet Rooms, Work Shop, and Store Rooms. The material is brick with cut stone trimmings.

The Legislature of 1903 appropriated the sum of $100,000 for the erection of a building for pathology, bacteriology and hygiene. The building, which is known as the Institute of Public Health and Pathology, has been erected with the general group of medical buildings, and the department moved into its new quarters April 1, 1907. It is 213 feet long by 100 feet deep in the central portion, and consists of the central main portion, 60x100 feet, with north and south wings each 56x 75 feet.

Space is provided on three floors for a museum and library. A Pasteur Institute is housed in this building for the treatment of and research in hydrophobia. The two large laboratories for teaching pathology, bacteriology and public health, and numerous offices, private and research laboratories, and a large amphitheatre are arranged with special attention to efficiency and convenience. The State Board of Health Laboratories are housed here in the end of the building adjacent to the special laboratory built by that board some years ago. Photographic laboratories, work-shops, cold storage and autopsy rooms are provided.

GIFTS MADE TO THE UNIVERSITY

The will of the late Mrs. A. F. Elliott, formerly of Minneapolis, but more recently of California, left a bequest to the University, from which the Regents expect to realize at least $125,000. The heirs have requested that this fund be used to erect a Hospital in connection with the Medical Department of the University.

The Hon. Thomas H. Shevlin donated to the University $60,000 for a "Woman's Building," to be known as the "Alice Shevlin Hall." The gift was accepted by the Regents, and the building has been erected on the site of the "Old Main" between the Library and Law buildings. It is a two-story and basement structure, the material used being pressed brick with stone trimmings. It has a frontage of 114 feet on Pillsbury avenue and a depth of 55 feet. The purpose of this building is to furnish suitable rest and study rooms for the women attending the University. The building contains several Society Rooms, a large Lunch Room, and a general Reception Hall, all of which are greatly

needed. The building was completed and turned over to the Board of Regents on December 10, 1906.

THE FINANCIAL MANAGEMENT OF THE UNIVERSITY

The financial management of the University is in the hands of the "Board of Regents," except in the erection of new buildings, the purchasing of fuel, and the placing of insurance on buildings and contents, which are in the hands of the State Board of Control.

UNIVERSITY REVENUES

The sources of the University income for Current Expense are three, viz: 1st, the United States Government; 2nd, the State, and 3rd, the University.

The U. S. Government gave to each of the States certain lands for educational purposes. The proceeds of these lands, as fast as sold, are invested in state bonds. These bonds are known as the University permanent fund, and at present amount to $1,400,000. The annual interest on these bonds is at present about $53,000. In addition to the interest on bonds, the University receives from the government the Hatch Bill appropriation of $15,000.00, an appropriation for the benefit of the Experiment Station, and the Morrill Bill appropriation of $25,000.00, an appropriation for the encouragement of the Departments of Agriculture, Mechanic Arts, and Military Science.

RECAPITULATION

Interest on bonds and land contracts	$53,000.00	
U. S. Government, Hatch Bill appropriation	15,000.00	
U. S. Government, Morrill Bill appropriation	25,000.00	
Total from the Government		$93,000.00
The University receives from the State an appropriation of 23-100 of one mill per dollar on a valuation of $846,000.000.00, which will give about	$194,000.00	
A flat appropriation called a deficiency appropriation of	165,000.00	
An appropriation for support of School of Mines.	5,000.00	
An appropriation for salaries of Mines and Electrical Engineering	4,500.00	
Total from the State		$368,500.00
Amount received from Students' fees	$139,000.00	
Dental Infirmary receipts	12,000.00	
Station and School, sales and fees	14,000.00	
Miscellaneous Receipts, University	2,000.00	
Total from University		$167,000.00
Total estimated current expense receipts for 1906		628,500.00

LIBRARIES

The following libraries are easily accessible to the University students:

Minneapolis—The University Libraries, 110,000 volumes; the Public Library, 135,000 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, 12,000 titles.

St. Paul—The State Historical Library, 78,000 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 those in Law, Medicine, Engineering, Agriculture.

3. *Departmental Libraries.* including those in Art, Astronomy, Animal Biology, Botany, Chemistry, French, Geology, German, Greek and Latin, History, Mathematics, 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 115,000. 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 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 text-books 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 to the University of all the Briefs and Paper-Books in the cases 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 30,000 specimens; a series of 3,000 thin sections of typical rocks and minerals largely representing Minnesota localities; purchased material comprising a fine collection of crystals; 5,000 minerals and 3,000 specimens of economic minerals and crystalline rocks, and a collection of over 4,000 photographs and lantern slides.

Mr. Arus S. Williams of Minneapolis has given to the University his extensive collection of negatives and photographs. During many years of active work as a photographer, he has collected a series of several thousand plates representing geologic and geographic subjects, commercial views and historic scenes. These will prove of great value in illustrating the physical, commercial and political history of the State. They are to be recognized as the A. S. Williams Collection of

Photographs and Photographic Negatives.

(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 25,000 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) *In 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) *In Classics:* Some material illustrating classical geography, topography, chronology, mythology, archaeology, and art has been collected, consisting mainly of plans and charts, casts, pictorial illustrations, facsimiles 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) *In Civil Engineering:* The department is collecting samples of road material typical of the various localities of the State, and 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) *In 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 forging 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) *In Electrical Engineering:* This museum contains a growing collection of samples furnished by various manufacturers and dealers for demonstrating the merits of different products and for illustrating modern practice; an excellent collection showing the development of electrical instruments, lightning arresters, switches, primary and secondary batteries, early forms of dynamos and motors, lighting apparatus and various industrial applications of electricity; also a collection of samples from repair shops and elsewhere, illustrating the effects of wear, accidents and abuse.

(j) *In Engineering Mathematics:* This department has recently added to its apparatus used for illustration in teaching. several types of slide-rules, including those of Thatcher, Faber, Keuffel and Esser, Schureman's Computer, Boucher's Calculator; also Amsler's Polar Planimeter.

(k) *In Mathematics:* The Schroeder wooden and the Schilling gypsum, string and paper models for Solid Analytical Geometry, many of the Schilling models for illustrating the Theory of Surfaces, several of the Schilling mechanical devices for describing various loci, the Keufel and Esser models for Solid Geometry, and large slated globes, suitably mounted, for use in Spherical Geometry and Spherical Trigonometry.

ASTRONOMICAL OBSERVATORY

The students' astronomical observatory contains a ten and one-half-inch refracting telescope furnished with a third lens for converting it into a photographic telescope; a filar micrometer; a spectroscope by Brashear; a students' meridian circle and zenith telescope; a Repsold photographic measuring machine, a chronograph, and astronomical clocks.

GYMNASIUM

The Gymnasium is located in the Armory, and is well equipped with a variety of gymnastic appliances. The object of the Gymnasium is to provide all of the students of the University opportunity for exercise to build up their general health. It also provides special training to correct physical defects and functional derangements. The gymnasium is in charge of a professional Medical Director and Assistant, and the training is under their direct supervision. A thorough physical examination is offered each student immediately before and after the gymnasium course, and a record is made of the same. The examination of these records shows a marked improvement in the standard of health of the average student during his college course. The Gymnasium is open at all times to 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.

IV

ORGANIZATIONS AND PUBLICATIONS

Organizations and Publications

RELIGIOUS AND SOCIAL ORGANIZATIONS

The Students' Christian Association was organized in 1869, its object being to promote growth in Christian character, and to engage in such religious work as may be deemed expedient and necessary. The Association owns a commodious building, which serves as the headquarters for student religious activity. 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." This association leases the Students' Christian Association building and keeps it constantly open, with a General Secretary in charge. All men in sympathy with the object of the association are eligible to membership. This building is maintained as the social and religious headquarters of all young men in the University.

This Association also provides an employment bureau whose services are free to students in all departments of the institution, as well as 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 at a nominal charge for instruction. The General Secretary will be pleased to correspond with any young man intending to come to the University. Any inquiry about board, room, employment, or general information will gladly be answered, and a hand-book will be sent to any one wishing it. Address the General Secretary of the Young Men's Christian Association, University of Minnesota, Minneapolis, Minnesota.

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

To this end frequent socials and informal teas are given throughout the year; 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 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 Young Women's Christian Association room before registering. Women from the upper classes will be there during the opening days to give advice and assistance. Any inquiry about board, room, employment, or general information will gladly be answered by Miss Margaret Elwell, 945 14th Ave., S. E., Minneapolis.

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 the Young Women's Christian Association, through the courtesy of those organizations. The Association is planning to erect a building on or near the campus at an early date.

Aside from the religious objects, the Association tends to promote good fellowship among its members. Early in each University year 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.

The Woman's League is an organization of the women of the University for mutual helpfulness and sociability.

LITERARY, SCIENTIFIC, AND MUSICAL ORGANIZATIONS

Phi Beta Kappa.—A chapter of the honorary society of *Phi Beta Kappa* was established at the University in 1892. A small proportion of the graduates of the College of Science, Literature, and the Arts are elected to membership each year. Election is based upon high scholarship and character.

Sigma Xi.—A chapter of the honorary scientific society of *Sigma Xi* was established at the University in 1896. A small proportion of the graduates of the scientific, and technical department are elected to membership each year. Election is based upon high scholarship and character.

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

Literary Societies.—The above named literary societies are mainly debating clubs. Every student is welcome to attend the literary sessions, but the business sessions are usually held behind closed doors. Students desiring to join should make early application to some member of the society he prefers, as the membership is limited.

Membership Limit: *Shakopean,* 35, men; *Forum,* 30, men; *Minerva,* 30, women; *Law Literary,* unlimited, law students; *Castalian,* 35, men; *Theta Epsilon,* 30, women; *Thalian,* 25, women; *Acanthus,* 30, women.

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

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 Iowa-Minnesota League is composed of the two universities and holds an annual contest in debate.

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.

The University competes annually for the *Hamilton Club* prize. Michigan, Minnesota, Wisconsin, Iowa, Ohio, Indiana, Northwestern and Chicago Universities and Knox College constitute the league. Each of the colleges named submits one oration upon Alexander Hamilton or some character or event connected with his time. From the orations submitted four are chosen to be delivered before the Hamilton Club.

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

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

The University Band is organized as a part of the military system of the University and is composed of about sixty musicians. It is under the efficient leadership of an instructor in Music, and furnishes music for military and many other University affairs.

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

Greek Club is a society composed of professors, students, and alumni of the Department of Greek for the study of Greek life, language, and customs.

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

The Philosophical Club 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.

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

American Chemical Society.—A local section of the American Chemical Society has been organized in Minnesota with headquarters at the University.

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

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

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 Zoological Reading Club meets evenings at the homes of the professors and 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 Mathematical Society is composed of professors, assistant professors, and instructors whose work is in Pure or Applied Mathematics, and meets the third Wednesday of each month for the discussion of mathematical subjects.

THE ATHLETIC ASSOCIATION

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 and arranges the schedule of games. It is the purpose of the 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. It contains a modern cinder track, baseball diamond and football gridiron. The grand stands have a seating capacity of about 15,000. A large portion of this field was a gift to the University from the heirs of the late John S. Pillsbury, and the brick wall surrounding it is the gift of his son, Mr. A. F. Pillsbury. It is generally conceded to be one of the handsomest fields in the West.

PUBLICATIONS

The University Catalogues are published by authority of the Board of Regents, as a regular series of bulletins. The number issued each year varies from twelve to fourteen. 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 Yearbook of the Society of Engineers is published annually by the engineering 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.

Scholarships, Loans, and Prizes

UNIVERSITY 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. Receipts 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 to 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.

ENDOWED SCHOLARSHIPS

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 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.

STUDENT LOAN FUNDS

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 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 two thousand dollars, to be used by the Board of Regents to assist worthy students, needing such aid, to secure an education. The Regents are empowered to give this aid in the way of loans or gifts, according to the circumstances of the case. As a rule the fund is used as a loan fund, and a small rate of interest is charged. The details of the regulations which have been adopted by the Regents for the administration of the fund may be learned by addressing the President of the University.

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 Department of Rhetoric, 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 by a member of the graduating class. The award is made by a Professor in History in some other institution.

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 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 $25 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 Influence of Immigration upon the Development of the Northwest."

THE WILLIAM JENNINGS BRYAN PRIZE

The Hon. William Jennings Bryan has given the University the sum of $200 for the encouragement of studies in political science. The annual income will be given as a prize to the writer of the best essay upon a topic to be announced each year. The competition is open to all students of the College of Science, Literature, and the Arts.

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 orator winning first place, $50 to the orator winning second place, and the remainder will be set aside each year for an interest fund to accumulate, and, in time, produce another endowment.

MINNEAPOLIS LIFE UNDERWRITERS ASSOCIATION PRIZE

A prize of fifty dollars is offered by the Minneapolis Life Underwriters Association for the best essay on life insurance written by a senior of the class of 1907. Essays should contain at least 3,000 words and be presented to the Professor of Political Economy on or before May 21, 1907.

THE BRIGGS PRIZE IN FOUNDRY PRACTICE.

For the encouragement of studies in foundry practice, Mr. O. P. Briggs, Commissioner of the National Foundrymen's Association, Detroit, Mich., offers $75 annually, in two prizes, which are to be accompanied by gold medals. The competition is open to sophomores in the College of Engineering, and the prize will be awarded for the best essay relative to the above subject. No prize will be awarded if less than five essays are submitted in competition. Essays should contain about 3,000 words, and must be submitted to the Professor of Rhetoric on or before May 1st.

THE GEORGE C. ANDREWS PRIZE.

Mr. George C. Andrews, M.E., '87, has offered an annual prize to the Senior Mechanical Engineers for the best essaay on any subject connected with heating and ventilation. The first prize in this contest will consist of $50.00 in cash accompanied by a suitable medal; a second prize will also be given which will consist of $25.00 in cash accompanied by a medal. The winner of the first prize will be offered a position with the George C. Andrews Heating Company.

THE ROLLIN E. CUTTS PRIZE IN SURGERY.

Dr. Mary E. Smith Cutts, '91 Medical, has given the University, as a memorial of her husband, Dr. Rollin E. Curtis, '91 Medical, the sum of $500.00, the income from which is to be awarded in the form of a gold medal to that member of the senior class of the College of Medicine and Surgery who presents the best thesis, showing original work. upon a surgical subject.

VI

MISCELLANEOUS

General Information

THE ONE-MILE LIQUOR LAW

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

MILITARY DRILL

The act of Congress of 1862, providing for the establishment of "Land Grant Colleges," requires that instruction be given in Military Science and Tactics at all institutions that are its beneficiaries. The Armory is located on the University campus and has all the facilities usually provided in a modern Armory. The United States Government supplies the University with the necessary arms, equipment and ammunition for instruction in infantry and artillery drill, and details a commissioned officer of the regular army to take charge of the department.

EXPENSES OF STUDENTS

Several years ago a number of young men and women, at the request of University officials, kept careful account of their expenses for the University year. The result was that the expenses of the young men ranged from $217.00 to $397.00. The same students earned sums varying from $237.00 to $272.00. The young women reported expenses varying from $150.00 to $355.00. These figures do not include fees, and, as the cost of living has increased decidedly, probably 25 per cent should be added to these figures to make them safe.

The students upon whose statements these figures are based were representative students; they were not extravagant nor did they deny themselves unduly to get along. While students can live within the figures given above, they would not, owing to the increased cost of living, be able to live as comfortably nor to have as many privileges as these students had.

Board can be had at prices ranging from $2.25 to as high as the student can afford to pay. In private families board ranges from $3.00 to $5.00.

Furnished rooms vary in price from $8 to $20 per month. Two students rooming together would of course reduce this expense. It is sometimes possible for a student, rooming alone, to secure a good room at an expense but little higher than when two room together; but such chances are the exception and not the rule. New students will find that they will be more likely to secure comfortable rooms and suitable board if they will consult the general secretary of either the Young Men's or Young Women's Christian Association immediately upon arrival at the University, or if they will correspond with these officers before coming to the University.

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

If it is possible for the student to have 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.

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 own way through college will find here stated some very interesting and encouraging facts. A copy will be sent free to any address upon application.

VII

DEPARTMENTS OF INSTRUCTION

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 Emeritus 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*
WILLIS M. WEST, M. A., *Professor of History*
GEORGE B. FRANKFORTER, M. A., Ph. D., *Professor of Chemistry*
FRANCIS P. LEAVENWORTH, M. A., *Professor of Astronomy*
FREDERICK KLAEBER, Ph. D., *Professor of Comparative and English Philology*
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. MCVEY, Ph. D., *Professor of Political Economy*
JOHN ZELENY, Ph. D., *Associate Professor of Physics*
SAMUEL G. SMITH, Ph. D., LL. D., *Professor of Sociology*
GEORGE FRANCIS JAMES, Ph. D., *Professor of Education*
NORMAN WILDE, Ph. D., *Professor of Philosophy and Psychology*
WILLIAM A. SCHAPER, Ph. D., *Professor of Political Science*
EMIL OBERHOFFER, *Professor of Music*
FRANK M. ANDERSON, M. A., *Professor of History*
CHARLES F. SIDENER, B. S., *Professor of Chemistry*
CARL SCHLENKER, B. A., *Professor of German*
ALBERT W. RANKIN, B. A., *Professor of Education*
RICHARD BURTON, Ph. D., *Professor of English Literature*
EDWARD SIGERFOOS, Ph. B., Capt. U. S. A., *Professor of Military Science*
GEORGE N. BAUER, Ph. D., *Professor of Mathematics*
*FREDERIC E. CLEMENTS, Ph. D., *Professor of Botany*
ALBERT ERNEST JENKS, Ph. D., *Professor of Anthropology*
FRANCES S. POTTER, M. A., *Professor of English*
ALBERT B. WHITE, Ph. D., *Professor of History*
*JOHN H. GRAY, Ph. D., *Professor of Political Science*
*EDWARD VAN DYKE ROBINSON, Ph. D., *Professor of Economics*

*Gisle Bothne, M. A., *Associate Professor of Scandinavian Languages and Literature*
*Charles M. Andrist, M. L., *Assistant Professor of French*
*Joseph W. Beach, Ph. D., *Assistant Professor of English*
John C. Brown, M. A., *Assistant Professor of Animal Biology*
*William H. Bussey, Ph. D., *Assistant Professor of Mathematics*
Ada L. Comstock, M. A., *Dean of Women and Assistant Professor of Rhetoric*
Louis J. Cooke, M. D., *Director of the Gymnasium*
Samuel N. Deinard, Ph. D., *Assistant Professor of Semitic Languages and Literature*
Hal Downey, M. A., *Assistant Professor of Animal Biology*
Henry A. Erikson, B. E. E., *Assistant Professor of Physics*
Julius T. Frelin, B. A., *Assistant Professor of French*
John E. Granrud, Ph. D., *Assistant Professor of Latin*
Everhart P. Harding, Ph. D., *Assistant Professor of Chemistry*
Hans Juergensen, *Assistant Professor of German*
*Edward M. Lehnerts, B. S., *Assistant Professor of Geography*
Harold L. Lyon, Ph. D., *Assistant Professor of Botany*
Edward Eugene McDermott, M. S., *Assistant Professor of Rhetoric*
James Burt Miner, Ph. D., *Assistant Professor of Psychology*
Edward E Nicholson, M. A., *Assistant Professor of Chemistry*
Oscar W. Oestlund, M. A., *Assistant Professor of Animal Biology*
Mary G. Peck, M. A., *Assistant Professor of English*
Carl Otto Rosendahl, Ph. D., *Assistant Professor of Botany*
Frederick W. Sardeson, Ph. D., *Assistant Professor of Paleontology*
Charles Albert Savage, Ph. D., *Assistant Professor of Latin and Greek*
Carlyle M. Scott, *Assistant Professor of Music*
David F. Swenson, B. S., *Assistant Professor of Philosophy*
*Fletcher Harper Swift, Ph. D., *Assistant Professor of Education*
Josephine E. Tilden, M. S., *Assistant Professor of Botany*
William L. Westermann, Ph. D., *Assistant Professor of History*
Matilda J. Wilkin, M. L., *Assistant Professor of German*
Henry L. Williams, M. D., *Director of Athletics*
Anthony Zeleny, Ph. D., *Assistant Professor of Physics*

INSTRUCTORS

Emma Bertin, *French*
Anna M. Butner, *Physical Culture*
Henrietta Clopath, *Drawing*
Lillian Cohen, M. A., *Chemistry*
Hans H. Dalaker, B. S., *Mathematics*
Otto Dunkel, Ph. D., *Mathematics*
Oscar W. Firkins, M. A., *Rhetoric*
Frank F. Grout, B. S., *Geology and Mineralogy*
*Rowland Haynes, A. M., *Psychology*
Charles M. Holt, B. A., *Education*
Ned L. Huff, M. A., *Botany*
*Charles E. Johnson, M. A., *Animal Biology*
†Edward C. Johnson, B. A., *Botany*
Leulah J. Judson, M. A., *History*
Alois F. Kovarik, B. A., *Physics*
Jennings C. Litzenberg, B. S., M. D., *Gymnasium*
Owen P. McElmeel, LL. B., *Rhetoric*
Linda H. Maley, B. L., *Rhetoric*
James E. Manchester, Sc. D., *Mathematics*
Carl Melom, M. A., *Spanish and French*
*Charles W. Nichols, M. A., *Rhetoric*
Raymond V. Phelan, Ph. B., *Economics*

†To retire June, 1907
*Appointed May, 1907

BERT A. ROSE, *Band*
THEOPHILUS SCHROEDEL, *German*
ROYAL R. SHUMWAY, B. A., *Mathematics*
EDWARD D. SOLENBERGER, Ph. B., *Lecturer in Economics*
CHARLES WILLIAMS, M. A., *German*

SCHOLARS AND ASSISTANTS

EDWARD ANDERSON, *Chemistry*
DONALD BABCOCK, B. A., *Sociology*
WALTER BADGER, *Chemistry*
THOMAS CAHILL, *Rhetoric*
FREDERIC D. CALHOUN, *Rhetoric*
CHARLES H. CRESSY, *Chemistry*
H. W. DAHLBERG, *Chemistry*
JAMES DORAN, *Chemistry*
HELEN GRIFFITH, *Rhetoric*
JOHN A. HANDY, *Chemistry*
JACK HAYNES, *Geology*
STANLEY B. HOUCK, *Rhetoric*
MILDRED A. HUNTER, B. A., *Geology*
WILLIAM W. KENNEDY, *Chemistry*
OLIVER J. LEE, *Astronomy*
WM. ALLISON MCMANIGAL, B. A., *Sociology*
JESSIE A. MATSON, *Physical Culture*
HARRY MILLER, *Political Science*
ALICE M. MISZ, B. A., *Botany*
EUNICE D. PEABODY, B. A., *Philosophy*
A. HAROLD PORTER, *Chemistry*
VICTOR H. ROEHRICH, *Chemistry*
RASMUS S. SABY, *Philosophy*
JESSIE SCHULTEN, *Rhetoric*
ELEANOR SHELDON, B. A., *English*
FRIEDA STAMM, B. A., *German.*
EDWARD F. SWENSON, *Economics*
CHARLES R. THOMPSON, *Political Science*
EDITH VON KUSTER, *Chemistry*
JAMES T. WATTS, *English*
NELLIE A. WHITNEY, *Rhetoric*

FACULTY COMMITTEES

ENROLLMENT—Professors Hutchinson, Anderson, Bauer, Savage, Lyon

CURRICULUM—Professors Moore, West, Sigerfoos, Rankin, Erikson

GRADUATE STUDIES AND DEGREES—Professors Eddy, Brooks, Folwell, Nachtrieb, Schaper, Gerould, Hutchinson (ex-officio)

PROGRAM—Professors Leavenworth, Tilden, Miner

STUDENTS' WORK—Professors Pike, '08; Nicholson, '09; White, '10; Comstock, '11; Wilde, '12

RELATION OF THE UNIVERSITY TO THE PUBLIC SCHOOLS—Professors James, Benton, Hall, Carlson, Westermann

MUSIC, PUBLIC LECTURES AND UNIVERSITY FUNCTIONS—Professors Schlenker, Sidener, Burton, Klaeber, Jenks

DEBATE AND ORATORY—Professors McDermott, Sanford, Willis, Sardeson

UNIVERSITY EXTENSION—Professors Downey, Frankforter, Granrud, Potter, Rosendahl

CATALOGUE—Professors Anderson, Zeleny, Harding, Clark, the Registrar

ADMISSION

Every applicant for admission to this college must take an examination in writing, spelling, and English composition. (For details see page 33.)

Aside from this test, admission is either by diploma or by examination.

No student, however, shall be admitted to the work of the second semester unless such student bring a certificate of advanced standing from another college showing his qualifications to continue the second semester's work.

I. ADMISSION BY DIPLOMA

Graduates of the following courses, provided they present credits for four years of English and one year each of elementary algebra and plane geometry, are admitted to the freshman class without conditions other than that imposed by the above examination in English.

(a) Any four-year course of a Minnesota state high school.

(b) A four-year course of other accredited schools in the state.

(c) A four-year course of schools in any other state accredited to the state university of that state.

(d) The advanced Latin or English course of the Minnesota state normal schools.

II. ADMISSION BY EXAMINATION

Entrance examinations are offered at the university the opening week of the university year. The program for the year 1907-8 is printed in this bulletin on pages 9-10. Certificates of Minnesota State High School Board examinations will be accepted in place of university entrance examinations in whole or in part.

Students who enter by examination, besides the test in English composition, must pass examinations in secondary school subjects as follows:

(1) The six year-credits under "A" below, and

(2) Nine year-credits selected from the list of electives under "B," provided that, if the total of entrance conditions does not exceed three half-year credits, the applicant shall be admitted conditionally and be given one year in which to make up the entrance conditions.

A. SUBJECTS REQUIRED OF ALL

English, four years, including
(a) Classics

(b) Principles of composition
(c) Practice in written expression

Mathematics

(a) Elementary Algebra, one year
(b) Plane Geometry, one year

B. ELECTIVES, NINE YEAR-CREDITS REQUIRED

Mathematics, one year
Higher Algebra, one-half year
Solid Geometry, one-half year

Latin, four years
Grammar, one year
Caesar, four books, one year
Cicero, six orations, one year
Virgil, 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

Swedish, Danish-Norwegian, Icelandic, 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

American Government, one-half year
Political Economy, one-half year
Physics, one year
Chemistry, one year
Botany, one half or one year
Zoölogy, one half or one year
Astronomy, one half-year
Geology, one half-year
Physiography, one half-year
Commercial History and *Commercial Law,* one year
Freehand Drawing, one year
Mechanical Drawing, one year

ENTRANCE EXAMINATION IN ENGLISH

Every applicant for admission to the College of Science, Literature, and the Arts must be examined in writing, spelling, and English composition. The examination will be given in two parts, the second of which is optional.

Part I. Elementary. (Required of all.) Those who fail to pass this test satisfactorily are required to take a special three-hour preparatory course in composition through their first year or longer if necessary. This work shall not receive credit toward a degree. Students pursuing it shall not take more than the maximum of seventeen hours of work a week including this course. These students must take freshman rhetoric, but not until the preparatory work has been completed. At any time during the first half of the first semester the department of rhetoric may transfer promising students from the preparatory class to the regular freshman rhetoric.

Part II. Advanced. (Not obligatory.) This examination is designed as a test of ability to express thought in a clear and orderly manner and a fair knowledge of elementary rhetoric. Those who do not take this test and those who fail to pass it with a grade of good or excellent shall be registered for freshman rhetoric as a required subject. Those who do pass this test with a grade of good or excellent are not required to take freshman rhetoric.

The entrance examination will be given at the University in the chapel of the library building, Saturday, May 18, and Wednesday, Sept. 11, at 9:00 a. m.

The examination in May will be sent, upon application, to the principals of state high and other accredited schools in the state, to be offered in each school at the option of the principal, to members of the senior class who expect to enter the University. The examination, if given, must be held on Saturday, May 18, under the general rules which govern State High School Board examinations. All papers must be sent immediately after examination to the Registrar of the University and will be marked by the proper University authority.

Students who enter the freshman class after the regular September examination without having taken the test in English may be given a special test if the department of rhetoric sees fit, or shall be registered for preparatory rhetoric with the provision that, if found proficient during the first six weeks, they may be promoted to the freshman rhetoric class. Such students must be prepared to suffer any further change in registration necessitated by the program and rules of the college.

SYLLABI

The following statements indicate in a general way the preparation which the university expects in 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. To satisfy this requirement a four years' course of not less than four hours per week must be pursued. 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: Shakespeare'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 know the leading facts connected with the author and his time; he should become familiar with the subject matter of the work and thoroughly at home with the story, and should 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, is desirable. The following works are noted as indicative of the minimum amount of work expected: at least two of Shakespeare'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.

Caesar (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 test. 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.

Virgil (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 Virgil 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 topically 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 influence 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.

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 Charta, 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.

American Government (one-half year)

This should be a study of our government, national, state and local, as it is organized and actually operated today. Students should be made familiar with the purpose and salient features of important instruments of government and other public acts like the Declaration of Independence, Articles of Confederation, Constitution of the United States, Constitution of Minnesota, and a local city or village charter.

In no case, however, should the instruction consist wholly or largely of an analysis of documents. It should rather aim to impart information essential to intelligent, active citizenship, such as the division of the government into departments, their organization and function; the methods of nominating, electing and appointing men to office; of framing and amending constitutions, city charters and statutes; of drawing grand and petit juries and the duty of the citizen to serve on them; the distinction between common law, state law and constitutional law, between equity, civil, and criminal cases.

To make the government seem a real working organization to the student, he should be encouraged to observe public proceedings by attending school meetings, town meetings, sessions of the county commissioners, city council, state legislature, a trial in court, and party primaries and conventions. He should also be led to read about and observe public affairs for himself. To that end let him collect statistics and accounts of work done by particular offices and departments from published reports and by personal inquiry.

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, bimetallism, 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 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.

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 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 and 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 subdivisions 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, the leading facts relating to the atmosphere and its phenomena, including some acquaintance with the work of the U. S. Weather Bureau; Land Sculpture, as it treats of the origin, development and decadence of land forms, and the influence of these processes on the physical environment of man.

Commercial Geography (one-half or one year)

The work usually provided in high schools will answer this requirement.

LIST OF ACCREDITED SCHOOLS

The following High Schools are accredited:

Ada
Adrian
Aitkin
Albert Lea
Alden
Alexandria
Amboy
Annandale
Anoka
Appleton
Argyle
Arlington
Atwater
Austin
Barnesville
Belle Plaine
Bemidji
Benson
Bird Island
Blooming Prairie
Blue Earth City
Brainerd
Breckenridge
Browns Valley
Buffalo
Caledonia
Cambridge
Canby
Cannon Falls
Cass Lake
Chatfield
Cloquet
Cokato
Cottonwood
Crookston
Dawson
Delano
Detroit
Dodge Center
Duluth
Eagle Bend
E. Grand Forks
Elbow Lake
Elgin
Elk River
Ely
Elmore
Eveleth
Excelsior
Fairfax
Fairmont
Faribault
Farmington
Fergus Falls
Fertile
Fosston
Frazee
Fulda
Gaylord
Glencoe
Glenwood
Graceville
Grand Meadow
Grand Rapids
Granite Falls
Hallock
Halstad
Harmony
Hastings
Hawley
Hector
Henderson
Herman
Heron Lake
Hibbing
Hopkins
Houston
Howard Lake
Hutchinson
Jackson
Janesville
Jordan
Kasota
Kasson
Kenyon
Lake Benton
Lake City
Lake Crystal
Lakefield
Lamberton
Lanesboro
Le Roy
Le Sueur
Le Sueur Center
Litchfield
Little Falls
Long Prairie
Luverne
Mabel
Madelia
Madison
Mankato
Mantorville
Mapleton
Marshall
Mazeppa
Milaca
Minneapolis—
Central
East Side
North Side
South Side
Minneota
Montevideo
Montgomery
Monticello
Moorhead
Mora
Morris
Morton
Mountain Lake
New Prague
New Richmond
New Ulm
Northfield
North St. Paul
Olivia
Ortonville
Osakis
Owatonna
Park Rapids
Paynesville
Pelican Rapids
Perham
Pine City
Pine Island
Pipestone
Plainview
Preston
Princeton
Red Lake Falls
Red Wing
Redwood Falls
Royalton
Renville
Rochester
Rush City
Rushford
St. Charles
St. Cloud
St. Louis Park
St. James
St. Paul—
Central
Cleveland
Humboldt
Mechanic Arts
St. Peter
Sandstone
Sauk Centre
Shakopee
Sherburn
Slayton
Sleepy Eye
South St. Paul
Springfield
Spring Grove
Spring Valley
Staples
Stephen
Stewartville
Stillwater
Thief River Falls
Tracy
Two Harbors
Virginia
Wabasha
Wadena
Warren
Waseca
Waterville
Wells
West Concord
Wheaton
White Bear
Willow River
Willmar
Windom
Winnebago
Winona
Winthrop
Worthington
Zumbrota

The following private schools are also accredited to the University:

St. Mary's Hall, Faribault
St. Paul Academy
Shattuck Military Academy, Faribault
Stanley Hall, Minneapolis
Windom Institute, Montevideo
Concordia College, Moorhead
Pillsbury Academy, Owatonna
St. Joseph's Academy, St. Paul
St. Paul's College, St. Paul Park
The Loomis School, St. Paul
The Backus School for Girls, St. Paul
The College of St. Catherine, St. Paul
St. Margaret's Academy, Minneapolis
The Winona Seminary, Winona
St. John's College, Collegeville

ADMISSION TO ADVANCED STANDING

1. FROM OTHER COLLEGES

This college 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 college. In bringing records from other institutions, the certificate must be upon the official blank of the institution granting the certificate, and should show:

(a) The subject studied; if a language, the books read, etc.
(b) The time spent upon each subject.
(c) Ground covered in laboratory work in case of laboratory subjects.
(d) The result. It is sufficient to state that the subject was completed creditably.

Records from institutions whose entrance requirements are not as high as those of this college will not be accepted for equivalent rank. The credits to be allowed in such cases will be determined by the Enrollment Committee.

2. FROM MINNESOTA NORMAL SCHOOLS

Graduates of the "advanced graduate course" of a Minnesota State Normal School are admitted with advanced standing equivalent to one year's credit, and receive the degree of Bachelor of Arts upon completing in this college ninety-six credits including freshman mathematics, courses III and IV, provided the usual requirements regarding majors and minors on page 43 be complied with. Such students will not be permitted to elect courses V or VII in education, I or II in mathematics, freshman rhetoric or reading, or history I, and upon registering for mathematics III and IV will be required to make good any deficiency in preparatory mathematics.

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.

ADMISSION AS UNCLASSED STUDENTS

Whenever in the judgment of the Enrollment Committee an applicant presents satisfactory reasons for not taking the regular course, such applicant may be admitted as an unclassed student. He must take the same examinations or present the same credentials as are required of those who enter the freshman class. Exceptions can be made only upon vote of the Faculty.

Unclassed students must take the same number of hours as regular students, and, unless advanced standing is obtained through credits from other institutions, four-fifths of the work during the first year must be taken from subjects offered to freshmen. A new application must be made each semester to the Enrollment Committee.

ADMISSION TO STUDY MUSIC

Students who enter the University for the express purpose of studying music, must take the same examinations or present the same credits that are required of those who apply for admission to the freshman class. Such students are required to register for courses I and IV in music, and at least six credits in other courses outside the department of music, to be selected with the approval of the Enrollment Committee.

DAILY ROUTINE

The daily session is divided into eight recitation periods of fifty minutes each, four in the morning and four in the afternoon. The morning session begins at 8:30 and closes at 12:35 o'clock. A general assembly of the faculty and students is held at 10:25 o'clock. The noon hour extends from 12:35 to 2 o'clock. The afternoon session begins at 2:00 o'clock and continues until 5:40. With the exception of Saturday afternoon work extends thru 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 semester 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 of 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.

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. 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 the various fee courses:

Animal Biology, I to VI, each	$3.00
Animal Biology, VII	1.00
Botany, I, II, III, V, VI, each	3.00
Chemistry, I (a), I (b), II, III, each	5.00
Chemistry, IV, V, VI, each	7.00
Geology IX and X, each	1.00
Mineralogy, I, II, III, and IV, each	3.00
Music, I, II, III, VI, VII, each	4.00
Music IV	$25.50 to 85.00
Music V	2.00
Physics I, II, III, IV, VI and VIII, each	3.00
Physics VII and IX, each	5.00

Military drill and gymnasium are required of all men. The price of military uniform, consisting of blouse, trousers, vest and cap is $15. The suit for gymnasium costs $2.

GRADUATION

Students completing the course of study to the satisfaction of the faculty of the college, are entitled to receive the baccalaureate degree. (For details see page 43.) 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* that examination, in every case, be held before a committee of the faculty appointed for that purpose.

THE UNIVERSITY STATE TEACHER'S CERTIFICATE

Graduates of the College of Science, Literature, and the Arts may apply for and receive upon vote of the faculty the University State Teacher's Certificate under the following conditions:

First: They must have maintained a good average of scholarship thruout the four years of college study.

Second: They must have the recommendation of at least one department concerned with high school studies.

Third: They must have completed one semester of Psychology and three semesters of Education, including courses I and II.

This certificate by state law authorizes students to teach in the public schools of Minnesota for two years from date. After that time, upon satisfactory evidence of success, the certificate may be made permanent by the endorsement of the State Superintendent of Public Instruction and the President of the University.

Requirements for the Degree of Bachelor of Arts

The degree of Bachelor of Arts will be conferred upon any student who fulfills the conditions as to amount, grade, and distribution of work stated under A, B, and C, below:

A. AMOUNT OF WORK—

The student must earn from the courses offered in the college 126 credits in addition to the required exercises in drill, gymnasium, and physical culture.

A credit is one hour per week through one semester.

Juniors and seniors pursuing beginning language courses (not including Greek and Hebrew), English I and II, Mathematics I and II, Chemistry I (a), Rhetoric I and VII, or History I, shall receive only half credits.

No student shall receive credit for more than two beginning modern language courses, save by special permission.

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

A notation [n] indicates the number of exercises per week and [n^2] indicates the number of double periods per week.

B. GRADE—

In at least one-half his work (63 credits), the student must secure a grade of "good." (For the system of grades see page 79.) For the purpose of this count each "excellent" shall balance one "pass," making an average of "good" for both records.[1]

[1]This rule will go into operation in September, 1907, provided that for the graduates of 1907-8, it shall be applied only to work for the senior year; for graduates of 1908-9 to work of the junior and senior years, and for graduates of the year 1909-10 to work of the sophomore, junior and senior years.

C. DISTRIBUTION OF WORK—

1. The student must complete a major and four minors. A major is not less than 18 credits, and a minor is not less than 12 credits in one department. Two minors, or a major and a minor, may be combined in one department, but at least one of the five subjects shall be chosen from each of the following groups:
   (a) English, French, German, Greek, Latin, Rhetoric
   (b) Animal Biology, Astronomy, Botany, Chemistry, Geology and Mineralogy, Physics
   (c) History, Philosophy, Economics and Politics, Sociology

   In the statement of courses, departments may indicate any courses which shall not count toward a major or minor, and in no case shall the following courses be so counted: the first year of beginning languages (excepting Greek and Hebrew), English I and II, Mathematics I and II, General Chemistry I(a), Rhetoric I and VII, and History I.
2. Each student must choose his major subject before the end of the sophomore year.
3. Upon the choice of his major subject the department in which the student has made his selection shall assign him to an adviser in that department.
4. The student shall choose, under the advice and approval of his adviser, a sufficient amount of work to make with his major, a total of forty-eight credits, the additional subjects being such as to reinforce the major.

Courses of Study

FOUR-YEAR COURSE IN SCIENCE, LITERATURE, AND ARTS

LEADING TO THE DEGREE OF BACHELOR OF ARTS

FRESHMAN YEAR

Mathematics [3]—Required of all during the freshman year.

(a) Second Part Higher Algebra and Trigonometry, for those who have entrance credits in First Part Higher Algebra and Solid Geometry.

(b) Solid Geometry and First Part Higher Algebra for those who lack entrance credits in these subjects.

(c) Freshmen who have an entrance credit in First Part Higher Algebra, but not in Solid Geometry, will take Second Part Higher Algebra the first semester and Solid Geometry the second semester.

(d) Freshmen who have an entrance credit in Solid Geometry, but not in the First Part Higher Algebra, will take First Part Higher Algebra the first semester and Trigonometry the second semester.

Note: First Part Higher Algebra and Solid Geometry cannot receive credits both for entrance and for freshman requirements.

Rhetoric [3] *Course* I.—Required of all who do not pass with a grade of "good" or "excellent" Part II of the examination in Entrance English.

Students who have had special preparation in Debate may, by consent of the Head of the Department, substitute Argumentation for Rhetoric.

Preparatory Rhetoric [3]—Required of all who do not pass Part I of the examination in Entrance English. This does not give a University credit.

Military Drill [3]—Required of men.

Gymnasium [1, in two periods]—Required of men.

Physical Culture [3]—Required of women.

In addition students shall choose from the following list a sufficient number of subjects to make in the aggregate not less than fourteen nor more than seventeen credits (not counting Drill, Gymnasium, or Physical Culture). The subjects chosen must be continued through the year.

Animal Biology [3^2], Course I, General Zoology.

Botany [3^2], Course I, General Botany.

Chemistry [3^2], Course I, General.

Elocution [3], Course VII. Shakspere reading. To count for two credits.

English [3], Course I, and Course II.

French [5], Course I, Grammar and translation, composition and conversation.

French [3], Course III, For students who have had two years of French in the high school.

French [5], Courses III and IV.

German [5], Course I, Grammar, translation, pronunciation, conversation and composition.

German [3], Course IV. For students who have two years of high school German.

German [5], Courses IV and V.

Greek [5], Course I, Grammar, Anabasis and composition.

Greek [3], Course III, Xenophon and Herodotus. For students who have had two years of Greek in high school.

History [3], Course I, 31 B. C. to 1500 A. D.—Open to students with less than two years of preparatory history.

History [3], Course II, English Constitutional. Open to students who have completed the equivalent of course I.

Latin [3], Courses I (Livy), II (Cicero).

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

Rhetoric [3]—Required of all who took Preparatory Rhetoric in the freshman year. It counts for freshman and not sophomore credits.

Military Drill [2]—Required of men.

In addition to Military Drill sophomores shall elect not less than fifteen nor more than eighteen credit-hours of work from the subjects open to them. 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 [3] beyond the required two years will be allowed two semester credits for each year; but no credit will be allowed for such Drill for less than one 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 subjects will be applied toward the work required for a degree in this department.

3. Members of the senior class of this college are permitted to elect 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 twelve senior credits, and will entitle him to admission to the middle class of the College of Law. The student may also elect the subject of "Negotiable Paper" and receive credit in the College of Law, but such election shall not be a basis for a claim for additional credits in the College of Science, Literature, and the Arts. 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 SCIENCE AND MEDICINE

LEADING TO THE DEGREES OF BACHELOR OF SCIENCE, AND DOCTOR OF MEDICINE

There has been established a six-year 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-year 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* [3 or 5]
2. *Botany* [3^2]
3. *Chemistry* [3^2]
4. *Zoology* [3^2]
5. *Higher Algebra and Trigonometry* [3], Courses III and IV.
6. *Military Drill* [3]
7. *Gymnasium* [1]

SECOND YEAR

1. *Rhetoric* [3]
2. *German or French* [3 or 5]
3. *Chemistry* [3^2]
4. *Comparative Anatomy of Vertebrates* [3^2]
5. *Physics* [6]
6. *Military Drill*

*Note: Students who enter with two years of German may elect French instead in the first or second year.

REQUIREMENTS FOR THE DEGREE OF A. B. "WITH DISTINCTION"

Students may receive the degree of A. B. "with distinction" in accordance with the following plan:

I. The degree with distinction shall be granted upon the basis of special excellence in the major subject.

II. To become a candidate for the degree of A. B. "with distinction," the student must signify his intention by registration, upon the proper blank, at some time between the close of the freshman year and the beginning of the senior year. Students wishing to become candidates for the degree are advised to register as such as early in the course as possible.

III. At the time of registration for such degree the applicant must have an *average* of "good" in all his previous work. (For the purpose of this count, each "excellent" shall balance one "pass," making an average of "good" for both records).

IV. To receive the degree "with distinction" at graduation, the student must fulfill the following requirements:

a. Comply with all the regulations applying to the ordinary degree of A. B.

b. Secure a record at graduation, higher than "pass" in four-fifths of all his work (provided that an "excellent" shall cancel a "pass," as in B, page 43).

c. By May 1st of his senior year, present a satisfactory thesis upon a subject approved by the adviser in charge of his work.

d. Comply with the special requirements of the department in which he takes his major work.

e. Be recommended by the department to the faculty for *special excellence* in his work; and

f. Be approved by vote of the faculty.

V. A student registered for the "degree with distinction" may withdraw his name at any time from such registration, or the registration may be cancelled by the department concerned, or by the dean after consultation with the department; but students whose registration for the degree with distinction has been withdrawn or cancelled shall still receive the degree of A. B. upon completion of the requirements therefor.

VI. The degree shall be given in the diploma thus: Bachelor of Arts, "with distinction."

VII. The names of students recommended by the faculty for the degree "with distinction" shall appear in the commencement program, with the statement that distinction has been acquired in a certain department. A certificate signed by the head of the department and the registrar shall be presented to the student who has attained the degree with distinction.

VIII. The special requirements of the departments in which distinction may be gained shall be authorized by the faculty, after recommendation by the curriculum committee.

ORDER OF DEPARTMENT STATEMENTS

I. English Language and Literature
  (a) English, (b) Rhetoric, (c) Philology
II. Ancient Languages and Literatures
  (a) Classics
    (1) Greek, (2) Latin
  (b) Semitic
    (1) Hebrew, (2) Arabic
III. Modern Languages and Literatures
  (a) Germanic Languages
    (1) German and Comparative Philology, (2) Scandinavian
  (b) Romance Languages
    (1) French, (2) Spanish, (3) Italian
IV. Biological Sciences
  (a) Botany, (b) Animal Biology, (c) Paleontology
V. Physical Sciences
  (a) Chemistry, (b) Physics, (c) Geology and Mineralogy
VI. Pure and Applied Mathematics
  (a) Mathematics, (b) Astronomy, (c) Physics, (d) Mechanics
VII. Philosophy, Education and Sociology
  (a) Philosophy, (b) Psychology, (c) Education, (d) Sociology
VIII. Social Sciences
  (a) Economics, (b) History, (c) Political Sciences, (d) Sociology
IX. Fine Arts
  (a) Drawing, (b) Music

Departmental Statements

1. English Language and Literature

ENGLISH

I. *Outline of English Literature* [3] — I. *Professor Burton, Assistant Professor Peck, Mr. Firkins, Assistant Professor Beach*

Open to freshmen.

An outline sketch of the main personalities and tendencies of English Letters from the earliest times to the present. The intention is to enable the student later to approach more specific aspects of the study with a general notion of the subject.

II. *Outline of American Literature* [3] — II. *Professor Burton Assistant Professor Peck, Mr. Firkins, Assistant Professor Beach*

Open to freshmen.

A study of the salient figures of our native literary development beginning with Irving. Special attention is given to the contemporary writers.

III. *Early English* [3] — I, II. *Professor Klaeber*

Open to sophomores, juniors, seniors.

A course in the grammar, literature and development of Old English. *This course is required of all those who wish to teach English.*

IV. *Introduction to Middle English language and literature* [2] — I. *Professor Klaeber*

Open to sophomores, juniors, seniors.

V. *Piers the Plowman* [2] — I. *Professor Klaeber*

Open to sophomores, juniors, seniors.

Courses IV and V will be given in alternate years.

VI. *Chaucer* [3] — I. *Assistant Professor Peck, Mr. Firkins*

Open to sophomores.

A study of the grammar and literary forms of Fourteenth Century English with selected readings from Chaucer's works. Special attention is given to the Canterbury Tales. *This course is required of all who intend to teach or to take their major in English.*

VII. *Spenser* [3] — II. *Assistant Professor Peck, Mr. Firkins*

Open to sophomores.

A course in forms and literary influences of the Elizabethan period, which are illustrated in the poetry of Edmund Spenser with selected readings from the minor poems and three books entire of the Faery Queen. *This course is required of all who intend to teach or to take their major in English.*

VIII. *Outline Eighteenth Century Literature* [3] — I. *Assistant Professor Beach*

Open to sophomores.

IX. *Outline Nineteenth Century Literature* [3] — II. *Assistant Professor Beach*

Open to sophomores.

X. *Early Nineteenth Century Poetry* [3] — I. *Mr. Firkins*

Open to juniors.

A course in forms and literary influences of the early Nineteenth Century, with a critical study of selected readings from Wordsworth, Coleridge, Byron, Shelley and Keats.

XI. *The Short Story* [3] II. *Mr. Firkins*
Open to juniors.
History and development of the short story to be followed by course XII.

XII. *The English Novel* [3] I. *Professor Potter*
Open to juniors and seniors who have had previously one full year of English.
A study of the history and development of the English Novel. It is suggested that this course be preceded by course XI. It is open only to students who have previously had one full year of English.

XIII. *The Bible as Literature* [3] II. *Professor Potter*
Open to juniors and seniors.
A literary survey of the Old Testament with special attention to forms and critical study of selected readings.

XIV. *Milton* [3] I. *Professor Potter*
Open to juniors.
A critical study of the early poems, six books of Paradise Lost and Samson Agonistes. *This course is required of all who intend to teach or to take their major in English.*

XV. *Shakspere* [3] II. *Professor Potter*
Open to juniors.
An outline study of the Shakspere plays with a critical study of selected comedies, tragedies and historical plays. *This course is required of all who intend to teach or to take their major in English.*

XVI. *Construction and Development of Modern Drama* [3] I. *Assistant Professor Peck*
Open to seniors.
A study of the theory of the drama with the history of English drama to the middle of the Nineteenth Century.

XVII. *Late Nineteenth Century Drama* [3] II. *Assistant Professor Peck*
Open to seniors.
A survey of Ibsen followed by critical reading of selected plays of Sudermann, Hauptmann, Maeterlinck, contemporary French drama, D'Annunzio, contemporary English and American playwrights. Open only to those students who have had course XVI.

XVIII. *Teachers' Course in English* [1] I, II. *Professor Potter*
Open to seniors. Only one credit given for the course.
This course is required of all who intend to teach English.

XIX. *The Philosophy of English Grammar* [1] I, II. *Professor Burton*
Open to juniors and seniors.
This course aims to show in a simple way the underlying principles of English speech, distinguishing these principles from the false speech uses, which have come into the language from foreign sources.

XX. *English Prose* [3] I. *Professor Burton*
Open to juniors and seniors.
A discussion of current idiom with the advantage of relating it to the underlying principles which have been brought out in the preceding course.

XXI. *Browning and Tennyson* [3] II. *Professor Burton*
Open to juniors and seniors.
This course involves a reading of the representative work of the two major poets of the Victorian era in order to show their quality and contrasted power.

XXII. *History of the English Language* [1] II. *Professor Klaeber*
Required of all who intend to teach or to take their major in English.

SENIOR SEMINAR

XXIII. *Hakluyt's Voyages* *Assistant Professor Peck*
An inquiry into the vivid and dramatic sources of language and literature found in this "prose epic" of the Elizabethan seamen.

FOR GRADUATES

(Graduates will not receive credit for work taken in undergraduate courses, except in minors.)

I. *Anglo Saxon* — *Professor Klaeber*
Grammar and reading of texts.

II. *Beowulf* — *Professor Klaeber*

III. *Principles of Criticism* — *Mr. Firkins*

This course comprises:
(a) A brief treatment of elements or forces in literature, e. g., clearness, vigor, beauty, precision, art, taste, humor, truth, ethics, and the like.
(b) An exposition of literary types, e. g., the lyric, epic, drama, short story, novel, biography, etc., in relation to the standards and methods of judging each.

IV. *Continental Drama* — *Professor Potter*
A study of the rise of continental drama, and its connection with Elizabethan drama.

V. *Prose Fiction as a Literary Form* — *Professor Burton*

VI. *The Drama as a Literary Form* — *Professor Burton*
This course will not be given in 1907-8.

RHETORIC AND ELOCUTION

RHETORIC

I. (a) *Rhetoric* [3] — I, II.
Open to all freshmen who have passed the entrance test in English.
This course includes the study of formal Rhetoric, the writing of compositions, and the study and analysis of masterpieces of prose.

(b) *Argumentation* [3] — I, II. *Mr. McElmeel*
Open to students recommended by the department.
Students who have had special preparation in Debate may, by consent of the Head of the Department, substitute Argumentation for Rhetoric. This course aims at instruction in the science of argumentation and in the art of debate. The work consists of 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.

II. (a) *Rhetoric* [3] — Sophomore I, II. *Mr. Firkins and Miss Maley*
Open to students who have completed course I, and to sophomores of whom, at entrance, Rhetoric was not required. The course consists of a study of the short story in the first semester, and of the essay and forms of public address in the second semester. The writing of compositions and the keeping of a note book form a greater part of the work.

II. (b) *Argumentation* [3] — I, II. *Mr. McElmeel*
Open to students who have completed I (b), and to sophomores of whom at entrance rhetoric was not required, provided they have had experience in debate.

III. *Literary Criticism* [3] — I, II. *Professor Sanford*
Open to juniors and seniors.
Study of models of English poetry, oratory, fiction, etc., with critical essays.

IV. *Lectures upon History of Art* [3] — II. *Professor Sanford*
Open to juniors and seniors.
This course embraces the study of the development of architecture, sculpture and painting from the earliest remains in Chaldea and Egypt down through the Sixteenth Century A. D. Some attention is also given to

more recent art. The College Histories of Art, Radcliffe's Schools and Masters of Painting and of Sculpture, Hoyt's Painters and other works are used as text books. Essays upon the history of art are required.

v. *Debate* [3] I, II. *Professor Sanford*
Open to juniors and seniors who have had course I (a) or I (b).
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. Not offered in 1907-8.

VI. *Advanced Rhetoric* [3] I, II. *Assistant Professor Comstock*
Open to juniors and seniors who have completed course II (a).
Structure and style, theoretically and practically considered, are subjects of study in this course. Some time is given to the oral presentation of topics. In the composition work the student is allowed to select his own subjects and methods of treatment. This course, in addition to the courses in Literature, is required of students who desire a recommendation in English toward a teacher's certificate.

VII. *Advanced Rhetoric* [3] I, II. *Assistant Professor Comstock*
Open to students who have completed course VI. This course is a continuation of course VI and will be conducted along the same lines.

ELOCUTION

VIII. *Reading* [2] I, II. *Professor Sanford*
The object of this course is voice building and training in interpretation and expression. The text used is Shakspere's plays. Three times per week, to count for two credits.

IX. *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, gutteral 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.

X. *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.

XI. *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.

COMPARATIVE PHILOLOGY

This department, besides (1) offering courses in the general principles of linguistic science, (2) affords an opportunity for elementary studies in comparative Indo-European philology, and (3) more particularly the investigation of old Germanic dialects. Related courses in English philology will be found under "English Language and Literature."

FOR UNDERGRADUATES

I. *General Introduction to the Science of Language* [2] I. *Professor Klaeber*
Open to sophomores, juniors, seniors.
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.

II. (a) *The Life of Words* [2] I. *Professor Klaeber*
Open to sophomores, juniors, seniors.
Etymology and Semasiology. Growth of vocabulary, change of words in form and meaning. Lectures and exercises, with special reference to English and other Germanic languages.

(b) *History of the Alphabet* [2] I. *Professor Klaeber*
Open to sophomores, juniors, seniors.
Survey of the principal systems of writing. Development of the letters in the Indo-European languages. History of English spelling and spelling reform.

III. (a) *Esperanto and the Idea of an International Language* [1] II. *Professor Klaeber*
Open to sophomores, juniors, seniors.
Comparison of the principal families of languages in grammatical and lexical respect. History of the movement for the creation of an international language. Consideration of the merits of Volapuk, Esperanto, and other artificial languages. Exercises in Esperanto.

(b) *Introduction to Teutonic Philology* [1] II. *Professor Klaeber*
Open to sophomores, juniors, seniors.
History of Germanic philology; biographies of leading scholars (J. Grimm and others). Classification of the Germanic languages. Rapid survey of the various branches of the Teutonic group (Gothic, Norse, English, Frisian, Dutch, Low German, High German).

IV. *Comparative Phonology of English and German* [3] II. *Professor Klaeber*
Open to sophomores, juniors, seniors.
Elements of phonetics; history of English and German sounds; orthography. The lectures will be supplemented by practical exercises.
Courses II (a) and II (b), III (a) and III (b) will be given in alternate years.

FOR GRADUATES

V. *Comparative Grammar*
Of the Greek, Latin and Germanic languages; with a general survey of the field of Indo-Germanic philology.

VI. *Urgermanische Grammatik*
Lectures and study of standard works (Brugmann, Kluge, Noreen, Streitberg, etc.).

VII. *Gothic*
The relation of Gothic to the other Germanic dialects will be particularly emphasized. Study of the grammar (Braune, J. Wright, Streitberg) and reading of the Gospels (Heyne's *Ulfilas,* 10th edition).

VIII. *Old Saxon*
Grammar and interpretation of the *Heliand.*

IX. *Old High German*
This course is identical with course XVII of the German Department.
Braune's Althochdeutsche Grammatik; Braune's Althochdeutsches Lesebuch.

N. B. Courses in English Philology will be found under "English Language and Literature."

II. Ancient Languages and Literatures

GREEK

I. *First Year in Greek* [5] *Professor Hutchinson*
Open to all.
(a) Introduction to Attic Greek I.
(b) Anabasis (begun) II.
Greek Composition is done in connection with the text.

II. *History and Epic Poetry—Anabasis and Iliad* [3]
Assistant Professor Savage and Professor Hutchinson
Open to those who have completed course I.
(a) Anabasis (continued) I.
(b) Iliad (elementary course) II.
The entire course must be taken to secure credit.

III. *History—Xenophon and Herodotus* [3] *Assistant Professor Savage*
Open to students who offer two years of preparatory Greek for admission to the freshman class. Open also to students who have completed course I, when in the judgment of the department they are qualified for the work. The work of both semesters must be taken to secure credit.
(a) Selections from Xenophon's Cyropedia I.
(b) Selections from Herodotus II.

IV. *Oratory—Lysias and Demosthenes* [3] I. *Assistant Professor Savage*
Open to those who have finished course II or III.

V. *Philosophy—Plato's Apology and Crito* [3] II. *Assistant Professor Savage*
Open to those who have finished course II or III.

VI. *Lyric and Bucolic Poetry* [3] I. *Professor Hutchinson*
Open to those who have finished course IV or V and to such students as have finished course II or III and in the judgment of the Department are qualified for the work.

VII. *Tragedy—Aeschylus and Sophocles* [3] II. *Professor Brooks*
Open to those who have completed course V.

VIII. *Philosophy—Plato's Republic* [3] I. *Professor Hutchinson*
Open to those who have completed course V.

IX. *Oratory—Demosthenes' De Corona* [3] I. *Professor Hutchinson*
Open to those who have completed course IV.
Courses VIII and IX are offered in alternate years, course IX in 1907-8.

X. *Epic Poetry (advanced course)—The Iliad* [3] II. *Professor Hutchinson*
Open to those who have completed course VII.
The Iliad and Odyssey are offered in alternate years.

XI. *Modern Greek* [3] I. *Professor Brooks*
Open to those who have completed course II or III.

XII. *Archaeology of Greek Art* [3] I, II. *Professor Brooks*
Open to all juniors and seniors. A knowledge of Greek is not required.

XIII. *Dramatic Poetry—Euripides and Aristophanes* [2]
I, II. *Assistant Professor Savage*
Open to those who have completed course II or III.

XIV. *Greek Composition* [1] I, II. *Professor Hutchinson*
Open to those who have finished courses IV and V.
Recommended to all who expect to teach Greek.

XV. *Greek Literature and Life* [2] II. *Assistant Professor Savage*
Open to all juniors and seniors. A knowledge of Greek is not required.
The course consists of lectures, text-book work and illustrative readings.

XVI. *Later Greek* [2] I, II. *Professor Hutchinson*
Open to all who have completed course V.
Selections chiefly from the Septuagint and the New Testament.

XVII. *Seminar* [1]
In connection with Demosthenes' De Corona. I. *Professor Hutchinson*
In connection with Course VII *in Tragedy* II. *Professor Brooks*

GRADUATE COURSES

XVIII. *Advanced Courses in Poetry*
Epic and Lyric *Professor Hutchinson*
Dramatic *Professor Brooks*

XIX. *Advanced Course in Oratory* *Assistant Professor Savage*

XX. *Later Greek.* (322 *B. C.*—200 *A. D.*) *Professor Hutchinson*

XXI. *Advanced Course in Modern Greek* *Professor Brooks*

LATIN

I. *Livy, Books* I, II, XXI *and* XXII. *Selections* [3]
Professor Clark, Professor Pike and Assistant Professor Granrud
Open to students who have completed the four years' entrance Latin.
The course consists of (a) a correct translation of the Latin into idiomatic English with a study of the difference between the idioms of the two languages; (b) Latin composition and review of the principles of Latin syntax.

II. *Plautus and Terence. Selections* [3] II.
Professor Clark, Professor Pike and Assistant Professor Granrud
Open to students having completed course I. The course comprises the translation of selected plays of Plautus and Terence with an outline study of the beginnings of the Roman drama and also of Roman political institutions. Courses I and II must be taken to gain credit.

III. *Horace* [3] I. *Professor Pike and Assistant Professor Granrud*
Open to students having completed courses I and II. Selections from the Odes, Epodes, Satires and Epistles with a study of the life and literary art of Horace.

IV. *Roman Literature* [3] II. *Professor Pike and Assistant Professor Granrud*
Open to students having completed courses I-III. History of Roman Literature, with illustrative readings.
Courses III. and IV. must be taken to gain credit.

V. *Ovid* [1] I and II. *Professor Clark*
Open to students who are taking courses III and IV. Translations of Ovid's Fasti, with a study of the religion and religious ceremonials of the Romans.

VI. *Teachers' Course in Latin* [1] I. *Professor Pike*
Open to students having completed courses I-IV. Explanation of indirect discourse; teachers' drill upon portions of Book 1, Caesar's Gallic war; discussion of various problems connected with the teaching of Latin in the high schools.

VII. *Advanced Course in Caesar* [2] I. *Professor Pike*
Open to students having completed courses I-IV. Selections from Books V-VII of Gallic war, and from civil war. Latin composition. Students are advised to take courses VI and VII together.

VIII. *Advanced Course in Virgil* [3] II. *Professor Pike*
Open to those having completed courses I-IV. Interpretation of selections from books VII-XII of Virgil's Aeneid. Students working for a major in Latin in the College of Education, or for a major recommendation for a teacher's certificate in the College of Science, Literature, and the Arts, must take courses VI, VII and VIII.

IX. *Latin Composition* [2] II. *Professor Pike*
Open to those having completed courses I to IV. Advanced Latin composition and lectures on Latin style.

X. *Medieval Latin* [1] I. *Professor Pike*
Open to those having completed courses I-IV. Sketch of the decadence of Literary Latin. A short course intended principally to assist the student in handling Latin historical documents of the middle ages.

XI. *Suetonius* [1] I. *Professor Pike*
Open to students having completed courses I-IV. Selections from Suetonius' lives of the Caesars.

XII. *Roman Elegiac Poetry* [3] I. *Professor Clark*
Open to students having completed courses I-IV. Selections from Catullus, Tibullus, Propertius, and Ovid, with a study of the rise, development and characteristics of Roman Elegiac Poetry.

XIII. *Correspondence of Cicero* [2] I. *Professor Clark*
Open to students having completed courses I-IV. Selections from the letters of Cicero, with a study of the life and history of his times.

XIV. *Roman Satire* [3] II. *Professor Clark*
Open to students having completed courses I-IV. Selections from Juvenal, Persius, Horace, and from early satire, with a study of the rise, development and characteristics of Roman satire.

XV. *Roman Private Life* [1] I. *Assistant Professor Granrud*
Open to juniors and seniors. A knowledge of Latin not required. The Roman house, family, dress, education and amusements.

XVI. *Roman Public Life* [1] II. *Assistant Professor Granrud*
Open to juniors and seniors. A knowledge of Latin not required. The city of Rome, the Forum, Roman architecture, sculpture, painting, Roman assemblies, magistracies, and lectures and stereopticon views and collateral reading.

FOR GRADUATES

XVII. *Roman Law* [2] *Professor Clark*
Reading of Robinson's selections of Roman Law, and the first book of the Institutes of Justinian, with lectures and topical study of Roman private law.

XVIII. *Tacitus* [2] *Professor Pike*
Reading and interpretation of books XIII-XVI of the annals, with a study of Tacitus' style and the history of the times of Nero.

XIX. *The History and Theory of Roman Eloquence to* 43 *B. C.* [2] *Assistant Professor Granrud*
Selections from the rhetorical works of Cicero will constitute the basis of the work of the first semester. During the second semester a few representative orations will be studied, with special reference to their structure and style.

SEMITIC LANGUAGES

I. *Elementary Hebrew* I, II. *Rabbi Deinard*
Open to juniors and seniors.
Harper's Elements of Hebrew and reading of easy prose passages of the Old Testament.

II. *Advanced Hebrew* I, II. *Rabbi Deinard*
Open to those who have completed course I.
Critical reading of some Old Testament book, with a review of Hebrew grammar.

III. *Elementary Arabic* I, II. *Rabbi Deinard*
Open to juniors and seniors.
Socin's Arabic Grammar and reading of the prose selections contained in it.

IV. *Advanced Arabic* I, II. *Rabbi Deinard*
Open to those who have completed course III.
Selected Suras of the Koran and a review of Arabic grammar.

V. *Elementary Aramaic or Syriac* I, II. *Rabbi Deinard*
Open to juniors and seniors.
Strack's Grammatik des Biblischen Aramaisch, and Brockelman's Syrische Grammatik.

VI. *History of the Hebrews* I, II. *Rabbi Deinard*
Open to juniors and seniors.
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.

III. Modern Languages and Literatures

GERMAN LANGUAGE AND LITERATURE

I. *Beginning* [5] I, II. *Professor Schlenker, Assistant Professors Wilkin and Juergensen, Mr. Schroedel, and Mr. Williams*
Open to all who do not present German for entrance. Pronunciation, grammar, conversation and composition; selected reading in easy prose and verse.
To follow this course students may take course II or course III, and course V as a supplementary course to either.

II. *Intermediate* [3] I, II. *Professor Schlenker, Mr. Schroedel, and Mr. Williams*
Open to students who have completed course I. First semester—Selections from modern narrative and descriptive prose; selected lyrics and ballads. Second semester—A drama of Lessing, Goethe or Schiller. This course may be supplemented by course V. To follow this course students should take course VI. Credit cannot be obtained for course IV by students who have credit for course II.

III. *Scientific Intermediate* [3] I, II. *Assistant Professor Juergensen*
Open to students who have completed course I. First semester—Hodge's German Science Reader (or equivalent). Second semester—Brandt and Day's German Scientific Reading. This course aims to give the student a reading knowledge of German for use in scientific studies.
This course may be supplemented by course V. To follow this course students may elect course VII or course VI, but must not elect course IV.

IV. *Classic Prose and Poetry* [3] I, II. *Professor Moore, Assistant Professor Wilkin, Mr. Schroedel, and Mr. Williams*
Open to students who have presented German for entrance. Not open to students who have credit for course II or course III. First semester—Meissner's Aus deutschen Landen; Goethe's Gedichte. Second semester—Schrakamp's Berühmte Deutsche, Heine's Buch der Lieder. Review of German grammar throughout the year. This course may be supplemented by course V.

V. *Elementary Conversation and Composition* [2] I, II. *Assistant Professors Wilkin and Jurgensen, Mr. Schroedel, and Mr. Williams*
Open to students who are taking or have taken course II or course III or course IV.
Translation of short English selections; conversation on topics of everyday life; narrative and descriptive essays and letter writing.

VI. *The Drama* [3] I, II. *Professor Schlenker, Assistant Professors Wilkin and Juergensen, and Mr. Schroedel*
Open to students who have taken course II, III, or IV.
First semester—Modern drama. Plays of Hebbel, Hauptmann or Sudermann. Study of the present day drama in Germany. Assigned readings and reports. Second semester—Classic drama. Plays of Lessing, Goethe and Schiller. Study of dramatic structure. History of the German drama in the eighteenth century.
This course may be supplemented by course VIII.

VII. *Advanced Scientific Reading* [3] I, II. *Mr. Juergensen*
Open to students who have taken course III or course IV. Reading of monographs and periodicals.

VIII. *Advanced Conversation, Grammar and Composition* [2] I, II.
Professor Schlenker, Assistant Professor Wilkin, and Mr. Schroedel
This course is intended as preparation for course XVI and is open to students who have taken or are taking course VI. It is recommended that students shall have taken course V. Required of those who desire a major recommendation toward a teacher's certificate.
Essays on assigned subjects; oral exercises in German by means of discussions on everyday subjects; debates, narration and the like.

IX. *German Literature of the Classic Period* [3] I, II. *Professor Moore*
Open to those who have taken course VI or course VII.
First semester—Goethe's Faust; its genesis; Faust legend; its treatment in literature before and since Goethe's time. Plan of Goethe's Faust; solution of the Faust problem in Part II. 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. Required of those who desire a major recommendation towards a teacher's certificate.

X. *Modern Authors, German Literature of the Nineteenth Century* [3]
I, II. *Professor Moore*
Open to those who have taken course IX.
First semester—Romantic school and Junge Deutschland. Second semester—German literature since 1848. Required of those who desire a major recommendation towards a teacher's certificate.

XI. *History of German Literature* [2] I, II. *Assistant Professor Juergensen*
Open to graduates and seniors who have completed course IX. Lectures in German on the history of German literature. Reviews and topical research on the part of the students.

XII. *Seminar in German Drama* [1] I, II. *Professor Schlenker*
Open to graduates; also by permission of the instructor, to undergraduates who have taken course IX, but without credit. This course aims to give in outline the history of German dramatic literature from its beginning to, and including the classic drama.

XIII. *Middle High German* [2] I, II. *Professor Schlenker*
Open to seniors and graduates who have completed course IX or X. Study of the language and literature of the period. Paul's Mhd. Grammatik. Selected readings from Armer Heinrich, Nibelungen Lied, Gudrun, Walter von der Vogelweide, etc.

XIV. *History and Literature of the Reformation* [2] I, II. *Professor Moore*
Open to seniors and graduates who have taken course IX or X. Brandt, Luther, Hutten, Sachs, Murner and Fischart. Selections from Jansen and Egelhaaf.

XV. *The German Volkslied* [2] II. *Mr. Williams*
Open to graduates who have completed course IX or X. Outline of the history and development of the Volkslied. Study of selected numbers in Uhland's *Volkslieder* with references to other general and special collections. Influence of the Volkslied upon lyric and ballad writers.

XVI. *Teachers' Course* [1] II. *Professor Moore*
Open to students who are taking or have completed courses VIII, IX and X. This course is especially designed for students who intend to become teachers in high schools.

SCANDINAVIAN

FOR UNDERGRADUATES

I. *Swedish, beginning* [5] I, II. *Professor Carlson*
Open to all. Elementary study of the language.

II. *Swedish, advanced* [3] I, II. *Professor Carlson*
Open to those who have completed course I. Grammar, composition, oral and written exercises, translations and an elementary study of the literature.

III. *Danish-Norwegian, beginning* [5] I, II. *Professor Carlson*
Open to all. Elementary study of the language.

IV. *Danish-Norwegian, advanced* [3] I, II. *Professor Carlson*
Open to those who have completed course III. Grammar, composition, oral and written exercises, translations, and an elementary study of the literature.

V. *Old Norse* [2] I, II. *Professor Carlson*
Open to qualified students, upon approval of the department.
Grammar and composition.

VI. *Scandinavian Literature*
Open to qualified students, upon approval of the department.
History of the literature and study of special authors.

FOR GRADUATES

VII. *Icelandic or Old Norse*
The history, language and literature of Iceland and Norway from earliest times to 1500 A. D.

VIII. *Old Swedish*
The history, language and literature of Sweden from earliest times to 1500 A. D.

IX. *Old Danish*
The history, language and literature of Denmark from earliest times to 1500 A. D.

X. *Modern Danish Language and Literature*

XI. *Modern Swedish Language and Literature*

XII. *Modern Norwegian Language and Literature*

FRENCH, SPANISH AND ITALIAN

FOR UNDERGRADUATES

I. *French, beginning* [5]
I, II. *Assistant Professor Andrist, Assistant Professor Frelin, Madame Bertin*
Open to freshmen and sophomores. Fraser and Squair's French Grammar and Reader; modern texts.

II. *French, second-year work* [3]
I, II. *Assistant Professor Frelin and Madame Bertin*
Open to students who have completed course I. Grammar and composition continued; modern texts will be read, including selections from Merimée, Daudet and Scribe.

III. *Advanced Grammar and Composition* [3] I, II. *Assistant Professor Andrist*
Open to those who have completed the French required for entrance. Francois' Introduction to French Composition; readings from modern authors, including selections from Copée, Feuillet, Sandeau.

IV. *Conversation* [2] I, II, *Assistant Professor Frelin and Madame Bertin*
Open to students taking courses II or III. A course in conversational French

v. *The Classical Period* [3] *Professor Benton*
Open to those who have completed courses I and II or course III. Lectures and conversations concerning the writers of the classical period and readings and works produced during this period, including La Fontaine, Corneille, Racine, Molière. Some modern authors will be read for the purpose of comparison. Francois' Advanced French Composition.

VI. *Advanced Conversation* [2] I, II. *Professor Benton*
Open to students in fourth, fifth or sixth year French.

VII. *Literature of the Nineteenth Century* [3] I, II. *Professor Benton*
Open to those who have completed course V. The works of many of the writers of this century will be read and reports given in class. Lectures in the French language on the literary movement of the nineteenth century, including Chateaubriand, Victor Hugo, Balzac, Renan, Taine, Bourget.

VIII. *Teachers' Course* [1] I, II. *Professor Benton*
Open to those who have completed course VII. Study of modern critics concerning the development of literature and teaching. All discussion in the French.

IX. *Romance Philology* [1] I, II. *Professor Benton*
Open to juniors and seniors who have completed course V. Lectures on the phonetical development of the French and other Romanic languages from popular Latin. Reading old French texts.

X. *Italian Literature* [1] I, II. *Professor Benton*
Open to juniors and seniors. Dante, Goldoni, Alfieri, Manzoni.

XI. *Spanish, beginning* [5] I, II. *Mr. Melom*
Open to all. Grammar and easy texts, including Galdos, Alarcon, etc.

XII. *Spanish, second year* [3] I, II. *Mr. Melom*
Open to students who have completed course I. Advanced grammar, Cervantes, Calderon, Lope de Vega.

XIII. *Spanish, third year* [3] I, II. *Mr. Melom*
Cervantes.

FOR GRADUATES

XIV. *Romance Languages, Old French*
French and other Romance languages from popular Latin. Morceaux choisis des Auteurs Francais du Moyen Age, par L. Clédat. 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 Cantiléne 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.

XV. *History of the Drama*

XVI. *Italian.* Dante's Divine Comedy

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

IV. Biological Sciences

BOTANY

I. *General Botany* [3] I, II. *Professor Clements and Assistant Professor Tilden*
Open to all.
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.

II. *General Plant Morphology* [3] I, II. *Assistant Professor Rosendahl and Mr. Huff*
Open to all students who have completed course I.
A view of mossworts, ferns and flowering plants is given, with lectures, laboratory work and collateral reading throughout the year.

III. *Plant Physiology* [3] I, II. *Professor Clements*
Open to all students who have completed course I.
The course consists of an experimental study of the vital activities of plants. Special attention will be given to the physiology of reproduction. Lectures, laboratory and collateral reading.

IV. *Mycology and Plant Pathology* [3]
I, II. *Professor Clements and Assistant Professor Rosendahl*
Open to juniors and seniors who have completed course I or II.
The course includes a comparative morphological and taxonomic survey of the fungi and a study of plant diseases of fungous origin. Lectures, laboratory and reference work.

V. *Taxonomy* [3] I, II. *Assistant Professor Rosendahl*
Open to juniors and seniors who have completed course I or II.
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.

VI. *Cytology* [3] I, II. *Assistant Professor Lyon*
Open to juniors and seniors who have completed course II.
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, Henneguy, Hertwig, Wilson, Guignard, Beneden and Driesch will be made and methods of cytological research indicated in the laboratory.

VII. *Algology* [3] I, II. *Assistant Professor Tilden*
Open to juniors and seniors who have completed course I or II.
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 fresh-water 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.

VIII. *Plant Ecology* [3] II. *Professor Clements*
Open to juniors and seniors who have completed course I.
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.

IX. *Industrial Botany* [3] I, II. *Assistant Professor Tilden*
Open to juniors and seniors who have completed course I or II.
The course embraces a study of the origin, distribution and cultivation of plants yielding products of economic value, the nature and use of these products and the processes by which they are obtained from the plants. Lectures, demonstrations, topics and laboratory work.

X. *Wood Technology* [3] I. *Assistant Professor Lyon*
Open to all students who have completed course I or II.
This course will include a histological study of the most important woods of commerce and the special taxonomy of the trees and shrubs producing these woods. Lectures and laboratory.

XI. *Teachers' Course* [1] II. *Professor Clements*
Open to seniors who have completed two years' work in the department.
This course consists of one lecture a week during the second semester, on the ends to be attained through the teaching of high school botany and on methods of presentation.

FOR GRADUATES

XII. *Morphology and Taxonomy* *Assistant Professor Rosendahl*
Open as a major or minor to candidates for an advanced degree.
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.

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

XIV. *Problems in Cytology and Embryology* *Professor Clements*
Open as a major to candidates for an advanced degree.
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.

XV. *Paleobotany* *Dr. Sardeson*
Open as a partial minor to candidates for the degree of master of arts or of science.
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

ANIMAL BIOLOGY

A long course in this department consists of course I and any one of courses II, III, IV and V, or courses XIV and XV. Course IV is required of those registered for the six-year medical course. Half-year and lecture courses (VI and IX-XII) are not credited toward a long course.

I. *General Zoölogy* [3]
I, II. *Professor Sigerfoos, Assistant Professor Oestlund and Assistants*
Open to all students.
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.

II. *Advanced Zoology* [3]
I, II. *Professor Sigerfoos and Assistant Professor Oestlund*
Open to those who have completed course I or its equivalent.
The object of this course is to familiarize the student with the methods and principles of zoology thru an intensive study of two or three groups of animals and to acquaint him with the minor phyla not considered in course I.

III. *Histology* [3] I, II. *Professor Nachtrieb and Assistant Professor Downey*
Open to those who have completed 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: Stöhr, Text-book of Histology; Szymonowics-MacCallum, A Text-book of Histology and Microscopic Anatomy; Böhm and Davidoff-Huber, Text-book of Histology; Schneider, Lehrbuch der vergleichenden Histologie der Tiere; Oppel, Lehrbuch der vergleichenden mikroskopischen Anatomie der Wirbelthiere; Hertwig, Zelle und Gewebe; Wilson, The Cell; and others.

IV. *Comparative Anatomy of Vertebrates* [3] I, II. *Assistant Professor Brown*
Open to those who have completed 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 Vertebrate Animals; Owen, Comparative Anatomy and Physiology of Vertebrates; Wiedersheim, Comparative Anatomy of Vertebrates; Gegenbauer, Vergleichende Anatomie der Wirbelthiere.

V. *Entomology* [3] I, II. *Assistant Professor Oestlund*
Open to those who have completed course I.
Lectures, text-book, quizzes and laboratory work.
The course covers, in general, the elements of entomology. Folsom's Entomology is used as text-book and general guide.

VI. *Neurology* [3] I. *Assistant Professor Downey*
Open to juniors and seniors.
Lectures on the nervous system of vertebrates, and the dissection of a mammalian brain in the laboratory.

VII. *Embryology of Vertebrates* [3] I, II. *Professor Nachtrieb*
Open to juniors and seniors who have completed courses I and III or their equivalents.
Lectures, reference and laboratory work.
The object of this course is to acquaint the student with the general principles of vertebrate development thru the study of various stages of several vertebrates and to give him practice in the preparation of material and the methods of reconstruction.
The 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 Entwickelungslehre der Wirbelthiere.

VIII. *Embryology of Invertebrates* [3] I, II. *Professor Sigerfoos*
Open to juniors and seniors who have completed courses I and III or their equivalents.
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.

IX. *Physiology* [3] I. *Professor Sigerfoos*
Open to juniors and seniors.
Text-book, lectures and demonstrations.
This course is offered in alternate years. It will be offered during 1908-9.

X. *Mental Evolution in Animals* [3] II. *Professor Nachtrieb*
Open to juniors and seniors.
Lectures on habit, instinct and intelligence of animals.
This course is offered in alternate years. It will be offered during 1908-9.

XI. *History of Zoölogy* [3] I. *Professor Nachtrieb*
Open to juniors and seniors.
Lectures on the history of zoology, the history of our domestic animals and those that have become extinct within historic times, and the modern theories and problems of heredity and evolution.
This course is offered in alternate years. It will be offered during 1907-8.

XII. *Economic Zoölogy* [3] II. *Professor Nachtrieb*
Open to juniors and seniors.
Lectures on the uses made of animals and their products, fish-culture and the life histories of disease-producing animals.
This course is offered in alternate years. It will be offered during 1907-8.

XIII. *Teachers' Course* [1] *Professor Nachtrieb*
Open to juniors and seniors who have completed a long course in the department.
Lectures and discussions on the ends to be attained through courses in general zoology, and the methods and means by which such ends may be gained.
This course is offered in alternate years. It will be offered during 1908-9.

XIV. *Ichthyology* [3] I. *Assistant Professor Brown*
Open to those who have completed course I.
Lectures and laboratory work. This course will cover the natural history, development, classification and culture of fishes with special reference to the fresh-water forms of economic importance.

XV. *Ornithology* [3] II. *Assistant Professor Brown*
Open to those who have completed course I.
Lectures and laboratory work.

XVI. *Problems or Research* I, II. *Professor Nachtrieb and Associates*
Open to those qualified to carry on special work or research. Those contemplating such work should confer with Professor Nachtrieb.

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.

BIOLOGICAL CLUB

This club consists of the professors, instructors and advanced students of the departments of Animal Biology and Botany who meet in joint session once a month for the review of papers and the discussion of subjects of general biological interest.

V. Physical Sciences

CHEMISTRY

FOR UNDERGRADUATES

I. (a) *General Chemistry* [3] Freshman I, II. *Miss Cohen*
Recitations 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.

(b) *Advanced General Chemistry* [3] Freshman I, II. *Professor Frankforter*
Lectures and laboratory work. This course is offered to those who have had an elementary course in general chemistry. The work is largely devoted to physical chemistry with certain technological and metallurgical problems essential in an exhaustive study of the chemical elements.

II. *Qualitative Analysis* [3] I. *Assistant Professor Nicholson*
Lectures and laboratory work. The course includes the general reactions of the metals and their qualitative separation.

III. *Identification of the Acids* [3] II. *Assistant Professor Nicholson*
Lectures and laboratory work. Open to those who have completed course II.

IV. *Quantitative Analysis (gravimetric)* [3] I. *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.

V. *Quantitative Analysis (volumetric)* [3] II. *Professor Sidener*
Lectures and laboratory work. A continuation of course IV.

VI. *Organic Chemistry* [3] 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 fur Dartstellung Organischer Preparate. Also the aromatic series with a preparation of some of the more important compounds supplemented by Fischer's Organischer Preparate. Open to those who have completed course III.

VII. *Teachers' Course* [1] Senior II. *Professor Frankforter*
This course is especially arranged for the students in the College of Education. The course will be largely didactic with experimental work necessary to a thorough understanding of the new methods and theories.

For technical courses see catalogue of the School of Chemistry.

FOR GRADUATES

1. *Special Inorganic Chemistry*
2. *Electro-chemistry*
3. *Organic Chemistry*
4. *The Alkaloids*
5. *Analytical Chemistry*

PHYSICS

I. *Mechanics (Heat, Sound)* [6] I. *Professor Jones and Assistants*
Experimental lectures, recitations and laboratory work.
Open to sophomores who have completed Algebra and Trigonometry of courses III and IV.

II. *Light, Electricity and Magnetism* [6] II. *Professor Jones and Assistants*
Experimental lectures, recitations and laboratory work.
Open to those who have completed course I.

III. *Electrical Measurements* [3] I. *Assistant Professor A. Zeleny*
Lectures and Laboratory Work.
Open to those who have completed course II.

IV. *Physical Manipulations* [3] II. *Professor J. Zeleny*
Open to those who have completed courses I and II.

V. *Theoretical Mechanics* [3] II. *Professor Jones*
Open to seniors and graduates who have completed Calculus and course I.

VI. *Advanced Laboratory Work* [3] I. *Professor J. Zeleny*
Open to seniors and graduates who have completed course II.

VII. *Advanced Laboratory Work* [6] I. *Professor J. Zeleny*
Open to seniors and graduates who have completed course II.

VIII. *Advanced Laboratory Work* [3] II. *Professor J. Zeleny*
Open to seniors and graduates who have completed course VI.

IX. *Advanced Laboratory Work* [6] II. *Professor J. Zeleny*
Open to seniors and graduates who have completed course VI.

FOR GRADUATES

X. *Kinetic Theory of Gases* [3] Graduates *Mr. Erikson*
Open to those who have completed course II.

XI. *Radio-activity* [3] Graduates *Mr. Kovarik*
Open to those who have completed course II.

XII. *Discharge of Electricity through Gases* [3] Graduates *Professor J. Zeleny*
Open to those who have completed course II.

XIII. *The Theory of Light* [3] Graduates *Professor Jones*
Open to those who have completed course II.

XIV. *The Mathematical Theory of Electricity and Magnetism* [3] *Professor J. Zeleny*
Open to those who have completed course III.

GEOLOGY AND MINERALOGY

GEOLOGY

I. *General Geology* [3] Junior and 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, wherein stratification, displacement and veining of rock masses are described; (3) Physiographic Geology, pointing out prominent earth features and inquiring into the causes producing them; (4) an outline of Historical Geology. Lectures and conferences illustrated by photographs, maps, profiles, and lantern slides.

II. *Essentials of Physical Geography* [3] Junior or Senior I. *Asst. Professor Lehnerts*
A discussion of the principles of earth sculpture and description of the structural features of continents, with special reference to the ethnic movements and commercial activities of mankind.

III. *Industrial Geography* [3] Junior or Senior II. *Assistant Professor Lehnerts*
Open to those who have taken course II or I.
The structural features of the North American continent outlined as an introduction. Following this is a study of the types of soil and dominating climatic characters of the several agricultural regions of the continent; a discussion of the geography of industries as they have grown up within the past 100 years and their dependence upon physiographic conditions; a study of local industries effected through excursions and reports. A brief survey of industries in other parts of the world parallels the more detailed study of North America. Throughout the course cause and effect are kept in view.

IV. *Elements of Meteorology* [3] Junior or Senior II. *Assistant Professor Lehnerts*
Open to all who have taken course I.
The general principles of Meteorology are treated, embracing the properties and phenomena of the atmosphere, including an explanation of the ordinary observations of pressure and temperature, together with a more extended study of the apparatus and practice of a Weather Bureau office.
This is followed by a study of storms and climatic elements generally. The conditions of climatic changes are studied and the influence of physiographic conditions are discussed.
Text-book, lectures and reference reading.

v. *Geography and Geology of Minnesota* [3] Junior or senior II. *Professor Hall*
(a) The physical geography of the state in its relations to geological history and industrial development.
(b) A study of the principles and facts of pre-Cambrian geology as exemplified within the state, and the extension of these into general application.
(c) The present problems of the state in agriculture, drainage, water power, mining, quarrying, etc., are considered in some detail.

VI. *Historical Geology* [3] Junior or senior II. *Assistant Professor 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 VI or course XIII.

VII. *Paleontology* [3] Junior or Senior I. *Assistant Professor Sardeson*
This course includes an elementary study of fossil organisms, and a discussion of the sources and interpretation of paleontologic evidence and the relation to it of theories of evolution. Lectures and demonstrations.
Occasional excursions will be arranged.
Open to students of geology and biology.

VIII. *Paleontology* [3] Senior I, II. *Assistant Professor Sardeson*
The 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.

IX. *Paleontologic Practice* [3] Senior I, II. *Assistant Professor Sardeson*
The course may be taken by advanced students in Geology and Biology in conjunction with course VII. Exercises in the collection, 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.

X. *Elements of Rock Study* [3] Junior or senior I. *Mr. Grout*
The structures, textures and mineral and chemical composition of rocks. A practical study of rock types with laboratory and field practice. The origin, occurrence, variation and alteration of rocks are considered with a view to their accurate description. An introduction to the use of the microscope concludes the course.
Kemp's Handbook of Rocks, reference reading and practice. Requisite, course I or equivalent.

XI. *Petrography* [3] Junior or senior II. *Mr. Grout*
The identification of rocks through the optical study of the component minerals; rock structures as seen under the microscope; alterations of rocks, and stratigraphic relations are studied. Preparation of material for study, its collection in the field and an examination of some group of Minnesota crystalline rocks are features of the course.
Laboratory, lectures, reference reading and field work. Requisite course IX.

XII. *Applied Geology* [3] Junior or senior I. *Mr. Grout*
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 fictile 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. Textbook and reference reading.

XIII. *Ore Deposits* [3] 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.

XIV. *Special Problems* [3] Senior II. *Professor Hall*
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, the keeping of note-books and the preparation of geological maps, profiles and sections will be taught.

FOR TEACHERS

XV. *The Method and Material of Geography* [1] I, II. *Assistant Professor Lehnerts*
The earth as an object of study; how knowledge of it is obtained; lines of investigation open to the teacher; text-books and their uses; collection and utilization of illustrative material, as globes, maps, profiles, structures, and reliefs: type studies prepared by members of the class personating teachers and pupils.

XVI. *Outline Study of Minerals and Rocks* [1]
Junior or senior I, II. *Professor Hall and Mr. Grout*
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.

XVII. *Field and Laboratory Practice* [1]
I, II. *Professor Hall and Assistant Professor Lehnerts*
A study of the geography and geology of Minneapolis, St. 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 geography and geology.

FOR GRADUATES

XVIII. *Petrographical Problems* *Professor Hall and Mr. Grout*
A study of rocks as geological bodies; the genesis of rocks and their chemical and dynamical alterations, illustrated in the gneisses and gabbro schists of the Minnesota river valley or the granites and basic eruptives of central Minnesota.

XIX. *The Keweenawan Eruptives* I. *Professor Hall and Mr. Grout*
1. Of eastern and northeastern Minnesota, their stratigraphic relations, textural and structural characters; 2, other problem in the Keweenawan to be selected on consultation.

XX. *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.

XXI. *Paleontologic Geology* *Assistant Professor Sardeson*
A study of the Ordovician fauna with special illustrations from the Ordovician of Minnesota and neighboring states.

XXII. *Paleontology* *Assistant Professor 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 1: "Double courses" may be arranged by students of Geology by electing the following "Single courses": Courses I and II; I and VI; I and IX; VI and VII; VII and VIII; XI and XII for the first semester; and courses III and IV; IV and V; V and VII; VII and VIII; VII and X for the second semester.

Note 2: By vote of the General Faculty credit will be given to students who satisfactorily complete any of the field courses in Geology offered in the joint announcement of various universities for the summer of 1907.

MINERALOGY

I. *Elements of Mineralogy* [3] I. *Professor Hall and Mr. Grout*

(a) The morphology of minerals; the physical and chemical characters of minerals, with demonstrations; a study of the native elements and of economic minerals; the basis of classification.

(b) Laboratory work; this 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.

II. *Descriptive Mineralogy* [3] II. *Professor Hall and Mr. Grout*

(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.

III. *Quantitative Mineralogy* [3] *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.

IV. *Optical Mineralogy* [3] Junior or senior II. *Mr. Grout*

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.

V. *The Morphology of Minerals* [3] Junior or senior I. *Mr. Grout*

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.

VI. *Physico-chemical Methods with their Applications* [3] Senior II. *Mr. Grout*

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.

VII. *An Outline of Mineralogy* [1] Junior or senior. *Mr. Grout*

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

FOR GRADUATES

VIII. *Original Problems in Morphological and Physical Mineralogy* *Professor Hall and Mr. Grout*

Investigations in mathematical crystallography and its application to crystal development and structure. Further applications than are made in course IV of the optical characters of minerals in identification of mineral species.

IX. *Special Investigations in Physical and Chemical Mineralogy* *Mr. Grout*

Special attention is here given to tenacity and electrical properties and their relation to crystal form, cleavage and fracture. Dimorphous compounds are investigated and the conditions governing their formation studied. The physical properties of artificial mineral compounds are compared with those of natural minerals.

X. *Mineral Occurrence and Association* *Professor Hall and Mr. Grout*

A discussion of genetic relationships. Field work in connection with the different phases of the particular problem in hand.

VI. Pure and Applied Mathematics

MATHEMATICS

FOR UNDERGRADUATES

The courses proceed in the order given through the first seven courses, though courses XI, XII and XIV can be taken earlier if desired. After that the courses may be taken in any order.

I. *First Part Higher Algebra* [3] Freshman I. *Dr. Manchester and Mr. Shumway*
Open to those not having an entrance credit in this subject.

II. *Solid Geometry* [3] Freshman II. *Dr. Manchester and Mr. Shumway*
Open to those not having an entrance credit in this subject.

III. *Second Part Higher Algebra* [3] Freshman and Sophomore I.
Professor Bauer, Assistant Professor Bussey, Dr. Manchester, Mr. Shumway
Open to those having a credit in course I. Variation, quadratic equations, special higher equations, simultaneous equations of the second degree, maxima and minima of algebraic functions, differentiation of algebraic functions, development of functions, logarithms, theory of equations and solution of numerical higher equations.

IV. *Trigonometry* [3] Freshman and Sophomore II.
Professor Bauer, Assistant Professor Bussey, Dr. Manchester, Mr. Shumway
Open to those having credits in courses I, II, and III. Text, tables, and numerous applications.

V. *Analytical Geometry* [3] Sophomore I.
Professor Downey, Assistant Professor Bussey, Dr. Manchester
Open to those who have completed courses I, II, III and IV.
The conic sections, both by rectilinear and polar co-ordinates, producing equations of loci whose law of development is known, constructing and discussing such equations, transformation of co-ordinates, properties of loci by means of their equations.

VI. *Differential Calculus* [3] Sophomore II. *Professor Downey, Dr. Manchester*
Open to those who have completed courses I to V, inclusive
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.

VII. *Integral Calculus* [3] Junior and Senior I. *Professor Downey*
Open to those who have completed courses I to VI, inclusive.
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.

VIII. *Differential Equations* [3] Junior and Senior II. *Professor Downey*
Open to those who have completed courses I to VII, inclusive.

IX. *Determinants* [2] Senior I. *Professor Bauer*
Open to those who have completed courses I to VII, inclusive. This course is required for course XI.
Based on Weld's Determinants.

X. *Theory of Equations* [3] Senior I. *Mr. Shumway*
Open to those who have completed courses I to VI, inclusive. This course should be taken by all who expect to teach Algebra in the High Schools.

XI. *Solid Analytical Geometry* [3] Senior II. *Professor Bauer*
Open to those who have completed courses I to VII, inclusive, and course IX.
A lecture course, dealing with the following subjects: Co-ordinates, the plane, the straight line, transformation of co-ordinates, quadric surfaces, and curves in space.

XII. *Mathematical Pedagogy* [1] Senior II. *Professor Bauer*
Open to those who have completed courses I to V, inclusive.
A lecture course, in which special attention is paid to the fundamental principles of Algebra and Geometry.

XIII. *Method of Least Squares* [2] *Professor Leavenworth*
Open to those who have completed the first seven courses.
A study of the combination and adjustment of observations and the discussion of their precision as applied especially to Engineering, Physics, and Astronomy.

XIV. *Descriptive Geometry* [2] I, II. *Professor Kirchner*
Open to those who have completed the first five courses.
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.

XV. *Applied Mechanics* [5] I, II. *Professor Eddy*
Open to those who have completed the first seven courses.
Statics, dynamics, strength and elastic properties of the ordinary materials of construction, hydro-mechanics (study of the laws of pressure and the flow of liquids). Recitations and lectures.

FOR GRADUATES

XVI. *Advanced Differential and Integral Calculus* [2] *Professor Downey*
This course goes farther into some of the subjects treated in courses VI and VII and takes up some important subjects not included in those courses.

XVII. *Theory of Curves and Surfaces* [2] *Professor Bauer*
This is a course in Differential Geometry. The fundamental equations of the theory of curves and of surfaces will be developed. The work will be based upon Scheffer's *Theorie der Curven* and *Theorie der Flaechen.*
Not given to fewer than four students.

XVIII. *Theory of Functions of a Complex Variable* [2] *Dr. Manchester*
Lectures, readings and problems. The course presupposes a knowledge of Differential and Integral Calculus and Differential Equations.

XIX. *History of Mathematics* [2] *Professor Haynes*
Lectures and reading, under direction, of works in the mathematical library on the ancient and the modern development of Mathematics.

XX. *Projective Geometry* [3] *Professor Kirchner*
A study of the theory and methods of Projective Geometry, perspective, homology, duality, cross ratios, involution, reciprocals, conics, systems of conics, ruled surfaces, and special problems and exercises.

XXI. *Perspective* [3^2] *Professor Kirchner*
The principles and practice of Perspective, including shadows, reflections, distortions, corrections, systems, methods, inverse constructions, and the practical problem.

XXII. *Elliptic Integrals* *Professor Brooke*

Courses V to XV inclusive are offered to those who do not elect them in their undergraduate years; courses VIII, IX, X, XI, XV counting as minors in graduate courses.

ASTRONOMY

FOR UNDERGRADUATES

I. *General Astronomy* [3] I, II. *Professor Leavenworth*
Open to those who have completed Trigonometry.
A study of the general principles of Astronomy, illustrated by observatory work.

II. *Practical Astronomy* [3 or 6] I, II. *Professor Leavenworth*
Open to those who have completed Analytical Geometry, Calculus and General Astronomy.
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.

FOR GRADUATES

III. *Extended course in Practical Astronomy*

IV. *Orbit work*

V. *Astrophotography with photographic measurements*

VII. Philosophy, Education and Anthropology

PHILOSOPHY AND PSYCHOLOGY

The introductory courses in this department are I and IX. Course I is required for all advanced work in Psychology and either I or IX for all work in Philosophy, but students are advised to take both. It is desirable that all students consult with the department before registering for advanced work, but for convenience the following grouping of courses is suggested:

(a) Of special value for Education, COURSES I, II, IX, XII.
(b) Fundamental courses in Psychology, COURSES I, II, III, IV, VII, VIII.
(c) Fundamental courses for Philosophy, COURSES I, IX, X, XI, XII, XIV.

For the degree with distinction in this department, not less than twenty-one credits must be elected.

I. *Introductory Psychology* [3] I. *Professor Wilde, Assistant Professor Miner, Assistant Professor Swenson, Mr. Haynes*
Open to sophomores, juniors and seniors.
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 involves text-books, lectures and essays.

II. *Educational Psychology* [3] II. *Assistant Professor Miner, Mr. Haynes*
Open only to sophomores, juniors and seniors who have completed course I.
The study of mental development in its relation to heredity and training. Lectures and student reports on the facts and theories of childhood and adolescence with special reference to their bearing on education.

III. *Experimental Psychology: the Senses* [3] I. *Assistant Professor Miner*
Open only to juniors and seniors who have completed course I.
Four hours of laboratory work and one hour of discussion. With course IV, this involves a broad survey of experimental methods and results as well as a training for laboratory research in Psychology. Typical experiments on sensation and movement.

IV. *Experimental Psychology: Higher Mental Processes* [3] II. *Assistant Professor Miner*
Open only to juniors and seniors who have completed course I.
If possible, this course should follow course III. It continues the same plan, with experiments on affection, memory, attention, and such other processes as can be studied by laboratory methods. The quantitative phase of Experimental Psychology is taken up for special discussion.

V. *Outline of Experimental Psychology* [3] II. *Assistant Professor Miner*
Open only to juniors and seniors who have completed course I. (Not given in 1907-8.) A study of the methods and accredited results of experimental investigation in Psychology. Class-room demonstrations, lectures, and discussion.

VI. *Psychological Interpretation* [3] I. *Assistant Professor Miner*
Open only to juniors and seniors who have completed course I.
Unusual and pathological mental states are studied for the light they throw upon normal mental life. The student is given drill in the detecting of mental defects and in the psychological explanation of characters in history and literature. The subconscious, dreams, suggestibility, telepathy, nervous disorders, insanity, secondary personalities, and the crowd are among the topics treated.

VII. *Psychological Principles* [3] II. *Assistant Professor Swenson*
Open to juniors and seniors who have completed courses I and IX.
An advanced course treating in detail some of the more important theoretical problems connected with Psychology. The discussions will center about the methods and aim of the science, its fundamental principles, and its relations to other sciences, regard being had to the general outlines of historical development in these respects.

VIII. *Psychological Problems* [3] I or II. *Assistant Professor Miner*
Open only to those who have completed courses III and IV, or their equivalent.
Original work on special topics. Credit hours to be determined by conference with the instructor.

IX. *Logic* [3] II. *Professor Wilde, Assistant Professor Swenson, Mr. Haynes*
Open to sophomores, juniors and seniors.
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.

X. *Ancient and Medieval Philosophy* [3] I. *Professor Wilde*
Open only to juniors and seniors who have had course I or IX.
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.

XI *Modern Philosophy* [3] II. *Professor Wilde*
Open only to juniors and seniors who have had course I or IX.
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.

XII. *The Principles of Ethics* [3] I. *Professor Wilde*
Open to juniors and seniors who have completed course I or IX.
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.

XIII. *Philosophy of Religion* [3] II. *Professor Wilde*
Open only to juniors and seniors who have completed course I or IX.
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.

XIV. *Logic of Science* [3] I. *Assistant Professor Swenson*
Open only to juniors and seniors who have completed course IX.
This course serves as an introduction to philosophy through the medium of the special sciences, its aim being to suggest a system of the sciences through a discussion of the nature and relations of their fundamental principles.

XV. *Philosophy of Herbert Spencer* [3] II. *Assistant Professor Swenson*
Open to juniors and seniors who have completed courses I and IX.
A critical reading of the First Principles, with references to other important features of the Synthetic Philosophy, and to the philosophical character of the modern scientific movement. The course is intensive, the aim being to develop the power of philosophical criticism in regard to such questions as the logical foundations of the theory of evolution, the relations of science and religion, and the place of the scientific interest 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.

XVI. *The Philosophy of Aristotle* *Assistant Professor Swenson*
A critical reading of his logical treatises, the Metaphysics, and the Psychology in the original Greek.

XVII. *The Philosophy of Kant* *Assistant Professor Swenson*
A critical reading of the three critiques; the relation of Kant to the development of modern philosophy.

XVIII. *The Philosophy of Hume* *Assistant Professor Swenson*
A critical reading of Hume's philosophical works; the position of Hume in the development of English philosophy.

XIX. *The Philosophy of Descartes, Spinoza and Leibnitz* *Assistant Professor Swenson*

XX. *The History of Ethics* *Professor Wilde*
A critical reading of the chief works in the History of Ethics.

XXI. *Systematic Ethics* *Professor Wilde*
A detailed study of the principles of conduct and the basis of moral obligation.

XXII. *German Idealism* *Professor Wilde*
A critical discussion of the philosophies of Fichte and Hegel.

XXIII. *Metaphysics* *Assistant Professor Swenson*
A critical and constructive discussion of theories of knowledge and reality.

XXIV. *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.

XXV. *Research in Psychology* *Assistant Professor Miner*
Minor or major research in experimental, educational, analytic, genetic or comparative psychology.

PHILOSOPHICAL READING CLUB

The club 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.

THE JOURNAL CLUB IN PSYCHOLOGY

This consists of a selected group of instructors, graduate students and seniors, who meet regularly to discuss current problems in psychology.

EDUCATION

Course I in Philosophy and courses I and II in Education are specified as necessary for the university teacher's certificate. One other three-hour course for a half year is required for this certificate, and is elective from the courses in education.

Graduates from normal schools who receive one year's credit at the university must fulfill the same conditions for the university teacher's certificate, but may not offer for this either course V or course VII in education.

A long course in education means not less than six hours per week for one year, selected from the following list.

For additional information, consult the Bulletin of the College of Education.

I. *History of Education to the Reformation* [3] I. *Assistant Professor Swift*
Open to juniors and seniors.
An introductory study in the history of education conducted by means of lectures, assigned readings, discussions and reports. The purpose of the course is to arouse an interest in educational problems, to secure some perspective for use in current investigation, with some command of the facts of educational history, and some ease in the methods of historical study. An attempt is made to bring out education as one phase of civilization and to show the connection of schools with other social institutions. Attention will be given especially to an examination of the schools of Greece and of Rome, the education of the early Christian centuries, the development of different types of schools in Medieval times, the rise of the university and of the humanistic schools of the Renaissance.

II. *History of Modern Education* [3] II. *Assistant Professor Swift*
Open to juniors and seniors who have taken course I in Education.
A somewhat intensive study of the periods in the history of modern education, with special reference to the development of the various national systems of public instruction. Different types of educational theory are considered in connection with a study of the men who first advanced them, and of the schools in which they were first put into effect. This course is a direct preparation for an understanding of the educational systems, theories, and practices of the present.

III. *Educational Psychology* [3] I or II. *Assistant Professor Miner*
Open to sophomores, juniors and seniors who have had course I in Philosophy.
The study of mental development in its relation to heredity and training. Lectures and student reports on the facts and theories of childhood and adolescence with special reference to their bearing on education.
This course is announced also as course II in Philosophy.

IV. *Secondary Education* [3] I. *Professor James*
Open to juniors and seniors who have had courses I and II in Education.
A study of secondary education in the United States, with such references to the secondary schools of other countries as will lead to a clearer understanding of the place and function of the high school, its curriculum, the problems of present-day importance, and the relation of the high school to other parts of the system of public instruction. The course will be conducted by lectures, reports and discussions.

V. *Practice of Elementary Teaching* [3] I. *Professor Rankin*
Open to juniors and seniors who have had course I in Philosophy.
This course includes a consideration of the course of study of the elementary school and of the best methods of instruction. It is conducted by means of lectures, assigned readings, discussions and reports, accompanied by either observation or practice in the elementary schools under the direction of the instructor. It is planned for all students who expect to teach in the high schools or to be principals or superintendents. No credit is given in this course to graduates of Normal Schools, who have received one year's credit at the University.

VI. *Practice of Secondary Teaching* [3] II. *Professor Rankin*
Open to juniors and seniors who have had course IV in Education.
This course includes lectures on the general methods of secondary teaching, assigned readings, reports and discussions, with either observation or practice of secondary teaching under the charge of the instructor. It is planned more particularly for those who expect to teach in high schools.

VII. *The Theory of Education* [3] I. *Professor James*
Open to juniors and seniors who have course I in Philosophy.
An introductory course in educational theory, including a somewhat detailed study of the principles on which is based the present practice in teaching. No credit is given in this course to graduates of Normal Schools who have received one year's credit at the University.

VIII. *School Administration* [3] I. *Professor Rankin*
Open to juniors and seniors.
An introductory study of school administration, conducted by lectures, reports and discussions; the organization of school systems, the work of school boards, superintendents, principals and teachers, school buildings and hygiene. This course is planned for students without any teaching experience, who hope later to do work in supervision.

IX. *School Supervision* [3] II. *Professor Rankin*
Open to seniors.
An advanced course treating of the duties of school principals and superintendents, intended primarily for students with experience in teaching.

X. *Comparative Study of School Systems* [3] II. *Professor James*
Open to seniors who have completed courses I and II in Education.
This course deals with the school systems of Germany, France, England and the United States, with special reference to principles and methods of administration. Elementary, secondary and higher institutions are examined with emphasis varying in successive years. The course is conducted partly by lectures and partly by assigned readings, reports and discussions.

XI. *Modern Educational Theories* [3] II. *Professor James*
Open to seniors who have had course I in Philosophy and courses I and II in Education.
An advanced course in educational theory, dealing particularly with the contributions of Rousseau, Froebel and Herbart, special emphasis being laid upon one of these writers in each successive year.

XII. *Current Problems in Elementary Teaching* [2] I. *Professor Rankin*
Open to seniors and to graduate students who have had course V in Education.
This is a seminar course, involving a general discussion of some current problems in elementary education, one or two of which are worked out practically by the student under the direction of the instructor, through readings, the visiting of schools and through class discussions.

XIII. *Educational Classics* [2] I. *Professor James*
Open to seniors who have completed courses I and II in Education.
A seminar course for the reading of selected educational classics and for the detailed study of corresponding periods in educational history.

XIV. *Current Problems in Secondary Teaching* [2] II. *Professor Rankin*
Open to seniors and to graduate students who have completed course VI in Education.
This is a seminar course for advanced students, preferably with teaching experience, who wish to pursue a theoretical and a practical study of some current problem in connection with secondary teaching. The course will be conducted by lectures, class discussion, readings and by the visiting of schools.

XV. *Problems in School Administration* [2] II. *Professor James*
Open to seniors and to graduate students who have completed courses I and II in Education.
A research course for advanced students, preferably with teaching experience, who desire to take up the investigation of some question of educational administration. The course will be conducted by lectures, class discussions, assigned readings, and, when possible, by a study of actual school conditions, falling within the proposed field.

XVI. *School Sanitation* [1] I. *Professor James*

Open to seniors and graduate students.

A course in school hygiene and sanitation, conducted partly by text readings and partly by lectures, with the coöperation of men from various faculties of the University.

(For Anthropology see "Sociology" on page 123.)

VIII. Social Sciences

SOCIAL SCIENCES

The departments of Economics and Politics, History, and Sociology constitute a Social Science group. The subjects are intimately inter-related, and they are all of especial importance to students who intend to engage in law, business, public service at home or abroad, journalism, the work of charities and corrections, or to give instruction in one of the Social Sciences. Students who are interested in the work of any one of the departments of the Social Science group ought to be familiar at least with the elements of the subjects offered in the other departments. A student who takes his major in any one of them ought to have more than the elements of the others. To students who are interested in the work of these departments, but who do not care to elect their major before the end of the Sophomore year, the departments unite in the following recommendations for the Freshman and Sophomore years:

GENERAL RECOMMENDATIONS

I. Freshman and Sophomore Years.—

1. The student should take the elementary work of each department within the group as early as possible. Accordingly the following courses are recommended:

Freshman year:—History II (English Constitutional); sophomore year:—History V (American); Economics I, first or second semester; Politics I, first or second semester.

2. The student is advised to take in these years his required minor in science from the departments of Botany or Animal Biology, and his required minor in language from French or German beginning courses, unless he has a reading knowledge of both these languages at entrance.

II. Junior and Senior Years:—

Elective under the direction of adviser selected from the department in which the major subject is taken.

†ECONOMICS

I. *Elements of Economics* [3] I or II. *Professor McVey*

A thorough course in the elements of economics. The aim is to inculcate accepted doctrine, and show the nature and bearing of economic theory on present day problems. Given in each semester. Open to Sophomores.

Text book, problems, lectures and discussions.

II. *Economic Geography* [2] I. *Professor McVey*

Open to Sophomores.

A course in geographical influences on commerce and trade together with a presentation of the growth of industry and a consideration of the development of commercial centers. Text book, lectures and special papers. Alternates with course IV.

III. *Money and Banking* [3] II. *Professor McVey*

A course open to students who have had course I.

Students desiring but one year's work in economics are advised to take this course following the work in elements of economics. If a longer course is desired, advanced economics should follow course III. This is an elementary course illustrated by constant reference to monetary legislation. Text books, lectures, papers and discussions.

IV. *Modern Industrial Legislation* [3] II. *Professor McVey*

A general course open to sophomores and upper classmen.

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. Not given 1907-8.

v. *Corporation Finance* [3] I. *Professor McVey*
This course is open to students who have had course I.
A study of the methods of financing modern corporations, their position in the law and the analysis of their accounts and statements. Textbooks: Green, Corporation Finance; Ripley, Trusts, Pools and Corporations; Wyman's Cases; Woodlock, Anatomy of a Railroad Report. Lectures, collateral reading and examination of corporation reports.

vi. *Public Finance, Part* I [3] 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.

vii. *Public Finance, Part* II [3] 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.

viii. *Advanced Economics* [3] I. *Professor McVey*
In this advanced course further consideration is given to selected topics from the course in elementary economics. Carver's Distribution of Wealth and Fisher's Capital and Income are used as texts, supplemented by readings and problems. Lectures, papers and discussions.

ix. *Transportation* [2] 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 seniors in the College of Engineering.

x. *Monetary History of the United States* [1] I, II. *Professor McVey*
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 Elements of Economics, course I, and Money and Banking, course III. The section meets one hour each week throughout the year. The hour of meeting will be determined by the convenience of students and instructor.

xi. *Economic Conditions in American Cities* [1] I. *Mr. Lies*
Students must have course I in Economics or course I in Sociology to register for this subject.
A study of the causes of economic dependence in American cities, the standard of living and the constructive agencies for economic betterment.

xii. *Methods of Investigation* [1] II. *Professor McVey and Mr. Gerould*
Open to juniors and seniors who have had course I.
A course in methods of using libraries, collecting and organizing material, followed by the actual investigation of important questions.

xiii. *Insurance* [1] I. *Lecturers*
Open to students who have had course I.
A course in the principles of life insurance, its history and theory, with application to standard policies.

*xiv. *Economic Schools and Movements* [1] I, II. *Professor Folwell*

*xv. *Statistics and Economics* [1] I, II. *Professor Folwell*
*These two courses, the scope of which is sufficiently indicated by the several titles, together with course x of Politics, are given throughout the year in a seminar for graduate students; but seniors especially interested and qualified may be admitted after consultation. Course xv, Statistics and Economics, will be offered in 1907-8.

xvi. *United States Finance* [3] I. *Professor Folwell*
Open to students who have taken courses I, VI and VII, American Policy and Practice. Instruction based on Dewey's Financial History of the United States. Topical exercises and reports, oral and written.

†This represents the work as given last year. For the work offered this year (1907-08) by Professors Gray, Robinson, Schaper, and assistants, see special announcement.

HISTORY

SUMMARY OF COURSES

The starred courses are offered only in alternate years

		Prerequisites	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
IV.	Europe Since 1789	I or II	I, II
V.	American Constitutional to 1840	II	I, II
VI.	American Constitutional since 1840	V	II
VII.	Making the Constitution	II, V	I, II
* VIII.	American Constitutional Law	VII	I
IX.	American Statesmen	II, V	II
* X.	Historical Masterpieces	III, IV or V	II
XI.	American Diplomacy	II, V	I
XII.	European Diplomacy since 1789	IV	II
* XIII.	Colonial Administration	IV or V	II
* XIV.	New England Sources [2]	V	I, II
XV.	Historical Method [2]	I or II	II
XVI.	Teachers' Course [1]	Three courses	II
* XVII.	French Medieval Institutions	II or III	II
XVIII.	English Judicial Institutions	II	II
* XIX.	American Expansion (Roads)	II, V	I, II
XX.	England, 1815-1905	II	I
XXI.	History of Greece	I or II	I
XXII.	Greek Political Institutions	XXI	II
XXIII.	Roman Imperial Institutions	two year-courses	II

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

INTRODUCTORY COURSES

I. *European History from the Establishment of the Roman Empire to the Reformation, 31 B. C.—1500 A. D.* [3] I, II. *Assistant Professor Westermann*

Open to all students, but designed especially for freshmen who have had less than two years of history in preparatory schools. *This course does not count toward a "long course," and, when taken by juniors or seniors, it counts only as a half-course.* Freshmen who have had the requisite entrance history (see below) may omit I and take II. Course I admits directly to II, III, IV, XV, XXI.

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 the 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.

II. *English Constitutional History to the Accession of George I* [3] I, II. *Professor White and Miss Judson*

Open to freshmen, or others, who in preparatory schools have completed one year in ancient and one year in modern history, or who are pursuing course I also.

Course II is required for all courses in American history (V-VIII, XI, XIII and XIV), for course XX, and will admit also to III, IV or XV. Students who intend to specialize in history or in any social science should elect this course as freshmen.

GENERAL COURSES

III. *The Renaissance and Reformation* [3] I. *Professor White*

Open to those who have completed either I or II, and a desirable preparation for IV.

The Renaissance and Reformation will be studied as general European movements, with the emphasis upon the work of individual men and upon ideas rather than upon politics and institutions. The purpose of the course will be to show how the medieval world became the modern world.

IV. *Europe since* 1789 [3] I, II. *Professor Anderson*

Open to those who have completed course I or II.

The entire class meets twice each week for lectures or recitations. The third exercise is devoted to the study of important historical documents, drawn principally from Anderson's Constitutions and other Select Documents illustrative of the history of France, 1789-1901. This work is done in small groups which meet in the European history seminar room.

The history of France occupies the most prominent place in the course, that of other countries being grouped about it, as far as possible. Much attention is given to international affairs, the principal territorial changes being illustratrated with a series of wall maps prepared for the course under the direction of the instructor. A special effort is made to put the students into a position to understand the present governments and politics of the leading European states.

V. *Constitutional History of the United States to* 1840 [3] I, II. *Professor West*

Open to those who have completed course II; and required for courses VI—IX, and 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.

VI. *American History,* 1841-1885 [3] II. *Professor West*

Open to those who have completed or are pursuing course V.

Special attention is given to the development of the slavery issue in politics, the political history of the civil war, and reconstruction.

XV. *Historical Method and Bibliography* [2] II. *Professor White*

Open to those who have completed course I or course II. The course is designed especially for those intending to 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 writings; 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 bibliographs, 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.

XVI. *Teachers' Course* [1] II. *Professor West*

Designed for those who intend to teach history in high schools, and open to all who have had three courses in history, provided one of these courses is an "advanced course" (VII-XIX). A course in progress may be counted toward the three. Professor West will be assisted by other members of the department.

XX. *English History,* 1815-1905 [3] I. *Professor Anderson*

Open to those who have completed course II. The period from 1660 to 1815 is covered in a rapid survey. From 1815 the work is more intensive, the topics and readings affording an opportunity to become acquainted with the principal British reviews and with two or three of the leading newspapers.

XXI. *History of Greece* [3] I. *Assistant Professor Westermann*

Open to students who have completed course I or II. The course is general in its nature, and will cover the political and social development of the Greek states to the time of their incorporation in the Roman Empire, with particular emphasis upon the later part of the period. Especial attention will be given to the permanent influence of Greek civilization.

ADVANCED OR INTENSIVE COURSES

VII. *The Making of the Constitution* 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 American 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.

VIII. *American History since* 1789 *as shown in the Development of Constitutional Law* [3] I. *Professor West*

Open to seniors who have 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 tc the course of development. Not offered in 1907-8.

IX. *Studies in American Biography* [3] II. *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 some acquaintance with the entire body of writings relating to the subject The subject for 1907-8 will be Thomas Jefferson.

X. *A Critical Study of Historical Masterpieces* [3] II. *Professor Anderson*

Open to undergraduates who have taken two courses in history, and to graduates.

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.

XI. *The History of American Diplomacy* [3] I. *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.

XII. *The History of European Diplomacy since* 1789 [3] II. *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 IV is the best preparation. Ability to read easy French is required. The course centers about a critical reading of the principal treaties.

XIII. *Colonial Expansion and Administration* [3] II. *Professor West*

Open to those who have completed 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.

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 to 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 criticise in the light of the original sources. The study involves also a careful comparison of the chief sources with one another, 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 limited to seven.

XVII. *Medieval Economic Documents* [2] II. *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 medieval period. The work is to be based on *Documents Relatifs a L' Historie et du Commerce en France,* edited by Fagniez. Not offered in 1907-8.

XVIII. *The Origin of the English Judicial System* [3] II. *Professor White*

Open to those who have completed course II with distinction and to graduates. Students must be able to read medieval Latin, and course X in the Latin department is recommended to give this preparation. The work will consist of detailed study in the sources of the twelfth and thirteenth centuries, and will aim to show how the king's court, from which the present judicial system has grown, superseded the older communal and private courts, the development of the primitive king's court into a system of courts, and the growth in it of a new procedure. In this last connection the critical stages in the early history of the jury will receive special attention.

XIX. *Expansion of America as Studied in its Highways of Immigration* [3] I, II

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. Not offered in 1907-8.

XXII. *Greek Political Institutions* [3] II. *Assistant Professor Westermann*

Open to students who have completed courses I or II and XXI. A study of the development of Greek political forms and of their operation as seen in typical oligarchic, democratic, federal, and monarchic states.

XXIII. *Roman Imperial Organization* [3] II. *Assistant Professor Westermann*

Open to students who have completed two year-courses. This course will survey the development and organization of the imperial system from the beginning of Roman expansion outside of Italy to the time of the Germanic invasion. Special attention will be given to the administration of the municipalities and provinces under the Empire and to the development of despotism.

RECOMMENDATIONS FOR TEACHERS' CERTIFICATES

To secure a "minor" recommendation in history, the student must complete three year-courses and the one-hour Teachers' course (XVI). To secure a "major" recommendation, the student must complete at least four year-courses, one of which must be an "intensive" course. Such students ought also to have at least the introductory course in each of the other social sciences.

POLITICS

I. *Elements of American Government* [3] I or II. *Professor Schaper*
Open to sophomores, juniors and seniors.
An elementary course on American Government intended as a preparation for the advanced courses in Politics, for teaching in secondary schools, and 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. Repeated in the second semester.

II. *Comparative Government* [3] I. *Professor Schaper*
Open to all students who have taken American Government. An account of the government as the agent of the state; a comparative study of the organization and workings of the government of the great European powers of today, including the French, German, British and others. Text with lectures and assigned reading.

III. *The Elements of Jurisprudence* [3] I. *Professor Schaper*
Open to all students who have taken American Government. 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 and 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.

IV. *American Constitutional Law* [2] I, II. *Professor Schaper*
Open to graduates and others who have taken courses I, II, and VIII. This is an advanced course in the study of the principles of our constitutional law based on important supreme court decisions and standard works. Given in alternative years beginning with 1905-6. Given in 1907-08.

V. *International Law* [3] I. *Professor Folwell*
Open to students who have taken courses I and II. An elementary treatment by lectures with required exercises; illustrations chiefly from American history.

VI. *Introduction to Political Science* [2] I. *Professor Schaper*
Intended primarily for seniors in the college of engineering.

VII. *Municipal Administration* [3] II. *Professor Schaper*
Open to students who have taken American Government.
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. A text and lectures.

VIII. *Theory of the State* [3] II. *Professor Schaper*
Open to students who have taken courses I and II. A study in the theory of the state, its origin, nature, purpose and its justification, including an examination of the state on its physical 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, a study of sovereignty, the origin, nature and classification of law. A text book with lectures and topical readings.

IX. *Politics and Administration* [2] I, II. *Professor Schaper*
Open to graduates and those who have taken I, II and VIII. An advanced course in politics and administration throughout the year. A study 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. Also a study of administration as a science and the administrative law of the federal government, being mainly the law of officers, important cases and text. Not given in 1907-8.

x. *Political Schools and Movements* [1²] I, II. *Professor Folwell*
Open to graduates and seniors of suitable preparation. See courses XIV and XV in Economics on page 77.

XI. *Seminar in Political Science* [1] I, II. *Professor Schaper*
Open to graduates and seniors of suitable preparation. A seminar for special research work in the field of Political Science. A feature of the seminar is the discussion of current problems in politics and administration. Open to graduates and those seniors who are prepared to do advanced work along this line.

XII. *United States International Law* II. *Professor Folwell*
Open to students who have taken course V. American policy and practice. Lectures with topical exercises oral and written. Moore's Digest of International Law, the chief book of reference.

SOCIOLOGY

The attention of students is called to the fact that they may now elect "long courses" in the department of Sociology; the department invites conference with graduates and others interested in work in its field.

I. *Descriptive Sociology* [3] I. *Professor Jenks*
Open to juniors and seniors.
This is a preliminary course designed as the first work of students in the Sociology department. It presents concrete data concerning human association, showing groups of peoples living in the four grades of culture called savagery, barbarism, civilization, and enlightenment; and it discovers the activities and institutions natural and peculiar to these cultures. Text book, lectures, assigned readings, and thesis.

II. *Elements of Sociology* [3] II. *Professor Jenks*
Open to juniors and seniors.
This course is designed to give a general knowledge of the field of modern sociology, the attempt being to prepare students for such special sociological investigations as they may wish to make. Text book, lectures, assigned readings, and thesis.

III. *Social Pathology* [3] I. *Professor Smith*
Open to juniors and seniors.
Dealing with problems of poverty, crime, insanity, social degeneration, and a discussion of the child problem and methods of social amelioration.

IV. *Social Theory* [3] I. *Professor Smith*
Open to juniors and seniors who have had courses I or II.
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.

V. *Social Groups* [3] I. *Professor Smith*
Open to juniors and seniors who have completed course I.
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 of and reasons for the modern city.

VI. *The Study of Institutions* [3] I. *Professor Smith*
Open to juniors and seniors who have completed course I.
The genesis of custom and the beginnings of law with the geographical and race influence in the growth of states will be studied, as well as the various forms of the family and their relation to forms of civilization.

VII. *Anthropology* [3] I. *Professor Jenks*
Open to juniors and seniors.
This is an elementary course studying the essential characteristics of mankind, and the general features of the several races of men. It also investigates the origin and development of the series of activities and various institutions which have had their beginnings in primitive society. Text books, lectures, assigned readings, and thesis.

VIII. *Ethnology* [3] II. *Professor Jenks*

Open to juniors and seniors who have had courses I, II, or VII, and to graduates.

This is a study of the different races of men in America, Europe, Asia, Africa, and Oceania. The various historical classifications of men into races are presented. The causes of the origin and distribution of the several races and subraces are sought, and from historical perspective and present indications an attempt is made to judge of the future development of races. Ethnological problems are also presented. Text books, lectures, assigned readings, and thesis.

IX. *The Philippine People* [3] I. *Professor Jenks*

Open to juniors, seniors, and graduates.

This course presents the geography, natural resources, and ethnology of the Philippine Islands. A careful comparative study of the four large ethnic and culture groups of people is made; tropical influences are noted; the present policy of the Insular Civil Government is outlined, so far as it tends to modify the natural characteristics and modern culture of the inhabitants, and to affect American home interests in the Orient. This course aims to present a practical model for the investigator of human culture, and to introduce students to Oriental race problems; it will also better fit students for government, business, or missionary service in the Orient. Lectures, illustrated lectures, assigned readings, and thesis.

X. *Physical Anthropology* [3] II. *Professor Jenks*

Open to juniors and seniors who have had courses VII or VIII, and to graduates.

This course studies the physical variations in the human body. It pays especial attention to those variations which distinguish one race or group of men from another; and it seeks the cause and significance of such variations. It also attempts to trace the physical evolution of the human body and to forecast its future, studying both its development and decline. Six lectures on the development and anatomy of the human brain are given by Professor Charles A. Erdman, M. D. This course is of prime importance to advanced students in the department of Sociology, and of interest to students preparing for the medical course. Lectures, laboratory work, assigned readings, and thesis.

XI. *The American Negro Race* [3] *Professor Jenks*

Open to properly qualified juniors and seniors, and to graduates. Not given in 1907-8.

This course begins with a study of the Negro's African tribal kinsmen, and traces the rise and development of the American Negro race from the birth of American slavery. The present characteristics, traits and conditions of the Negro are especially considered. The developing tendencies of the Negro are studied for the purpose of considering the probable future of the American Negro race. Lectures, assigned readings, and thesis.

XII. *The American People* [3] *Professor Jenks*

Open to properly qualified juniors and seniors, and to graduates. Not given in 1907-8.

This course presents the distribution in the United States of the different peoples of the world found here. It seeks the natural genius of the peculiar home development of these peoples, and notes the modifications of this development in America, thus portraying the ethnic contribution of each to American civilization. It aims to discover the dominant physical, mental, and moral characteristics of each people, and attempts to determine the relative ethnic and cultural importance of each to the nation.

XIII. *Biblical Sociology* [3] *Professor Smith*

Open to juniors and seniors. Not given in 1907-8.

Lectures, and the Old Testament as a text book.

IX. Fine Arts

DRAWING

The practical aim of this work in the University is two-fold; to help the students who need drawing for scientific work and to train those who wish to prepare for teaching drawing. The educational side of the work is emphasized in the development of the powers of the mind in the order of observation, memory, and imagination. Special efforts are made toward educating the taste to an appreciation of what is good in form, construction and color and in showing the relation of artistic and æsthetic principles to life.

A certain amount of work is given in the different mediums used in the schools and in the representative, decorative and constructive work found in all educational courses in drawing.

Lectures are offered on the theory and practice of drawing as related to education and on the principles which are at the foundation of all art, illustrating those by the best examples of pictorial and decorative work.

I. *Drawing A, Elementary* [3] I. *Miss Clopath*
It includes drawing from objects, from plants, from landscape and from figure poses in pencil and in water color; the study of perspective; work from cast in charcoal; brush drawing.

II. *Drawing B* [3] II. *Miss Clopath*
More advanced work from objects and from cast. Work in water color and colored chalks. Pen and ink drawing. Simple exercises in lettering and composition.

III. *Design* [3] I, II. *Miss Clopath*
Open to juniors and seniors who have completed course III.
Exercises in composition illustrating the various principles of decorative work, adaptation of plant forms, stencils, illuminated lettering. Designs applied to simple forms of handicraft.
Lectures on the fundamental principles of designs illustrated by art masterpieces.

IV. *Historical Design* [3] I, II. *Miss Clopath*
Open to juniors and seniors who have completed course I.
Original designs in different styles applied to articles of household use. Color harmony. Simple forms of pottery with applied designs. Lectures and collateral reading.

V. *Drawing as Related to Education* [3] I. *Miss Clopath*
Exercises in all the different kinds of art work used in the schools. Advanced work in black and white, and in color.

VI. *The Teaching of Drawing* [1] II. *Miss Clopath*
Open to seniors who have completed course III.
This course is conducted by lectures and collateral reading on the methods and educational value of drawing, as revealed through a study of the instincts and mental processes of the child.

MUSIC

I. *Harmony* [2] I, II. *Assistant Professor Scott*
Open to juniors.
The study of chords, their construction, relations and progressions. The work consists of written exercises on basses, and the harmonization of given melodies. Modern Harmony by Foote and Spaulding is used as text book.

II. *Counterpoint* [2] I, II. *Assistant Professor Scott*
Open to seniors.
This course is open only to students who have a thorough knowledge of Harmony.
The work will include the Harmonization of melodies in two, three and four voices in the different orders of Counterpoint. Spaulding's Tonal Counterpoint is used as a text book.

III. *Musical Form and Free Composition* [2] II, *Assistant Professor Scott*

Open to seniors.

This course is open only to students who have completed course I and half of course II. At the close of the year a program of original compositions by members of the class will be given.

IV. *Pianoforte* (advanced) [1½ or 3]
I, II. *Professor Oberhofter and Assistant Professor Scott*

Open to juniors and seniors.

For students who intend to pursue the higher branches of the art of pianoforte playing (2 years—4 semesters); and 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.

V. *Choral Culture* [2] I, II. *Professor Oberhoffer*

Open to juniors and seniors.

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 consent of the director.

VI. *History of Music* [1] I, II. *Assistant Professor Scott*

Open to juniors and seniors.

A literary course.

Lectures are given on the development of music from the time of Palestrina to the present day.

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, II or III must pay a registration fee of four dollars a semester; course V two dollars; course VI four 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 courses I and IV and in addition two other three-hour subjects outside of the department of Music.

For courses I, II or III 2 credits are given.

For course IV, one lesson a week, 1½ credits are given; two lessons a week, 3 credits are given.

For course VI, 1 credit is given.

A certificate of proficiency in music will be granted to students who have completed the theoretical courses and two years of pianoforte, are able to play one of the standard concertos, and in addition show marked musical ability.

MILITARY SCIENCE AND TACTICS

CAPTAIN EDWARD SIGERFOOS, Ph. B., 5th U. S. Infantry, Commandant

For the instruction in military drill and administration the students are organized into a corps of cadets, consisting of three battalions of infantry, a band 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 a 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 a year's drill to count as a two-hour credit for one semester, but no credit will be allowed for such drill for less than one year.

In addition to the above, a course is given in Military Science, optional with the seniors and juniors, during the second 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 manoeuvers, guards and the theoretical and practical use of firearms.

On graduation of each class the Commandant will report to the Adjutant-General of the Army the names of three 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 OF CADETS.

Field and Staff.

Cadet Colonel, H. P. Councilman
Cadet Captain and Adjutant, J. H. Ray
Cadet Captain and Quartermaster, A. L. McAfee

Band

Instructor of Music, B. A. Rose
Cadet Chief Musician, J. S. Mikesh

First Battalion

Cadet Major, H. H. Miller
Cadet First Lieutenant and Battalion Adjutant, J. Fulkerson
Cadet Second Lieutenant and Battalion Quartermaster, Robert Nelson

Company A

Cadet Captain, Chester S. Wilson
Cadet First Lieutenant, Guy C. Bland
Cadet Second Lieutenant, Robt. A. Cone

Company B

Cadet Captain, Edwin G. Eklund
Cadet First Lieutenant, Willis T. Newton
Cadet Second Lieutenant, Lawrence Oppegard

Company C

Cadet Captain, Wilbur D. Shaw
Cadet First Lieutenant, J. Russel Smith
Cadet Second Lieutenant, H. R. Fancher

Company D

Cadet Captain, L. A. Frey
Cadet First Lieutenant, C. Dana McGrew
Cadet Second Lieutenant, R. W. Foulke

Second Battalion

Cadet Major, D. I. Okes
Cadet First Lieutenant and Battalion Adjutant, H. H. Knowlton
Cadet Second Lieutenant and Battalion Quartermaster, J. F. Plummer

Company E

Cadet Captain, Ralph T. Knight
Cadet First Lieutenant, C. C. Houston
Cadet Second Lieutenant, R. V. Hauser

Company F

Cadet Captain, W. B. Crosby
Cadet First Lieutenant, F. G. Scobie
Cadet Second Lieutenant, Walter L. Councilman

Company G

Cadet Captain, Harold C. Deering
Cadet First Lieutenant, Walter Mallory
Cadet Second Lieutenant, Willis Shippam

Company H

Cadet Captain, R. W. Muir
Cadet First Lieutenant, Lawrence W. King
Cadet Second Lieutenant, Malcomb B. Moyer
Cadet Second Lieutenant, L. H. Gadsby

Third Battalion

Cadet Major, R. L. West
Cadet First Lieutenant and Battalion Adjutant, M. H. Gee
Cadet First Lieutenant and Battalion Quartermaster, P. L. Sheaf

Company I

Cadet Captain, L. H. Robbins
Cadet First Lieutenant, C. Eckland
Cadet Second Lieutenant, E. A. Strand

Company K

Cadet Captain, A. B. Lathrop
Cadet First Lieutenant, E. H. King
Cadet Second Lieutenant, H. A. Follingstad

Company L

Cadet Captain, J. I. Swedberg
Cadet First Lieutenant, N. S. Skogland
Cadet Second Lieutenant, H. S. Bachellor

Detachment Artillery

Cadet Captain, Hobart D. Frary
Cadet First Lieutenant, Alva H. Warren
Cadet Second Lieutenant, E. A. Reiff

PHYSICAL CULTURE

FOR WOMEN

Miss Butner and Miss Matson

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

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

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

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

FOR MEN

Dr. Cooke and Dr. 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.

The College of Engineering and the Mechanic Arts

Faculty

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

FREDERICK H. BASS, B.S., *Assistant Professor of Civil Engineering in charge of Municipal and Sanitary Engineering.*
WILLIAM BROOKE, B.C.E., M.A., *Assistant Professor of Engineering Mathematics.*
FRANK H. CONSTANT, C.E., *Professor of Structural Engineering.*
HENRY T. EDDY, C.E., Ph.D., LL.D., *Professor of Engineering and Mechanics.*
HENRY A. ERICKSON, E.E., *Assistant Professor of Physics.*
JOHN J. FLATHER, Ph.B., M.M.E., *Professor of Mechanical Engineering.*
GEORGE B. FRANKFORTER, M.A., Ph.D., *Professor of Chemistry.*
WILLIAM W. FOLWELL, LL.D., *Professor of Political Science.*
ARTHUR EDWIN HAYNES, M.S., M.Ph., ScD., *Professor of Engineering Mathematics.*
WILLIAM R. HOAG, C.E., *Professor of Civil Engineering in charge of Road and Topographical Engineering.*
FREDERCK S. JONES, M.A., *Professor of Physics.*
WILLIAM H. KAVANAUGH, M.E., *Assistant Professor of Mechanical Engineering, in charge of Experimental Engineering.*
WILLIAM H. KIRCHNER, B.S., *Assistant Professor of Drawing.*
FRANCIS P. LEAVENWORTH, M.A., *Professor of Astronomy.*
EDWARD E. NICHOLSON, M.A., *Assistant Professor of Chemistry.*
WILLIAM S. PATTEE, LL.D., *Lecturer on Contracts.*
EDWARD P. SANFORD, M.A., *Assistant Professor of English.*
FREDERICK W. SARDESON, Ph.D., *Assistant Professor of Geology.*
WILLIAM A. SCHAPER, M.A., Ph.D., *Professor of Political Science.*
GEORGE D. SHEPARDSON, M.A., M.E., *Professor of Electrical Engineering.*
FRANK W. SPRINGER, E.E., *Assistant Professor of Electrical Engineering.*
CHARLES F. SIDENER, B.S., *Professor of Chemistry.*
EDWARD SIGERFOOS, Captain U. S. A., *Professor of Military Science.*
ANTHONY ZELENY, M.S., *Assistant Professor of Physics.*
JOHN ZELENY, B.A., Ph.D., *Associate Professor of Physics.*

INSTRUCTORS.

OLAF HOVDA, B.S., *Instructor in Engineering Mathematics.*
ALOIS F. KOVARIK, B.A., *Instructor in Physics.*
JOHN V. MARTENIS, M.E., *Instructor in Machine Design.*
WILLIAM H. MERRIMAN, *Instructor in Machine Work.*
PETER PETERSON, *Instructor in Foundry Practice.*
RALPH H. RAWSON, *Instructor in Drawing.*
NORMAN W. ROSE, M.E., *Instructor in Drawing.*
WILLIAM RYAN, E.E., *Instructor in Electrical Engineering.*
C. F. SHOOP, B.S., *Instructor in Mechanical Engineering.*
JAMES M. TATE, *Instructor in Carpentry and Pattern Work.*
HENRY ULRICH, *Instructor in Carpentry.*

ASSISTANTS AND OTHERS.

J. WESLEY ASH, *Assistant in Civil Engineering.*
HARRY W. DIXON, *Engineer.*
MABEL HOLT, *Clerk.*
PETER JOHNSON, *Machinist.*
EARL W. KELLY, *Assistant in Drawing.*
RALPH W. KERNS, *Assistant in Electrical Engineering.*
L. W. MCKEEHAN, *Assistant in Drawing.*
GEORGE P. MUNGER, *Assistant in Forge Work.*
FRANK L. NEMEC, *Assistant in Drawing.*
WILLIAM PURFERST, *Assistant Engineer.*
ROY T. RAWSON, *Assistant Engineer.*

STANDING COMMITTEES.

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

Non-Resident Lecturers, 1906

ELECTRICAL ENGINEERING DEPARTMENT

Edw. P. Burch, Consulting Engineer, Minneapolis, "The Physical and Financial Advantages of Electric Traction for Heavy Railway Work." "The Speed-Torque Characteristics of Steam Locomotives." "The Speed-Torque Characteristics of Electric Locomotives." "The Physical Data for the Electrification of a Division of a Trans-Continental Railway."

J. M. S. Waring, Chicago, Sales Engineer, Electric Storage Battery Co. "Storage Battery Engineering."

Lee H. Parker, Installing Engineer, Stone & Webster, Boston, Mass. "The Development of the Water Power at Taylor's Falls and its Transmission to Minneapolis."

E. B. Craft, Detail Engineer, Western Electric Co., Chicago. "Opportunities for Engineers with a Telephone Manufacturing Company."

J. A. Stewart, Plant Superintendent, N. Y. & N. J. Telephone Co. "The Opportunities for Technical Graduates in a Large Telephone Operating Company."

Chas. E. Downton, Foreman of Apprentices, Westinghouse Elec. & Mfg. Co., Pittsburg, Pa. "The Engineering Apprentice Course of the Westinghouse Electric & Mfg. Co."

Truman Hibbard, Chief Designer, Elec. Machinery Co., Minneapolis. "The General Problems met in Dynamo Design." "The Design of a 300 kw. 125 volt, Direct-connected Generator." "The Design of a 250 kw. 60 cycle Belted Alternator."

J. R. Cravath, Illuminating Engineer, Chicago. "Illumination Engineering."

Chas. L. Pillsbury, Consulting Engineer, Minneapolis. "The Design of the Engineering Features of a large Modern Office Building."

A. L. Abbott, Installing Engineer with W. I. Gray & Co., Minneapolis, "The Cost, Estimation and the Installation of the Engineering Features of a large Modern Office Building."

The Purposes of the College

The College of Engineering and the Mechanic Arts was founded in accordance with the Laws of the State of Minnesota and of the Federal Government, its object being "to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life." It offers courses of study, of four years each, in civil, mechanical, electrical and municipal engineering, leading to the degrees of civil, mechanical or electrical engineer. This college offers a four-year 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 work in the graduate school leading to the degree master of science.

Admission

Students proposing to enter this college must be prepared to pass examinations in *fifteen* high-school year-credits or their equivalent chosen from the following list of subjects. The first six subjects, amounting to eight year-credits are required of all students and substitutes cannot be accepted. Of the remaining seven year-credits at least *two* year-credits must be chosen from one of the language groups. Two half year-credits are equivalent to one year-credit. The ground to be covered for each credit is given in the syllabus on page 141.

EIGHT YEAR-CREDITS REQUIRED:

Elementary Algebra, one year-credit.
Higher Algebra, one-half year-credit.
Plane Geometry, one year-credit.
Solid Geometry, one-half year-credit.
English, four year-credits.
Chemistry, one year-credit.

SEVEN YEAR-CREDITS REQUIRED FROM THIS GROUP, OF WHICH AT LEAST TWO YEAR-CREDITS SHALL BE CHOSEN FROM *one* OF THE LANGUAGE GROUPS.

Latin (four years).

Grammar, one year-credit.
Caesar, four books, one year-credit.
Cicero, six orations, one year-credit.
Vergil, six books, one year-credit.

Greek (two years).

Grammar, one year-credit.
Anabasis, one year-credit.

German (two years).

Grammar, one year-credit.
Literature, one year-credit.

French (two years).

Grammar, one year-credit.
Literature, one year-credit.

Spanish (two years).

Grammar, one year-credit.
Literature, one year-credit.

History (three years.)
Ancient to Charlemagne, one year-credit.
Modern from Charlemagne, one year-credit.
England, 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.
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.
Commercial Geography, one-half or one year-credit.
Drawing, one-half or one year-credit.
Shop Work, one-half or one year-credit.

Total credits required from both groups fifteen year-credits.

ENTRANCE EXAMINATIONS.

I. Every applicant for admission to the freshman class, whether a graduate of a high school or not, must either,

(a) present State High School Board certificates for each of the mathematical subjects required for admission, or

(b) take the entrance examinations in said subjects at the University.

No applicant will be admitted who fails to obtain credit in one of these two ways in all of the mathematical subjects required for admission.

Students proposing to enter this college should be thoroughly prepared in mathematics, since the prosecution of the work depends so largely upon the preliminary training in this subject.

II. Graduates of Minnesota State high schools; of advanced courses of Minnesota normal schools; or of Minnesota high schools or academies not under the supervision of the State High School Board, but which are accredited by the faculty of the University, will be admitted without examination in the remaining subjects presented for entrance, provided.

(a) that the school maintain *a full four-year course.*

(b) that the applicant present to the registrar the principal's certificate on the blank form provided by the University (see note below), showing the satisfactory completion of at least fourteen of the required fifteen year-credits. Such deficiency, when not a mathematical subject, is charged against the student as an entrance condition which must be removed before he enters the sophomore class.

III. Graduates of such schools, whose principal's certificate shows them to be deficient in not more than one and one-half year-credits and who have made such additional preparation in one or more of these subjects as they deem necessary, may take the regular entrance examinations in such subjects to reduce their deficiency to one year-credit or less. But graduates whose principal's certificate shows them to be deficient in more than one and one-half year-credits, even though they have made such additional preparation as they deem necessary, must take the regular entrance examinations in all subjects.

IV. Graduates from schools in any other state, accredited to the state university of that state, will be admitted on the same terms as graduates of Minnesota State high schools.

V. Applicants from schools not coming within any of the above classes must take the regular entrance examinations or present State High School Board certificates, which will be accepted in lieu of an examination in the subjects which they represent.

N. B.—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.

N. B.—Any Minnesota high school or academy *not under supervision of the State High School Board,* but requiring for graduation *a four years' 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.

TIME AND PLACE OF EXAMINATIONS.

Entrance examinations are held only at the beginning of the college year (Monday, Sept. 9th). Applicants should present themselves to the registrar who will furnish them with application blanks and directions how to proceed with these examinations and registration. Students prevented from entering at the beginning of the year may be admitted at a subsequent date when circumstances are such as to justify the action.

Such students are at a great disadvantage and all students expecting to enter the University are urged to be present at the beginning of the year.

ENTRANCE CONDITIONS.

No applicant will be admitted who is deficient in more than one year-credit, which deficiency becomes an entrance condition and must be made up before the student passes into the sophomore class. But no applicant will be admitted to the college with an entrance condition in mathematics.

Students are strongly advised to enter without entrance conditions if possible, since the work of the freshman year is arduous, requiring the full time and energy of students to get the greatest benefit from it. It is very important that the candidate be fully prepared in the entrance requirement in chemistry, since qualitative chemistry must be pursued during the freshman year.

ADVANCED CREDIT.

Advanced credit for work done in manual training in the high schools is allowed under the following conditions:

(a) The courses in drawing and shop work in the high schools must be approved by the corresponding departments in the College;

(b) Students presenting two or three year-credits in wood-work from such courses will receive an advanced credit in the first semester freshman shop.

(c) Students presenting three year-credits from such courses in drawing will receive an advanced credit of the first semester freshman drawing.

(d) Students presenting four year-credits from such courses in shop will receive an advanced credit of the first semester freshman and one-half semester sophomore shop.

(e) Students presenting four year-credits from such courses in drawing will receive an advanced credit of the first and second semester freshman drawing, not including descriptive geometry.

Syllabi

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: Shakespeare's "Macbeth," Milton's "Paradise Lost," books one and two, Burke's "Concilliation with America," Carlyle's essay on "Burns." In the study of these works the student should come to know 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 Shakespeare'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 practuce 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.

Caesar (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 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 Ecologues. The student should be familiar with the life of Vergil, and an account of his times and writings. A correct rhythmical 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 or 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 topically 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 influence 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 accissible documents like Magna Charta, 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 of 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, bimetallism, 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 year).

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

Botany. (one or one-half 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 coures of zoology, whether a half year or a year, 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 relations to one another and their environments. 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, and 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 faunae of the locality in general as well as 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 subdivisions 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.

Commercial Geography (one-half of one year).

The work usually provided in larger schools will cover this requirement.

Drawing (one or one-half year).

One full year of the work usually provided in the manual training course of high schools will satisfy the requirement for a half-year entrance credit. Two years or more of high school work will be accepted for a one-year entrance credit.

Shop Work (one or one-half year).

One full year of the work usually provided in the manual training course of high schools will satisfy the requirement for a half-year entrance credit. Two years or more of high school work will be accepted for a one-year entrance credit.

Advanced standing—The University accepts records from other 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 department concerned. In bringing records from other institutions, the certificates must be on the official blanks of the institution granting the certificate, and should show:

1. The subject studied and ground covered.
2. The time spent upon each subject.
3. In case of laboratory subjects a concise statement of work done.
4. The result—it is sufficient to state that the subject was creditably completed.

Students who desire to obtain advanced standing must present their applications and certificates to the enrollment committee who will consult departments concerned in determining the credit to be given.

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.

GRADUATION.

Students completing the course of study to the satisfaction of the faculty of the college are entitled to receive the professional 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.

THESES.

Theses. Every member of the senior class of 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. 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 prep-

aration 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 undergraduates 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 into the hands of the faculty not later than the Friday before commencement, upon a good quality of paper 8½ by 11 inches, leaving a margin 1½ inches wide at the left for binding and a margin about 1¼ inches wide on the other side.

The original drawings, tracings, negatives, etc., are to be placed in the department files. Clear prints therefrom are to accompany the manuscript. The thesis shall be bound in black cloth and leather and shall be deposited in the department library.

FACULTY REGULATIONS.

Registration for work. Students will not receive credit for work done in classes for which they have not been registered.

Examination for credit.—Students who make up work out of class and wish to take examinations to gain credit in their University course, shall apply to the faculty for permission to take the examinations.

Reports.—At the end of each semester each student shall receive a mark in each subject for which he is registered. The several marks shall be as follows: A—Pass with honor; B—pass with credit; P—Pass; C—Conditional; F—Failed.

In determining the standing of any student in any subject, the result of his daily work in that subject shall be combined with the result of the final examination in the ratio of two to one.

Subjects to be repeated—Any student in the College of Engineering whose average for the year is below passing grade will be required on reëntering the University to pursue again all the subjects of the year in which he has not passed with credit.

Students who receive a condition or failure in work of either semester so as to make impossible for them to continue the same line of work in the following semester, will not be allowed to elect an advanced subject in place of the one omitted, but shall be required to devote their full time to the remaining subjects of the course.

However, those students who attain an average grade of B in the

remaining subjects pursued may elect an advanced subject in the place of the one omitted.

Conditions and Failures.—No student will be allowed to omit any freshman work in order to make up entrance conditions.

No student with an entrance condition will be allowed to register for any sophomore subject, nor will any student with a freshman condition or failure be allowed to register for a junior subject, nor will any student with a sophomore condition or failure be allowed to register for any senior subject.

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

Students conditioned in the work of the first semester are given an opportunity to remove their conditions at the beginning of the first semester of the following year. Students conditioned in the work of the second semester are given an opportunity to remove their conditions at the beginning or end of the first semester of the following year, at the date regularly set by the program for such examinations. It is provided that if a student attempts to remove a condition at the first examination he will not be allowed to try the following examination, but shall be required to take the work over in class. Failures must be taken over again in class.

Dropped from Rolls.—Any student receiving conditions or failures in more than 50 per cent of his work in the first semester shall be dropped from the rolls, and will not be allowed to re enter the University until the opening of the following year.

Fees and Expenses

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.

First Semester.	
Shop work	$ 7.00
Chemistry	5.00
Second Semester.	
Shop work	$ 7.00
Chemistry	5.00

SOPHOMORE YEAR.

First Semester.	
Shop work	$ 7.00
Physics	3.00
Chemistry	3.00
Second Semester.	
Shop work	$ 7.00
Physics	3.00

JUNIOR YEAR.

First Semester.	
Shop work	$ 4.50
Mechanical Laboratory	6.00
Physics	3.00
Second Semester.	
Shop work	$4.50
Mechanical Laboratory	3.00
Fuel and Gas analysis	5.00
Electrical Laboratory	4.50

SENIOR YEAR.

First Semester.	
Electrical Laboratory	$ 6.00
Electrical Engineering practice	3.00
Mechanical Laboratory	6.00
Second Semester.	
Electrical Engineering	$ 4.50
Mechanical Engineering	4.50

A fee of 25 cents per day is charged for each day of delayed registration.

Courses of Study

Figures at the left indicate credit hours; figures at the right indicate the course number. Letters at the right are abbreviations for the various courses, as follows:

Astronomy	A.
Biology and Bacteriology	B. & B.
Botany	B.
Chemistry	C.
Civil Engineering	C.E.
Contracts and Specifications	C. & S.
Drawing	D.
Electrical Engineering	E.E.
Engineering and Mechanics	E., M.
English	E.
Geology	G.
Mathematics	M.
Mechanical Engineering	M.E.
Physics	P.
Political Science	P.S.

FRESHMAN YEAR.

First Semester.

ALL COURSES.

5	Mathematics, 1, 2, M.	Asst. Prof. Brooke, Mr. Hovda.
4	English, 1, E.	Asst. Prof. Sanford.
4	Chemistry, 1, C.	Asst. Prof. Nicholson.
4	Drawing, 1a, 1b, D.	Mr. Rose and assistants.
4½	Shop, 1 or 2, M. E.	Mr. Tate, Mr. Peterson.
3	Drill,	Captain Sigerfoos.

CIVIL ENGINEERING.

FRESHMAN YEAR.

Second Semester.

5	Mathematics, 2, 3, 4, M.	Asst. Prof. Brooke, Mr. Hovda.
4	English, 1, E.	Asst. Prof. Sanford.
3	Chemistry, 1, C. D.	Asst. Prof. Nicholson.
2	Descriptive Geom., 1c, D.	Asst. Prof. Kirchner and assistants.
3	Drawing, 1b, D.	Mr. Rose, Mr. Kelly.
4	Surveying, 15, 16, C. E.	Asst. Prof. Bass.
3	Drill,	Captain Sigerfoos.

SOPHOMORE YEAR.

First Semester.

5	Mathematics, 5, M.	Prof. Haynes.
6	Physics, 1a, P.	Prof. Jones and assistants
3	Technological chem., 2, C.	Prof. Sidener.
3	Drawing, 2a, 3a, D.	Asst. Prof. Kirchner, Mr. Rawson.
4½	Topography, 17, 18, C. E.	Prof. Hoag.
3	Drill,	Captain Sigerfoos.

Second Semester.

5	Mathematics, 5, 6, 7, M.	Prof. Haynes.
6	Physics, 1b, P.	Prof. Jones and assistants.
2	Drawing, 3a, D.	Asst. Prof. Kirchner, Mr. Rawson.
2	Astronomy, 1, A.	Prof. Leavenworth.
4½	Topography, 19, 20, C. E.	Prof. Hoag.
2	Highways, 8, C. E.	Prof. Hoag.
3	Drill,	Captain Sigerfoos.

JUNIOR YEAR.

First Semester.

5	Mechanics, 1 E., M.	Prof. Eddy.
3	Physics, 2, P.	Associate Prof. J. Zeleny.
2	Mechanical lab., 25 M. E.	Asst. Prof. Kavanaugh, Mr. Shoop.
4½	Curves and Earthworks, 4, C. E.	Prof. Hoag.
3	Field work, 5, C. E.	Prof. Hoag.
3	Stresses, 9, C. E.	Prof. Constant.

Second Semester.

5	Mechanics, 2, E., M.	Prof. Eddy.
3	Structural details, 10, C. E.	Prof. Constant.
3	Stresses, 9, C. E.	Prof. Constant.
5	Railroad work, 6, C. E.	Prof. Hoag.
3	Geology, 1, G.	Prof. Sardeson.
2	Hydraulic laboratory, 27, M. E.	Asst. Prof. Kavanaugh, Mr. Shoop.

SENIOR YEAR.

First Semester.

5	Masonry, 12, C. E.	Prof. Constant.
2	Experimental lab., 14, C. E.	Asst. Prof. Bass.
	or	
2	Railway Economics, 7, C. E.	Prof. Hoag.
3	Electric power, 20, E. E.	Asst. Prof. Springer.
5	Structural design, 11, C. E.	Prof. Constant.
2	Political science, 1, P. S.	Prof. Schaper.
4	Hydraulic Engineering, 1, C. E.	Asst. Prof. Bass.
	Thesis.	

Second Semester.

5	Structural design, 11, C. E.	Prof. Constant.
2	Least squares, 9, M.	Prof. Leavenworth.
3	Geodesy, 21, C. E.	Prof. Hoag.
	or	
3	Concrete, 13, C. E.	Prof. Constant.
2	Political science, 2, P. S.	Prof. Folwell.
3	Sanitary engineering, 2, C. E.	Asst. Prof. Bass.
2	Contracts and Spec., 1, 2, C., S.	———, Prof. Flather.
4	Thesis.	

ELECTRICAL ENGINEERING.

FRESHMAN YEAR.

Second Semester.

5	Mathematics, 2, 3, 4, M.	Asst. Prof. Brooke, Mr. Hovda.
4	English, 1, E.	Asst. Prof. Sanford.
3	Chemistry, 1, C.	Asst. Prof. Nicholson.
5	Drawing, 1b, 1c, D.	Asst. Prof. Kirchner and assistants.
4½	Shop, 1 or 2, M. E.	Mr. Tate, Mr. Peterson.
3	Drill,	Captain Sigerfoos.

SOPHOMORE YEAR.

First Semester.

5	Mechanics, 1, E., M.	Prof. Haynes.
6	Physics, 1a, P.	Prof. Jones.
3	Technological chem., 2, C.	Prof. Sidener.
3	Drawing, 2b, 3b, D.	Asst. Prof. Kirchner, Mr. Rawson.
4½	Shop, 3, 4, M. E.	Mr. Martenis, Mr. Merriman, Mr. Munger.
3	Drill,	Captain Sigerfoos.

Second Semester.

5	Mathematics, 5, 6, 7, M.	Prof. Haynes.
6	Physics, 1b, P.	Prof. Jones.
2	Drawing, 3b, D.	Asst. Prof. Kirchner, Mr. Rawson.
2	Kinematic drawing, 10, M. E.	Mr. Martenis, Mr. Rose.
3	Mechanism, M. E.	Mr. Martenis.
4½	Shop, 3, 4, M. E.	Mr. Martenis, Mr. Merriman, Mr. Munger.
3	Drill,	Captain Sigerfoos.

JUNIOR YEAR.

First Semester.

5	Mechanics, 1, E. M.	Prof. Eddy.
3	Physics, 2, P.	Asst. Prof. A. Zeleny.
3	Stresses, 9, C. E.	Prof. Constant.
3	Applied electricity, 1, 2, E. E.	Prof. Shepardson, Asst. Prof. Springer.
1	Steam boilers, 17, M. E.	Mr. Shoop.
4	Machine design, 11, M. E.	Prof. Flather, Mr. Martenis.
2	Mechanical lab., 25, M. E.	Asst. Prof. Kavanaugh, Mr. Shoop.

JUNIOR YEAR.

Second Semester.

5	Mechanics, 2, E. M.	Prof. Eddy.
4	Dynamos and Motors, 2, E. E.	Asst. Prof. Springer.
3	Steam engines, 17, M. E.	Prof. Flather.
2	Machine design, 11 M. E.	Prof. Flather, Mr. Martenis.
2	Electrical design, 11, E. E.	Mr. Ryan.
3	Electrical laboratory, 14, E. E.	Asst. Prof. Springer.
2	Mechanical laboratory, 17, E. E.	Asst. Prof. Kavanaugh, Mr. Shoop.

SENIOR YEAR.

First Semester.

3	Thermodynamics, 3, E., M.	Prof. Eddy.
3	Alternating currents, 3, E. E.	Prof. Shepardson.
2	Electrical engineering practice, 4 to 9, E. E.	Prof. Shepardson, Asst. Professor Springer.
2	Water Turbines, ** 4, E., M.	Prof. Eddy.
2	Political science, 1, P. S.	Prof. Schaper.
2	Electrical laboratory, 15, E. E.	Prof. Shepardson.
3	Mechanical lab., 28, M. E.	Asst. Prof. Kavanaugh.
3	Elective, ***	
	Thesis.	

SENIOR YEAR.

Second Semester.

3	Alternating currents, 3, E. E.	Prof. Shepardson.
2	Electrical engineering practice, ***E. E.	Prof. Shepardson, Mr. Ryan.
2	Contracts and spec., 1, 2, C., S.	———, Prof. Flather.
2	Political science, 2, P. S.	Prof. Folwell.
3	Electrical design, 13, E. E.	Mr. Ryan.
3	Electrical laboratory, 15, E. E.	Prof. Shepardson.
3	Elective***	
3	Thesis.	

** This course in Water Turbines is a prerequisite to the course in Steam Turbines in the second semester, and all students desiring to take the latter course should not omit Water Turbines in the first semester. Senior Mechanical Engineers wishing to take Railway Mechanical Engineering may be allowed to substitute "Railway Technology" for Water Turbines but may, nevertheless, elect Water Turbines in preparation for Steam Turbines as an elective in the second semester. Senior Electrical Engineers wishing to specialize in Telephone Engineering will be allowed to elect an optional course in Telephony instead of Water Turbines, but they may, nevertheless, elect Water Turbines as preparation for Steam Turbines of the second semester if they desire to take Steam Turbines as an elective.

(***See note on page 169.)

MECHANICAL ENGINEERING.

FRESHMAN YEAR.

Second Semester.

5	Mathematics, 2, 3, 4, M.	Asst. Prof. Brooke, Mr. Hovda.
4	English, 1, E.	Asst. Prof. Sanford.
3	Chemistry, 1, C.	Asst. Prof. Nicholson.
5	Drawing, 1b, 1c, D.	Asst. Prof. Kirchner and assistants.
4½	Shop, 1, 2, M. E.	Mr. Tate, Mr. Peterson.
3	Drill,	Captain Sigerfoos.

SOPHOMORE YEAR.

First Semester.

5	Mathematics, 5, M.	Prof. Haynes.
6	Physics, 1a, P.	Prof. Jones and assistants.
3	Technological chem., 2, C.	Prof. Sidener.
3	Drawing, 2b, 3b, D.	Asst. Prof. Kirchner, Mr. Rawson.
4½	Shop, 3, 4, M. E.	Mr. Martenis, Mr. Merriman, Mr. Munger.
3	Drill,	Captain Sigerfoos.

SOPHOMORE YEAR.

Second Semester.

5	Mathematics, 5, 6, 7, M.	Prof. Haynes.
6	Physics, 1b, P.	Prof. Jones.
2	Drawing, 3b, D.	Asst. Prof. Kirchner, Mr. Rawson.
2	Kinematic Drawing, 10, M. E.	Mr. Martenis, Mr. Rose.
3	Mechanism, 9, M. E.	Mr. Martenis.
4½	Shop, 3, 4, M. E.	Mr. Martenis, Mr. Merriman, Mr. Munger.
3	Drill,	Captain Sigerfoos.

JUNIOR YEAR.

First Semester.

5	Mechanics, 1, E., M.	Prof. Eddy.
3	Physics, 2, P.	Asst. Prof. A. Zeleny.
3	Stresses, 9, C. E.	Prof. Constant.
4	Machine design, 11, M. E.	Prof. Flather, Mr. Martenis.
1	Steam boilers, 17, M. E.	Mr. Shoop.
2	Mechanical lab., 25, M. E.	Asst. Prof. Kavanaugh, Mr. Shoop.
3½	Shop, 5, M. E.	Mr. Merriman.

Second Semester.

5	Mechanics, 2, E., M.	Prof. Eddy.
3	Steam engines, 18, M. E.	Prof. Flather.
4	Machine design, 11, 12, M. E.	Prof. Flather, Mr. Martenis.
3	Fuel and gas analysis, 5, C.	Prof. Sidener, Asst. Prof. Harding.
2	Gas engines and producers, 19, M. E.	Asst. Prof. Kavanaugh.
4	Mechanical lab., 26, 27, M. E.	Asst. Prof. Kavanaugh, Mr. Shoop.

SENIOR YEAR.

First Semester.

3	Thermodynamics, 3, E., M.	Prof. Eddy.
2	Water turbines, **4, E., M.	Prof. Eddy.
2	Mechanical engineering, 23, M. E.	Prof. Flather.
4	Electric power, 20, E. E.	Asst. Prof. Springer.
4	Steam engine design, 13, M. E.	Prof. Flather.
	or	
4	Gas engine design, 13, M. E.	Prof. Flather.
2	Political science, 1, P. S.	Prof. Schaper.
3	Mechanical lab., 29, M. E.	Asst. Prof. Kavanaugh.
0 to 2	Elective. Subject to approval of department.	
	Thesis.	

**See note page 151.

Second Semester.

2	Steam Turbines, 5, E., M.	Prof. Eddy.
	or	
	Railway Mechanical Engineering, 35, M. E.	Prof. Flather.
2	Contracts and spec., 1, 2, C. & S.	———, Prof. Flather.
2	Political science, 2, P. S.	Prof. Folwell.
4	Machine design, 14, M. E.	Prof. Flather.
	or	
4	Railway design, 34, M. E.	Prof. Flather.
4	Gas engine lab., 30, M. E.	Asst. Prof. Kavanaugh.
2 to 4	Elective. Subject to approval of department.	
3	Thesis.	

MUNICIPAL ENGINEERING.

FRESHMAN YEAR.

Second Semester.

5	Mathematics, 2, 3, 4, M.	Asst. Prof. Brooke, Mr. Hovda.
4	English, 1, E.	Asst. Prof. Sanford.
3	Chemistry, 1, C.	Asst. Prof. Nicholson.
5	Drawing, 1b, 1c, D.	Asst. Prof. Kirchner, and assistants.
4	Surveying, 14, 15, C. E.	Asst. Prof. Bass.
3	Drill,	Captain Sigerfoos.

SOPHOMORE YEAR.

First Semester.

5	Mathematics, 5, M.	Prof. Haynes.
6	Physics, 1a, P.	Prof. Jones.
3	Quantitative Anal., 3, C.	Prof. Sidener.
3	Drawing, 2a, 3a, D.	Asst. Prof. Kirchner.
4½	Topography, 16, 17, C. E.	Prof. Hoag.
3	Drill,	Captain Sigerfoos.

Second Semester.

5	Mathematics, 5, 6, 7, M.	Prof. Haynes.
6	Physics, 1b, P.	Prof. Jones.
2	Drawing, 3a, D.	Asst. Prof. Kirchner, Mr. Kelly.
2	Astronomy, 1, A.	Prof. Leavenworth.
4½	Topography, 18, 19, C. E.	Prof. Hoag.
2	Highways, 8, C. E.	Prof. Hoag.
3	Drill,	Captain Sigerfoos.

JUNIOR YEAR.

First Semester.

5	Mechanics, 1, E., M.	Prof. Eddy.
3	Physics, 2, P. or	Asst. Prof. A. Zeleny.
2½	Curves and earthwork, 4, C. E.	Prof. Hoag.
2	Curves and earthwork, 4, C. E.	Prof. Hoag.
2½	Water analysis, 4, C.	Prof Frankforter.
2	Mechanical lab., 25, M. E.	Asst. Prof. Kavanaugh, Mr. Shoop.
3	Field work, 5, C. E.	Prof. Hoag.
3	Stresses, 9, C. E.	Prof. Constant.

Second Semester.

5	Mechanics, 2, E. M.	Prof. Eddy.
3	Biology, 1, B. & B.	Asst. Prof. Tilden.
3	Stresses, 9, C. E.	Prof. Constant.
5	Railroad work, 6, C. E.	Prof. Hoag.
3	Geology, 1, G.	Prof. Sardeson.
2	Hydraulic lab., 27, M. E.	Asst. Prof. Kavanaugh, Mr. Shoop.

SENIOR YEAR.

First Semester.

5	Masonry, 12, C. E.	Prof. Constant.
2	Experimental lab., 13, C. E.	Asst. Prof. Bass.
3	Electric power, 5, E. E.	Asst. Prof. Springer.
5	Structural design, 11, C. E.	Prof. Constant.
2	Political science, 1, P. S.	Prof. Schaper.
4	Hydraulic engineering, 1, C. E.	Asst. Prof. Bass.

Second Semester.

5	Structural design, 11, C. E.	Prof. Constant.
1	Public Health, 3, C. E.	Prof. Wesbrook.
3	Bacteriology, 2, B. & B.	Prof. Wesbrook, Dr. Mullin.
5	Sanitary engineering, 2, C. E.	Asst. Prof. Bass.
2	Political science, 2, P. S.	Prof. Folwell.
2	Contracts and spec., C. & S., 1, 2.	———, Prof. Flather.
3	Thesis.	

COURSE IN SCIENCE AND TECHNOLOGY.

FRESHMAN YEAR.

5	Mathematics, 1, 2, M.	Asst. Prof. Brooke, Mr. Hovda.
4	English, 1, E.	Asst. Prof. Sanford.
3 or 5	French or German.	Prof. Benton or Prof. Moore.
4 or 3	Chemistry or history.	Prof. Frankforter or Prof. West.
3	Military Drill	Captain Sigerfoos.

SOPHOMORE YEAR.

5	Mathematics, 5, M.	Prof. Haynes.
3	History or Chemistry, or French or English.	
6	Physics, 1, P.	Prof. Jones and assistants.
4(5)	Engineering Drawing, 1, D.	Asst. Prof. Kirchner.
1	Rhetoric, 1, E.	Asst. Prof. Sanford.
3	Military Drill.	Captain Sigerfoos.

JUNIOR YEAR.

First Semester.

5	Mechanics, 1, E., M.	Prof. Eddy.
3	Physics, 2, P.	Prof. J. Zeleny.
3	Drawing, 2, D.	Asst. Prof. Kirchner.
4	Technical work.	
4	Elective work.	

Second Semester.

5	Mechanics, 2, E. & M.	Prof. Eddy.
2	Drawing, 3, D.	Asst. Prof. Kirchner.
5	Technical work.	
7	Elective work.	

SENIOR YEAR.

12	Elective.
8	Technical work

POST SENIOR YEAR.

Subjects all elective.
For more detailed statement of this course see pages 180 to 182.
See printed footnote, page 151.

Courses of Instruction

ENGLISH.

COURSE 1. ENGLISH.

Freshman I, II. 144 hours. ASSISTANT PROFESSOR SANFORD

The work for this course is planned with special reference to the needs of engineering students. Two hours a week will be given in 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 1. HIGHER ALGEBRA.

Freshman I. 75 hours. ASSISTANT PROFESSOR BROOKE AND MR. HOVDA

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 2. PLANE TRIGONOMETRY.

Freshman I, II. 45 hours. ASSISTANT PROFESSOR BROOKE AND MR. HOVDA

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 unreal roots. Open to those who have completed course I.

COURSE 3. SPHERICAL TRIGONOMETRY.

Freshman II, 15 hours. ASSISTANT PROFESSOR BROOKE AND MR. HOVDA

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. Open to those who have completed course 2.

COURSE 4. ANALYTICAL GEOMETRY.

Freshman II, 36 hours; ASSISTANT PROFESSOR BROOKE AND MR. HOVDA
Sophomore I, 70 hours.* PROFESSOR HAYNES

Co-ordinate systems, transformation of co-ordinates, algebraic equa-

tions 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. Open to those who have completed course 3.

COURSE 5. DIFFERENTIAL CALCULUS.

Sophomore I, II. 55 hours. PROFESSOR HAYNES

The differentiation of algebraic and transcendental functions successive differentiation, series, derivatives, maxima, minima, tangents, subtangents, normals, subnormals, illusory forms, asymptotes, direction and rate of curvature, radius of curvature, evolutes, envelopes, singular, points and curve tracing. Open to those who have completed course 4.

COURSE 6. INTEGRAL CALCULUS.

Sophomore II. 40 hours. PROFESSOR HAYNES

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. Open to those who have completed course 5.

COURSE 7. APPLICATIONS OF THE CALCULUS.

Sophomore II. 15 hours. PROFESSOR HAYNES

Some practical applications of the technical calculus to mechanics and physics, maxima and minima, center of gravity, center of hydrostatic pressure and moment of inertia.

The foregoing courses in mathematics are required, *in the order given,* of all undergraduates in each of the engineering courses. In order to enter any year of the course in Engineering Mathematics, the student must have a passing mark in all the required preceding mathematics.

*Of the five hours per week required in sophomore mathematics, four are devoted to recitations and one hour to lectures. These lectures are devoted to the philosophy and use of the slide rule, to a review of the work of the preceding four hours and to practical problems requiring the application of the differential and the integral calculus for their solution.

COURSE 8. ADVANCED CALCULUS AND DIFFERENTIAL EQUATIONS.

Junior or Senior I, II. 2½ hours. PROFESSOR EDDY

Preparation: Courses 5 and 6 M.

COURSE 9. METHOD OF LEAST SQUARES.

Senior II. 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 1. (*a*) FREEHAND.

Freshman I. [2] *72 hours.* MR. ROSE AND ASSISTANTS

Lettering, geometric forms and engineering details in outline, including working sketches, translations and the elements of perspective.

(*b*) MECHANICAL.

Freshman I [2] *II* [3] *180 hours.* MR. ROSE AND ASSISTANTS

Conventional methods, lettering, machine and structural details, and standard sizes and shapes.

(*c*) DESCRIPTIVE GEOMETRY.

Freshman II [2] *36 hours.*

ASSISTANT PROFESSOR KIRCHNER AND ASSISTANTS

Problems relating to points, lines, planes, solids, interpenetrations, surfaces of revolution, tangents and developments, including the constructive geometry involved. Recitations and lectures.

COURSE 2. DESCRIPTIVE GEOMETRY.

Sophomore I [2] *72 hours.*

ASSISTANT PROFESSOR KIRCHNER AND ASSISTANTS

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 3. WORKING DRAWINGS.

Sophomore I, [1] *II.* [2] *108 hours.*

Engineering details, assembly drawing, 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 4. INSTRUMENTAL.

I, II [4] *252 hours.*

Problems, projections, sections, developments and interpenetrations. With conventional renderings in line and wash.

FOR GRADUATES.

COURSE 5. ADVANCED DESCRIPTIVE GEOMETRY AND APPLICATIONS.

COURSE 6. PROJECTIVE GEOMETRY.

ENGINEERING AND MECHANICS.

(*a*) APPLIED MECHANICS.

COURSE 1. STATICS, DYNAMICS AND MECHANICS OF MATERIALS.

Junior I. 90 hours. PROFESSOR EDDY

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 2. HYDRAULICS AND PUMPING MACHINERY.

Junior II. 90 hours. PROFESSOR EDDY

Hydraulics, including the laws of equilibrium, pressure and flow of fluids; the theory of the action of pumps. Recitations and lectures. Open to those who have completed course 1.

(*b*) THEORETICAL MECHANICS AND MATHEMATICAL PHYSICS.

For Graduates and Undergraduates who have completed calculus and physics.

PROFESSOR EDDY

COURSE 1. THE POTENTIAL FUNCTION AND SPHERICAL HARMONICS.
COURSE 2. ANALYTICAL STATICS AND ELECTROSTATICS.
COURSE 3. DYNAMICS OF RIGID BODIES.
COURSE 4. CIRCULAR, HYPERBOLIC AND ELLIPTIC FUNCTIONS WITH THEIR PHYSICAL APPLICATIONS.

FOR GRADUATES.

Open only to those who have completed advanced work in mathematics.

PROFESSOR EDDY

COURSE 5. DIRECTIONAL CALCULUS, VECTOR ANALYSIS AND DETERMINANTS.
COURSE 6. ANALYTICAL THEORY OF THE CONDUCTION OF HEAT.
COURSE 7. THEORIES OF ELASTICITY AND SOUND.
COURSE 8. WAVE THEORIES OF LIGHT, HEAT AND ELECTRICITY.
COURSE 9. KINETIC THEORY OF GASES.
COURSE 10. HYDRODYNAMICS AND FLUID MOTION.
COURSE 11. THEORY OF FUNCTIONS WITH APPLICATIONS.

PHYSICS.

FOR UNDERGRADUATES.

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

COURSE 1.

Sophomore I, II. [6] PROFESSOR JONES AND ASSISTANTS
(*a*) Mechanics, heat, and sound.
(*b*) Electricity, magnetism, and light.
Recitations, experimental lectures and laboratory work.

COURSE 2. ELECTRICAL MEASUREMENTS.

Junior I [3] ASSISTANT PROFESSOR A. ZELENY
Recitations, experimental lectures and laboratory work.

COURSE 3. ADVANCED LABORATORY WORK.

Senior I, II. ASSOCIATE PROFESSOR JOHN ZELENY
Open to those who have completed course 2.

GEOLOGY.

COURSE 1. GEOLOGY.

Junior II, 5½ hours. ASSISTANT PROFESSOR 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 1. CONTRACTS.

Senior II, 12 hours. PROFESSOR 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 2. SPECIFICATIONS.

Senior II, 12 hours. PROEFSSOR FLATHER
A study of engineering specifications. Classes of specifications; essential features; clauses; details. Examples. Lectures, recitations and practice in writing specifications.

ASTRONOMY.

COURSE 1. PRACTICAL ASTRONOMY.

Sophomore II. 36 hours. PROFESSOR LEAVENWORTH
Spherical co-ordinates; time; latitude; longitude, and other astronomical problems. Lectures.

POLITICAL SCIENCE.

COURSE 1. INTRODUCTION TO POLITICAL SCIENCE.

Senior I. 36 hours. PROFESSOR SCHAPER
A study of the elements of jurisprudence, including partnerships, corporations, liability of officers, citizenship, etc. Lectures and reading.

COURSE 2. TRANSPORTATION.

Senior II. 36 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 1. BIOLOGY.

Junior II. 54 hours. ASSISTANT PROFESSOR TILDEN

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 2. BACTERIOLOGY.

Senior II. 54 hours. PROFESSOR WESBROOK

Brief course in general bacteriology. Preparation of media and study of cultures, especially those of pathogenic bacteria found in water and sewage.

BOTANY AND PLANT PRODUCTS.

COURSE 1. TIMBERS AND TIMBER DISEASES.

Elective I. 36 hours. PROFESSOR LYON

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.

COURSE 2. PLANT PRODUCTS.

Elective II. 36 hours. PROFESSOR LYON

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.

CHEMISTRY.

COURSE 1. QUALITATIVE ANALYSIS.

Freshman I, II. 288 hours. ASSISTANT PROFESSOR NICHOLSON

The course includes 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 2. CHEMICAL TECHNOLOGY.

Sophomore I. 72 hours. PROFESSOR SIDENER

Includes technical analysis of materials of engineering, with special reference to iron and steel. Lectures and laboratory work.

COURSE 3. VOLUMETRIC ANALYSIS.

Sophomore I. 72 hours. PROFESSOR SIDENER

COURSE 4. WATER ANALYSIS.

Junior I. 72 hours. PROFESSOR SIDENER

Sanitary chemical analysis of water. Samples collected by the students tested for nitrogen in its several conditions, chlorine, color, turbidity, hardness.

COURSE 5. FUEL AND GAS ANALYSIS.

Junior II. 90 hours. ASSISTANT PROFESSOR HARDING

The work includes an exhaustive chemical examination of fuels and the common gases, with a determination of their light and heat efficiencies. Lectures and laboratory work.

CIVIL ENGINEERING.

MUNICIPAL AND SANITARY ENGINEERING.

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 1. (a) HYDRAULIC ENGINEERING.

ASSISTANT PROFESSOR BASS

Senior I. 36 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. Turneaure & Russell's Water Supply: text. Lectures on water power development, irrigation, river and harbor improvements and drainage. Required preparation: E., M. 2. (Recitations and lectures).

COURSE 1. (b) HYDRAULIC DESIGN.

ASSISTANT PROFESSOR BASS

Senior. 54 hours.
A series of problems in calculation of quantities and design. Estimates of cost. Required preparation: E., M. 2. (Drawing room.)

COURSE 2. (a) SANITARY ENGINEERING.

ASSISTANT PROFESSOR BASS

Senior II. 54 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, estimate of cost, inspection of work. Methods of disposal, irrigation, filtration, chemical precipitation, bacterolytic methods. House drainage. Garbage disposal. Preparation required: E., M. 2. Folwell's Sewerage: text. (Recitations and lectures.)

COURSE 2. (b) SANITARY DESIGN.

ASSISTANT PROFESSOR BASS

Senior II. 72 hours.
Problems illustrative of work in course 2. A complete design for collection and purification of sewage. Ogden's Sewer Design, Rideal's Sewage. Moore's Sanitary Engineering, &c.: References. Preparation: E., M. 2. (Drawing room.)

COURSE 3. PUBLIC HEALTH.

PROFESSOR WESBROOK

Senior II. 18 hours.
Lectures upon general problems concerning public hygiene.

RAILWAY AND HIGHWAY ENGINEERING.

COURSE 4. CURVES AND EARTHWORKS.

PROFESSOR HOAG

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 5. EXECUTION IN FIELD OF PRACTICAL PROBLEMS.

PROFESSOR HOAG

Junior I. 108 hours.
Illustrating the analytical work of course 4, including the computation of earthwork of railroad grades and pits, platting profiles and construction of maps.

COURSE 6. RAILWAY LOCATION AND ESTIMATES.

PROFESSOR HOAG

Junior II. 108 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 7. RAILWAY ECONOMICS.

Junior I, II. 36 hours. PROFESSOR HOAG

This course consists of lectures once a week through the junior year. During the first semester the subject of structures of permanent way, related to course 4, 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 8. HIGHWAY CONSTRUCTION AND MAINTENANCE.

Sophomore II. 36 hours. PROFESSOR HOAG

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 9. STRESSES IN FRAMED STRUCTURES.

Junior I, II. 180 hours. PROFESSOR CONSTANT

Theory of structures and determination of stresses by graphical and analytical methods, for static and for moving loads. Lecture, one hour per week; work in drawing room in computation and graphic statistics, supplemented by daily informal lectures, four hours per week. Reference books: Merriman's Roofs and Bridges, Parts 1 and 2; Ketchum's Steel Mill Buildings. Open to students pursuing the course in mechanics.

COURSE 10. STRUCTURAL DETAILS.

Junior II. 108 hours. PROFESSOR CONSTANT

Methods of proportioning individual members of framed structures and the design of joints and splices in steel and wooden structures. Practice in the use of handbooks of steel manufacturers. Design of a roof truss and railway plate girder bridge. Practice in making complete shop drawings. Reference books: Handbooks of the Carnegie and Cambria Steel Companies. Johnson's Stresses in Framed Structures. Open to students who have completed first half of course IX.

COURSE 11. STRUCTURAL DESIGNS.

Senior I, II. 360 hours. PROFESSOR CONSTANT

Theory and design of steel structures, including railway and highway bridges, standpipes and towers, and other problems of structural interest. Theory of higher structures. References: Johnson's Stresses, Merriman's Part III and IV Bridge Series. Open to students who have completed courses 9 and 10.

COURSE 12. MASONRY CONSTRUCTION.

Senior I. 144 hours. PROFESSOR CONSTANT

Properties of stones, bricks, cement and concrete, and their use in engineering structures. Foundations, retaining walls, piers and abutments, dams and chimneys. Theory of reinforced concrete. Theory and design of masonry arches. Design of stone and concrete structures. Lectures and text-book work, two hours per week; drawing room work, six hours per week. Reference books: Baker's Masonry, Howe's Retaining Wall, Church's Mechanics, and current periodical engineering literature. Open to students who have completed course 9.

COURSE 13. CONCRETE.

Senior II. 108 hours. PROFESSOR CONSTANT

Continuation of course 12 with special attention to concrete, its properties, manufacture and design. Economical design in reinforced concrete. Theory of the elastic arch and design of reinforced concrete arch. Lectures and drawing room work. Reference books: Taylor and Thompson's Concrete, Howe's Symmetrical Arches. Open to students who have completed course 12.

COURSE 14. (a) EXPERIMENTAL LABORATORY.

Senior I. 72 hours. ASSISTANT PROFESSOR BASS
Experimental tests of the properties of cements, concrete, reinforced concrete and strength of joints, columns and framed structures. Laboratory work four hours per week.

(b) CEMENT LABORATORY.

Junior I. 16 hours. ASSISTANT PROFESSOR BASS AND MR. ASH
A short course in cement testing, supplemented by lectures upon the properties of cement and methods of testing. Given to all junior engineers in conjunction with the course 25 M. E.

TOPOGRAPHICAL ENGINEERING.

COURSE 15. SURVEYING.

Freshman II. 72 hours. ASSISTANT PROFESSOR BASS AND ASSTS.
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 coördinate 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 16. PLATTING.

Freshman II. 36 hours. ASSISTANT PROFESSOR BASS AND ASSTS.
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 usual office reduction of all field notes.

COURSE 17. TOPOGRAPHY.

Sophomore I. 122 hours. ASSISTANT PROFESSOR BASS AND ASSTS.
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 18. MAPPING.

Sophomore I. 40 hours. ASSISTANT PROFESSOR BASS AND ASSTS.
Notes taken in course XVII are reduced, areas computed and topographical maps made of land surveyed.

COURSE 19. HIGHER SURVEYING.

Sophomore II. 108 hours. PROFESSOR HOAG
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 20. FIELD WORK AND PLATTING.

Sophomore II. 72 hours. PROFESSOR HOAG
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 sur-

vey 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 21. GEODESY.

Senior II. 54 hours. PROFESSOR HOAG

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.

COURSE 22. SHORT COURSE IN SURVEYING.

One hour a week (two as field work), open to Seniors of Electrical and Mechanical Engineering courses. PROFESSOR HOAG

Ordinary and special instruments used in making surveys. Measurement of angles and distances with and without instruments. Determination of distances by gradienter and telemeter. Calculation of land areas. Methods for overcoming obstacles to alignment and measurement. Theory of transversals with applications. The transit and level, their care, use and adjustment. Establishing a meridian. The solar compass and public land surveys. Leveling—rough and accurate, instruments and methods. Barometric leveling. Measurement of flow of water in streams and open channels. Measurement of volumes in barrow-pits and reservoirs. The time is about equally divided between lectures (no text-book used) and work in the field. The field-work has to do with a few of the more important problems suggested by the lecture work.

MECHANICAL ENGINEERING.

SHOP WORK.

COURSE 1. CARPENTRY AND PATTERN MAKING.

Freshman I. 162 hours. MR. TATE

Wood working, use of tools; lathe and bench work. Patterns for moulding, core boxes. Lectures and practice.

COURSE 2. FOUNDRY PRACTICE AND PATTERN MAKING.

Freshman II. 162 hours. MR. PETERSON

Patterns and flasks. Moulding, casting, mixing metals, brass work and core making. Shop practice, recitations and lectures.

COURSE 3. BLACKSMITHING.

Sophomore I or II. 90 hours. MR. MARTENIS AND MR. MUNGER

Use of tools, forging, welding, tool dressing, tempering. Lectures and practice.

COURSE 4. MACHINE WORK.

Sophomore I and II. 270 hours. MR. MERRIMAN

Chipping, filing, machine work, gear cutting, finishing; machine construction. Lectures and practice.

COURSE 5. TOOL CONSTRUCTION.

Junior I. 108 hours. MR. MERRIMAN

Tools, taps, reamers, cutters and other special work. Lectures and practice. Preparation, course 4 M. E.

COURSE 6. CARPENTRY, JOINERY AND WOOD CARVING.

Elective, I or II. 144 hours. MR. TATE

A course in wood working designed with special reference to the needs of teachers of manual training.

COURSE 7. MACHINE CONSTRUCTION.

Senior I or II. 144 hours. (Elective). PROFESSOR FLATHER

Construction of patterns and machine work for special apparatus or machinery, designed by the students.

COURSE 8. SHOP ECONOMICS.

Senior II. 36 hours. (Elective). PROFESSOR FLATHER
Shop and factory organization and management; cost systems.

MACHINE DESIGN.

COURSE 9. PRINCIPLES OF MECHANISM.

Sophomore II. 54 hours. MR. MARTENIS
The transmission of motion without consideration of the strength of parts. Gear wheels, linkages, belts, screws, epicyclic trains, parallel motions, quick-return movements. Lectures and recitations. Preparation: course 4 M.

COURSE 10. KINEMATICS.

Sophomore II. 72 hours. MR. MARTENIS
Graphical diagrams of the paths, speeds and accelerations of important mechanisms; centroids, analysis of mechanism; construction of cams; kinematic pairs. Preparation: course 4 M.

COURSE 11. MACHINE DESIGN.

Junior I and I. 216 hours. PROFESSOR FLATHER AND MR. MARTENIS
Calculation and design of such machine parts as fastenings, bearings, rotating pieces, belt and tooth gearing. Recitations, lectures and drawing room practice. Open only to students pursuing course E., M. 1.

COURSE 12. MACHINE DESIGN.

Junior II. 72 hours. (Second half Semester.)
PROFESSOR FLATHER AND MR. MARTENIS
Application of graphical methods to the design of valve gears and link motions; Zeuner diagrams, indicator cards. Lectures and drawing room practice. Open only to those pursuing course 18 M. E.

COURSE 13. MACHINE DESIGN. STEAM ENGINE.

Senior I. 144 hours. PROFESSOR FLATHER
Calculations and working drawings for a high speed automatic steam engine. Theoretical diagrams and determination of details. Preparation: Courses 12 and 18 M. E.
Gas engine. An alternative course in gas engine design is offered those who have completed course 19 M. E.

COURSE 14. MACHINE DESIGN.

Senior II. 144 hours. PROFESSOR FLATHER
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 11 M. E.

COURSE 15. TOOL DESIGN.

Senior I or II. 72 or 144 hours. PROFESSOR FLATHER
Design of special tools for manufacturing interchangeable parts; jigs and milling fixtures. Preparation: courses 5 and 11 M. E.

COURSE 16. ENGINEERING DESIGN.

Senior II. 72 or 144 hours. PROFESSOR FLATHER
Problems, designs and estimates for power plants, central stations and factory equipment. Selection of motive powers, pumps, shafting, piping and accessory plant. Preparation: courses 17, 18 and 19 M. E.

STEAM ENGINEERING AND PRIME MOVERS.

COURSE 17. STEAM BOILERS.

Junior I. 18 hours. MR. SHOOF
Application of theory and practice in the design and construction of steam boilers, chimneys, boiler settings and accessories, smoke prevention, mechanical stokers; methods of operating boilers with safety and economy. Open only to students pursuing course 1 E., M.

COURSE 18. STEAM ENGINE.

Junior II. 54 hours. PROFESSOR FLATHER

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 1, E., M.

COURSE 19. GAS ENGINES AND PRODUCERS.

Junior II. 36 hours. ASSISTANT PROFESSOR KAVANAUGH

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

A study of the power gas producer including suction and pressure types for various fuels; construction and operation of the generator and accessory apparatus. Application to various industrial purposes. Recitations and lectures. Open only to students pursuing course 5 C.

COURSE 20. THERMODYNAMICS.

Senior I. 54 hours. PROFESSOR EDDY

The mechanical theory of heat as applied to the steam engine and other motors. Preparation: courses 1 and 2 E., M. and course 18 M. E.

COURSE 21. STEAM TURBINES.

Senior II. 54 hours. PROFESSOR EDDY

Thermodynamics of gas and oil engines; heat losses and efficiencies.

Steam turbines; elementary theory; axial and radial turbines; distribution of pressure; limiting velocities; thermodynamic efficiency.

Refrigerator machinery and ice manufacture. Preparation: courses 18, 19 and 20 M. E.

COURSE 22. WATER TURBINES.

Senior I. 36 hours. (Elective.) PROFESSOR EDDY

Theory of turbines, hydraulic motors and wind mills. Preparation: course 2 E., M.

COURSE 23. MECHANICAL ENGINEERING.

Senior I. 36 hours. PROFESSOR FLATHER

Measurement of power. A study of the methods employed in measuring power. Dynamomoters. Prony brakes; measurement of water power; water meters: weir measurement, flow of water in pipes; measurement of electric power, efficiency of motors; power required to drive machine tools and shafting. Recitations and lectures. Preparation, course 2 E., M.

Air compressors and motors, and the transmission of power by compressed air. Recitations and lectures. Preparation: course 2 E., M.

COURSE 24. MECHANICAL ENGINEERING.

Senior I. 36 hours. (Elective.) MR. MARTENIS

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

Journal club—Open to the seniors and juniors. Once a week.

EXPERIMENTAL ENGINEERING LABORATORY.

COURSE 25. STRENGTH OF MATERIALS.

Junior I. 72 hours. ASSISTANT PROFESSOR KAVANAUGH AND MR. SHOOP

Laboratory work investigating the strength and physical qualities of iron, steel, brass, copper, belting, chains, beams. Open only to students pursuing course 1 E., M.

COURSE 26. STEAM LABORATORY.

Junior II. 72 hours. ASSISTANT PROFESSOR KAVANAUGH AND MR. SHOOP
Exercises in valve setting, indicator practice, calibration of steam gages, calorimetry, efficiency of screws and hoists. Open only to students pursing course 18 M. E.

COURSE 27. HYDRAULIC LABORATORY.

Junior II. 72 hours. ASSISTANT PROFESSOR KAVANAUGH AND MR. SHOOP
Hydraulic measurements, calibration of weirs, nozzles, orifices and meters, tests of water meters, rams, pulsometers, pumps and other hydraulic apparatus. Open only to students pursuing course 2 E., M.

COURSE 28. MECHANICAL LABORATORY.

Course I. 108 hours. ASSISTANT PROFESSOR KAVANAUGH
Calibration of dynamometers and other apparatus. Testing lubricating value of oils; tests of injectors, steam engines and boilers, and complete power and lighting plants. Preparation: course 26 and 27 M. E.

COURSE 29. MECHANICAL LABORATORY.

Senior I. 108 hours. ASSISTANT PROFESSOR KAVANAUGH
Hydraulic measurements, calibration of weirs, nozzles, orifices and meters. Tests of water motors, rams, pulsometers, steam pumps and pumps and other hydraulic apparatus. Calibration of dynamometers and other apparatus. Testing lubricating value of oils; tests of injectors, steam engines and boilers. Preparation: course 26 M. E.

COURSE 30. GAS ENGINE LABORATORY.

Senior II. 144 hours. ASSISTANT PROFESSOR KAVANAUGH
Tests of gas, gasoline and hot air engines; gas producers; air compressors; automobile and locomotive testing, and other special work. Preparation: courses 19 and 28 M. E.

COURSE 31. MECHANICAL LABORATORY.

Senior 72 hours. ASSISTANT PROFESSOR KAVANAUGH AND MR. SHOOP
Special modification of courses 29 and 30 covering work in hydraulic measurements, steam engine and boiler testing for students in mining and metallurgy.

COURSE 32. MECHANICAL LABORATORY.

Senior II. 72 or 144 hours. (Elective.) ASSISTANT PROFESSOR KAVANAUGH
Special research work and commercial tests.

RAILWAY MECHANICAL ENGINEERING.

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

COURSE 33. RAILWAY TECHNOLOGY.

Senior I. 72 hours. ASSISTANT PROFESSOR KAVANAUGH
The object of this course is to familiarize the student with the principal details of construction of locomotives, and consists in part of a systematic course of visits to the various railroad shops in the vicinity. Lectures and recitations.

COURSE 34. RAILWAY DESIGN.

Senior II. 144 hours. PROFESSOR FLATHER
(a) Of link and valve motions. Continuation of course 12 M. E. with special applications of the Stephenson link.
(b) Of locomotive and car details.
(c) Of the locomotive boiler.
(d) Of assembled parts. Preparation: course 33 M. E.

COURSE 35. LOCOMOTIVE CONSTRUCTION.

Senior II. 36 hours. PROFESSOR FLATHER

Lectures, reading and recitations on design and construction of locomotives, supplementing course 34. This treats—

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

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

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

COURSE 36. LOCOMOTIVE ROAD TESTING.

Senior II. ASSISTANT PROFESSOR KAVANAUGH

FOR GRADUATES.

Courses are offered in:
Engineering design.
Experimental investigations.
Railway engineering.

ELECTRICAL ENGINEERING.

COURSE 1. APPLIED ELECTRICITY.

Junior I. 48 hours. PROFESSOR SHEPARDSON AND ASST. PROFESSOR SPRINGER

Outline of industrial uses of electricity; units; application of Ohm's law; methods and calculation of wiring; electrical instruments and measurements. Text book: Shepardson, Electrical Catechism. Preparation: course 1 P.

COURSE 2. DYNAMOS AND MOTORS.

Junior II. 72 hours. ASSISTANT PROFESSOR SPRINGER

Theory of electro-magnet and direct current dynamo and motor; methods of regulation, construction and operation of dynamos and motors; methods of testing. Preparation: course 1 E. E., courses 1 and 2 P., and courses 5 and 6 M.

COURSE 3. ALTERNATING CURRENTS.

Senior I, II. 108 hours. PROFESSORS SHEPARDSON AND EDDY

Phenomena, measurement and use of alternating currents; theory of line, transformer, generator and motor; types of apparatus Text-book: Steinmetz, Alternating Current Phenomena. Preparation: courses 1 and 2 E. E.

COURSE 4 ELECTRICAL ENGINEERING PRACTICE. ELECTRIC RAILWAY.

Senior I. 18 hours. ASSISTANT PROFESSOR SPRINGER

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: course 2 E. E.

COURSE 5. ELECTRICAL ENGINEERING PRACTICE. BATTERIES.

Senior I. 108 hours. MR. RYAN

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: course 2 E. E.

COURSE 6. ELECTRICAL ENGINEERING PRACTICE. ELECTRIC LIGHTING.

Senior I. 18 hours. PROFESSOR SHEPARDSON

Comparison of different sources of light; photometry; physics of the arc; history, design and regulation of arc lamps; adaptation to constant current, constant potential and A. C. circuits; carbons; history, manufacture and economy of incandescent lamps; distribution of light. Preparation: course 2 E. E.

COURSE 7. ELECTRICAL ENGINEERING PRACTICE. ELECTRICAL TRANSMISSION.

Senior II. 18 hours. PROFESSOR SHEPARDSON

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. Preparation: course 1, 2 and 6 E. E.

COURSE 8. ELECTRICAL ENGINEERING PRACTICE. CENTRAL STATIONS.

Senior II. 18 or 36 hours. MR. RYAN

Preliminary surveys; choice of electrical systems; load diagrams; best units of power; comparison of steam, gas and water power; location, design and erection of station buildings; boilers, engines dynamos, storage batteries, switch board and lines; operation and regulation; maintenance of plant; emergencies; examination of stations in Minneapolis and St. Paul. Preparation: course 2 and 6 E. E.

COURSE 9. ELECTRICAL ENGINEERING PRACTICE. TELEGRAPH AND TELEPHONE.

Senior II. 18 or 36 hours. PROFESSOR SHEPARDSON

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. Preparation: courses 1 and 3 E. E.

COURSE 10. ELECTROCHEMISTRY.

Senior II. 36 or 72 hours. PROFESSOR SHEPARDSON

Theoretical and experimental study of electrolysis, electrodeposition and electric furnaces.

COURSE 11. ELECTRICAL DESIGN.

Junior II. 72 hours MR. RYAN

Problems in designing circuits, electro-magnets and dynamos; complete working drawings and specifications to accompany each design. Preparation: courses 1 and 2 P., courses 1 and 2 E. E., course 11 M. E.

COURSE 12. ELECTRICAL DESIGN.

Senior I. 72 hours. MR. RYAN

Design of a dynamo or other problem as assigned. Preparation: courses 2 and 4, E. E.

COURSE 13. ELECTRICAL DESIGN.

Senior II. 108 hours. MR. RYAN

Designs, specifications and estimates for an electric light or power plant, or other approved problem. Preparation: courses 4 and 6 E. E.

COURSE 14. ELECTRICAL LABORATORY.

Junior II. 108 hours. ASSISTANT PROFESSOR SPRINGER

Tracing circuits and locating faults; measurements of resistance and insulation; calibration and use of instruments; operation and characteristic curves of dynamos and motors, courses 1 and 2 P courses 1 and 2 E. E.

COURSE 15. ELECTRICAL LABORATORY.

Senior I. 72 or 144; II, 108 hours. PROFESSOR SHEPARDSON

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 16. ELECTRICAL LABORATORY.

Senior I or II. 56, 72 hours.
PROFESSOR SHEPARDSON AND ASST. PROFESSOR SPRINGER
Efficiency tests and special problems.

COURSE 17. ELECTRICAL ENGINEERING MEASUREMENT.

Senior I, II. 72 hours. ASSISTANT PROFESSOR SPRINGER
Lectures and Laboratory work. Application of measurements to electrical engineering practice.

COURSE 18. PLANT OPERATION.

Senior I, II. 36 hours. MR. RYAN AND MR. DIXON
Practice in operation and care of boilers, engines, motors, and dynamos, battery and circuits of the University lighting plant.

COURSE 19. JOURNAL READING.

Senior I. 36 hours; II, 36 hours. PROFESSOR SHEPARDSON
Weekly discussion of current electrical periodicals. The class meets monthly with the Minnesota Branch of the American Institute of Electrical Engineers.

COURSE 20. ELECTRIC POWER.

Senior I. Civil, Mechanical and Mining Engineers, 72 or 108 hours.
ASSISTANT PROFESSOR SPRINGER AND MR. RYAN
Elements of theory and practice of electrical measurements, wiring, dynamos, motors and electric lighting. Twenty-four lectures and recitations and forty-eight or eighty-four hours laboratory. Preparation: course 1 P.

COURSE 21. DENTAL ELECTRICITY.

Senior I. Dentists. 27 hours. ASSISTANT PROFESSOR SPRINGER
Electrical and magnetic units; electrical instruments and measurements; electro-dental apparatus. Recitations and experimental lectures. Text-books: Shepardson, Electrical Catechism, and Custer, Dental Electricity.

COURSE 22. ELECTRICAL MEASUREMENTS OF PRECISION.

ASSISTANT PROFESSOR SPRINGER
Lectures and laboratory work. Precise measurements of resistance, voltage, current, self-induction and capacity; standardization of measuring instruments. Open to a limited number subject to approval.

COURSE 23. ILLUMINATING ENGINEERING.

PROFESSOR SHEPARDSON
Lectures and laboratory work. Investigation of performance of electric and gas lamps, reflectors and diffusers; luminous efficiency, distribution, color characteristics, physiological phenomena, methods of determining location, kind and quantity of lights for obtaining desired illumination.

COURSE 24. TELEPHONE ENGINEERING.

PROFESSORS SHEPARDSON AND EDDY
Lectures and laboratory work. Theoretical and experimental study of telephonic apparatus; lines and line phenomena, including induction, transpositions, loading coils, etc.

COURSE 25. ALTERNATING CURRENT PHENOMENA.

PROFESSOR SHEPARDSON
Lectures and laboratory work. Study of wave-forms, transient phenomena; oscillographic investigations; tests of apparatus.
Candidates for the degree of electrical engineer are required to take courses 1, 2, 3, 11, 13, 14, 15, also 68 hours class room work selected from courses 4 to 9.

Note.—*Electives* may be chosen from any courses given in the academic or engineering colleges for which the student has sufficient preparation. Attention is called to the following as desirable for electrical engineers:

Botany—Timber and timber diseases.

Chemistry—Quantitative analysis, fuel and gas analysis, electro-chemical analysis.

Civil engineering—Short course in surveying for seniors; masonry construction, structural details; hydraulic engineering; railway economics.

Drawing—Advanced work.

Electrical engineering—Any courses not taken as required work (except 20 and 21).

Geology—Mineralogy.

Language—English, French, German, Spanish.

Mathematics—Theory of turbines, hydraulic motors and wind engines; circular, hyperbolic and elliptic functions; wave theories of light, heat and electricity; directional calculus, vector analysis, differential equations, least squares.

Mechanical engineering—Measurement of power, air compressors and motors, shop work, heating and ventilation, machine design, railway technology, experimental laboratory, gas engines and producers

Physics—Advanced work on special problems.

Political science—Money and banking, corporation finance, public finance, modern industrial problems.

MILITARY SCIENCE AND TACTICS.

For the instruction in military drill and administration the students are organized into a corps of cadets, consisting of four battalions of infantry, a band 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 encouraged by allowing a year's drill to count as a two-hour credit for one semester, but no credit will be allowed for such drill for less than one year.

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 firearms.

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.

Buildings and Equipment

As an integral part of the University of Minnesota, the College of Engineering and the Mechanic Arts enjoys the advantages of the resources of the institution to the fullest extent. In addition to the University libraries and laboratories in which engineering students receive instruction, three buildings are devoted exclusively to the work of this college. The Mechanic Arts Building is used by the Department of Mathematics, the Department of Drawing, the Department of Civil and Municipal Engineering and the Experimental Engineering Laboratory. The Mechanical Engineering Department has an entire building devoted to its special work and the Electrical Engineering Department together with the Electric Light and Power Plant occupies a third building.

For information concerning methods of work and the equipment of the various departments the following condensed statements are offered:

CIVIL ENGINEERING.

Geodesy. For this work the department has a three hundred foot standard steel tape, astronomical transits and repeating theodolites, heliotropes, a telemeter, a deflection magnetometer, precise levels, two marine chronometers, one 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.

Laboratory. 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, stadia-transits, reduction charts and slide rules clinometers, pedometers, current-meters, compasses, 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 the engineering building where are to be found all of 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 and foreign periodicals relating to civil engineering. The files of the most important are bound and are of easy access to the students.

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 work which follows.

A thorough course is then given in the theory and practice of the more important professional lines, such as railroad and structural engineering and topography. Considerable time is devoted to hydraulics, municipal engineering, higher surveying and geodesy.

While theory is at all times made prominent it is always accompanied by practice according to the mehods 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 applica-

tions 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 shops a three-ton crane covers a clear span of 12 feet, the entire length of the shop, thus giving ample space for erecting. This crane also serves 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 have 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 the 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 3½x3½x5 feet, and one 3½x7x6 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 materials 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 pound and 100,000 pounds capacity, and three transverse testing machines are provided for determining 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; coal and gas calorimeters for determining the heating value of fuels, and apparatus for the analysis of flue gases.

The laboratory is also provided with 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 gage tester, for use in calibrating gages and other pressure indicators. In addition to the boilers in the university heating plant, there is 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 gages, calorimeters, tanks and pyrometers 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 pulsometer, and several steam pumps. The laboratory 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 large 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 has recently been erected and is available for experimental work.

This engine is provided with a condenser, and is arranged so that it may be run simple or compound, condensing or non-condensing, as desired. It thus constitutes 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.

Visits of inspection. During the year numerous visits are made to the manufacturing plants of St. Paul and Minneapolis, which have proven to be of great value in supplementing the class room work.

ELECTRICAL ENGINEERING.

The electrical engineering department and the University electric light and power plant are housed in a commodious building of slow-burning mill construction. The part of the building devoted exclusively to the work of the electrical engineering department of instruction is 80 feet long by 60 feet wide with two stories and full basement. In the basement are standardizing laboratory, electro-chemical laboratory, shop, battery room, toilet and stock rooms. On the first floor are the dynamo laboratory, high tension laboratory, research laboratories, instrument rooms and office. 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 currents at 500 volts and alternating currents at 220 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 for current, electromotive force and resistance, allows the frequent checking of instruments, so that students may work at 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 electro-plating and other electrolytic processes and for the formation and study of electric furnace products. Alternators, rotary converters, transformers, lamps, condensers, special apparatus and suitable instruments afford facilities for the experimental study of alternating currents. Telephone transmitters, receivers and accessories provide for practice in assembling and testing the ordinary telephonic apparatus and circuits and for investigation.

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 department 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 illustrating the treatment received by apparatus in commercial use and the necessity of careful design and construction. Free access is given to the private libraries and collections of the professors.

Instruction. The course aims to give the students a knowledge of phenomena and principles and the various applications of electricity, the methods and instruments used in measuring and transforming it, and practice in the design and operation of electrical apparatus. Practice and theory are taken together as far as possible. During the junior and senior years, students have daily work with electrical instruments and apparatus, and with commercial problems. Occasional inspection tours

among the extensive and varied electrical interests in Minneapolis and St. Paul furnish excellent illustration. 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 rules, 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.

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 electro-magnets 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 about six hundred 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 Mechanic Arts Building is a library consisting chiefly of books devoted to civil 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 mechanical engineering, electrical engineering and of physics have excellent collections of standard works which number over fourteen hundred volumes; the chemistry library contains over five hundred technical works; the drawing department has a collection of between one and two hundred volumes relating to drawing, architecture and design. The above number, upwards of four thousand volumes, comprising many works which are the private property of professors, are 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 profession. 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. The 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.

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 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 course in engineering—the work is merely distributed over a more extended pediod. 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 for the proposed engineering degree.

COURSES IN SCIENCE AND TECHNOLOGY.

FRESHMAN YEAR.

5 Mathematics, 1, 2, 3, 4 M.
4 English, 1, E.
3or5 French or German.
4 Chemistry or 3 History.
3 Military drill.

SOPHOMORE YEAR.

5 Mathematics, 5, 6, 7, M.
3 History or Chemistry (one year of chemistry is required).
6 Physics, 1a, 1b, P.
4, 5 Engineering drawing, 1a, 1b, 1c, D.
3 Military drill.

JUNIOR YEAR.

CIVIL ENGINEERING.

First Semester.		*Second Semester.*	
5	Mechanics, 1, E., M.	5	Mechanics, 2, E., M.
3	Physics, 2, P.	2	Engineering Drawing, 3a, D.
3	Engineering drawing, 2a, 3a, D.	4½	Topography, 19, 20, C. E.
3	Technological chem., 2, C.	2	Highways, 8, C. E.
4½	Topography, 17, 18, C. E.	2	Practical astronomy, 1, A.

MECHANICAL ENGINEERING.

First Semester.		*Second Semester.*	
5	Mechanics, 1, E., M.	5	Mechanics, 2, E., M.
3	Physics, 2, P.	2	Engineering drawing, 3b, D.
3	Engineering drawing, 2b, 3b, D.	4½	Shop practice, 1, 2, M. E.
3	Technological chem., 2, C.	3	Mechanism, 9, M. E.
4½	Shop practice, 1, 2, M. E.	2	Kinematic drawing, 10, M. E.
3	Stresses, 9, C. E.		

ELECTRICAL ENGINEERING.

First Semester.		*Second Semester.*	
5	Mechanics, 1, E., M.	5	Mechanics, 2, E., M.
3	Physics, 2, P.	2	Engineering drawing, 3b, D.
3	Engineering drawing, 2b, 3b, D.	4	Dynamos and Motors, 2, E. E.
3	Technological chemistry, 2, C.	3	Electrical lab., 14, E. E.
	Applied electricity, 1, 2, E. E.	3	Mechanism, 9, M. E.
3	Stresses, 9, C. E.	2	Kinematic drawing, 10, M. E.

SENIOR YEAR.

CIVIL ENGINEERING.

First Semester.		*Second Semester.*	
2	Water supply, 1, C. E.	3	Stresses, 9, C. E.
2	Curves and earthworks, 4, C. E.	3	Structural details, 10, C. E.
2	Machine design, 11, M. E.	3	Railway work, 6, C. E.
3	Stresses, 9c, E.	3	Sanitary engineering, 1, B. & B.
2	Least squares, 9, M.	3	Geology, 1, G.
2	Mechanical laboratory, 25, M. E.	4	Elective.
3	Electric power, 20, E. E.		

MECHANICAL ENGINEERING.

First Semester.		*Second Semester.*	
3	Thermodynamics, 3, E., M.	3	Steam engine, 18, M. E.
4	Machine design, 11, M. E.	4	Mech. lab., 26, 27, M. E.
2	Mechanical laboratory, 25, M. E.	4	Machine design, 11, 12, M. E.
4½	Shop practice, 3, 4, M. E.	2	Thermodynamics, 5, E., M., or Railway Mech. Eng., 35, M. E.
4	Electrical power, 20, E. E.	4½	Shop practice, 3, 4, M. E.
1	Steam boilers, 17, M. E.		

ELECTRICAL ENGINEERING.

First Semester.		*Second Semester.*	
3	Thermodynamics, 3, E., M.	3	Steam engines, 18, M. E.
3	Alternating currents, 3, E. E.	2	Mech. lab., 26, M. E.
4	Machine design, 11, M. E.	2	Machine design, 11, M. E.
2	Mech. lab., 25, M. E.	2	Electrical design, 11, E. E.
4½	Shop practice, 3, 4, M. E.	3	Alternating currents, 3, E. E.
1	Steam boiler, 17, M. E.	4½	Shop practice, 3, 4, M. E.

POST SENIOR YEAR.

CIVIL ENGINEERING.

First Semester.		*Second Semester.*	
3	Masonry, 12, C. E.	5	Structural design, 11, C. E.
5	Structural design, 11, C. E.	3	Geodesy, 21, C. E., or Concrete, 13, C. E.
2	Experimental laboratory, 14, C.E.	2	Political science, 2, P. S.
2	Railway economics, 7, C. E.	2	Elective.
2	Political science, 1, P. S.	2	Contracts and specifications, 1, 2. C. & S.
6	Elective.	5	Thesis.

MECHANICAL ENGINEERING.

First Semester.		*Second Semester.*	
4	Steam engine design, 13, M. E., or	2	Contracts and specifications, 1, 2, C. & S.
4	Gas engine design, 13, M. E.	4	Machine or railway design, 14, or 34, M. E.
2	Mechanical engineering, 23, M. E.	4	Mechanical laboratory, 30, M. E.
2	Mechanical laboratory, 29, M. E.	2	Political science, 2, P. S.
2	Political science, 1, P. S.	4	Elective.
8	Elective.	5	Thesis.
	Thesis.		

ELECTRICAL ENGINEERING.

First Semester.		*Second Semester.*	
2	Electrical engineering, 4 to 9, E. E.	2	Contracts and specifications, 1, 2, C. & S.
2	Electrical laboratory, 15, E. E.	3	Electrical design, 13, E. E.
3	Mechanical laboratory, 28, M. E.	3	Electrical laboratory, 15, E. E.
2	Political science, 1, P. S.	2	Electrical engineering.
10	Elective.	2	Political science, 2, P. S.
	Thesis.	4	Elective.
		5	Thesis.

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.		SOPHOMORE YEAR.	
5	Mathematics.	3or4	History, Chemistry or Language.
4	English.	5	Mathematics.
3or5	French or German.	3or5	Physics.
4	Chemistry or 3 History.	4or5	Engineering drawing.
3	Military drill.	1	Rhetoric.
		3	Military drill.

JUNIOR YEAR.

First Semester.		*Second Semester.*	
5	Mechanics.	5	Mechanics.
3	Physics.	3	Physics.
3	Engineering drawing.	2	Engineering drawing.
2	Technological chemistry.	3	Mechanism or
4	*Chemistry.*	3	Surveying.
		4	*Chemistry.*
		2	Mechanical laboratory.

SENIOR YEAR.

3	Thermodynamics, or	4	Dynamos and motors.
4	Mineralogy.	3	Thermodynamics, or
3	Applied electricity, or	3	Geology.
3	Electric power.	3	Steam engines, or
3	*Physics.*	2	Highways.
4	Political science.	3	*Physics.*
4	Elective.	4	Political science.
		4	Elective.

The required subjects are printed in Roman type; the electives, printed in italics, may be replaced by others selected from the general list.

DEPARTMENT OF AGRICULTURE

THE COLLEGE OF AGRICULTURE

Faculty

THE FACULTY

CYRUS NORTHROP, LL. D., *President.*
E. W. RANDALL, *Dean.*
SAMUEL B. GREEN, B. S., *Professor of Horticulture and Forestry.*
HARRY SNYDER, B. S., *Professor of Agricultural Chemistry and Soils.*
T. L. HAECKER, *Professor of Dairy Husbandry.*
M. H. REYNOLDS, M. D., V. M., *Professor of Veterinary Medicine and Surgery.*
ANDREW BOSS, *Professar of Agriculture and Animal Husbandry.*
FREDERICK L. WASHBURN, M. A., *Professor of Entomology.*
D. D. MAYNE, *Principal of School of Agriculture, Agl. Pedagogics.*
FANNIE C. BOUTELLE, *Preceptress, Domestic Economics.*
E. M. FREEMAN, M. S., *Professor of Vegetable Pathology and Botany.*
WILLIAM BOSS, *Professor of Farm Structures and Farm Mechanics.*
JOHN A. HUMMEL, B. Agr., *Assistant Professor of Agricultural Chemistry.*
C. P. BULL, B. Agr., *Assistant Professor of Agriculture.*
D. A. GAUMNITZ, M. Agr., *Assistant Professor of Animal Husbandry.*
C. C. LIPP, D. V. M., *Assistant Professor of Physiology and Veterinary Medicine.*
E. G. CHEYNEY, B. S., *Assistant Professor of Forestry.*
S. B. DETWILER, B. S., *Assistant Professor of Forestry.*

INSTRUCTORS

J. A. VYE, *Farm Accounts.*
J. M. DREW, *Blacksmithing, Poultry.*
JUNIATA SHEPPERD, M. A., *Domestic Science.*
MARGARET BLAIR, *Domestic Art.*
A. L. EWING, M. S., *Agricultural Physics.*
A. G. RUGGLES, M. A., *Entomology.*
A. D. WILSON, B. Agr., *Agriculture.*
E. C. PARKER, B. Agr., *Agriculture.*
LE ROY CADY, B. Agr., *Horticulture.*
A. E. WILHOIT, M. A., *Soils.*
W. H. TOMHAVE, B. Agr., *Animal By-Products.*
W. L. BEEBE, D. V. M., *Bacteriology.*
W. H. FRAZIER, B. S., *Agricultural Chemistry.*

In the College of Agriculture, three regular courses of study are offered: A course in agriculture, a course in forestry, and 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 freshmen class in the courses in the College of Agriculture; the former to Division "A," and the latter to Division "B."

Agricultural students taking 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.

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 equivalent to 128 credit hours, together with such practical experience as may be required by the committee on college course, students in the course in agriculture will be recommended for graduation with the degree of Bachelor of Science in Agriculture and students in the course in home economics with the degree of Bachelor of Science in Home Economics.

Students in the course in Forestry after completing the prescribed course of study, equivalent to 158 credit hours, will be recommended for graduation with the degree of Bachelor of Science in Forestry.

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.

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 also within the Graduate School. They 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 or in the College of Engineering and Mechanics Arts. Graduate students registered in the Graduate School may take one or both of their minor subjects in the College of Agriculture.

I. The degree of Master of Science in 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 in accordance with the requirements of the Graduate School.

II. All general regulations of the Graduate School 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 Science will be conferred by the Graduate School for study in 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 prescribed by the faculty of the graduate school.

FEES

All students in the college, who are residents of the state of Minnesota, 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.

LIBRARY

The Library of the College of Agriculture contains between 10,000 and 11,000 carefully selected volumes and a large number of pamphlets, bulletins, and reports which are unbound.

Each department connected with the school and college aids in bringing together all valuable material, and students will find every inducement to pursue an extended reading course in connection with their class work. The library also contains a small but well selected number of the standard works in English and American literature, and is well provided with general reference books, general technical periodicals. The card catalog of author and subject aids greatly in the use of the books which are all classified by the Dewey Decimal Classification. Those in charge are always pleased to assist students and aim to make the library a center for all agricultural research study.

The library is located in the new Main building. The rooms are well lighted and attractive.

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 agricultural 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 drawing, geology, German, French, rhetoric, botany, zoology, psychology, English literature, economics, and education 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.

The classes in the College of Agriculture begin with the opening of the regular University year (for which see calendar) except the Freshman class which begins Monday, Sept. 9, and closes Saturday, June 1.

AGRICULTURE

Equipment. The equipment for instruction in agriculture consists of the following: Special laboratories and class rooms with modern apparatus for all courses, collections of classes and varieties of all field and weed seeds; herbariums of weeds and grasses indigenous to the state; a germinating room which affords opportunity for a study of the vitality and strength of seed; charts and models of various details of crops together with bulletins on farm management, the cost of crop production,

and other pertinent topics supplement the daily lectures; machinery used on University farm and generously loaned by the firms of the Twin Cities which afford valuable subjects for instruction work. The fields and plots of the Experiment grounds offer additional "laboratories" and studies for use in class work. The student's home and farm is at all times made the basis of his particular study.

The State Grain Inspection department, elevators, mills and adjoining farms of the Twin Cities and vicinity furnish a study for the merchandizing of grains and the planning of farms. An agricultural museum, now being equipped, will contain much material that will be instructive and historic, and serve to show the close relation of agriculture and the modern industries.

Standard references upon agriculture are provided for an exhaustive study of any branch of this subject and original research is a prominent factor of the agricultural course.

AGRICULTURAL CHEMISTRY AND SOILS

Equipment. A special laboratory with modern apparatus for the analysis of soils, foods and agricultural products is provided. The equipment contains an experiment 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. 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. Standard reference books and journals, including Jahresbericht der Agrikultur Chemie, Coptes Rendus, Biedermann's Centralbatt, 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.

ANIMAL HUSBANDRY

Equipment. Representatives of some of the leading breeds of cattle, sheep and swine are kept at University farm, and 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. Each year a number of experiments are under way in the feeding of these classes of animals. 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 live stock building affords excellent accommodations for class work in stock judging.

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.

ENTOMOLOGY

Equipment. Well lighted laboratories with modern equipment are at the disposal of college students for both undergraduate and graduate work. Instruction is further aided by an excellent series of charts and lantern slides. The department is well equipped with museum specimens convenient to the lecture room, showing not only a large series of insects injurious and otherwise, but also many birds and other animals which have a direct bearing upon agriculture.

In economic work the student is brought into direct contact with spraying apparatus and insecticides. Practical work in bee keeping is offered in our apiary, and experiments in insect life can be carried on by advanced students in the insectary at nearly all seasons of the year.

FARM STRUCTURES AND FARM MECHANICS

Lectures and practicums in designing and construction of farm houses, farm barns, silos, out-buildings and conveniences; cement floors, walls, troughs; farm water systems, wells, cisterns, tanks house heating and plumbing systems, and in painting farm buildings.

Equipment. Students taking this subject have the advantage of many practical examples in designing and constructing farm buildings.

The buildings on the campus, such as farm house, barns, dairy buildings, greenhouses, live stock pavilion, sheep barns, swine barns, silos, the water, sewer and heating systems are available for this work.

Many new residence buildings being erected in the vicinity of the campus afford excellent opportunities for special studies in modern house construction.

The aim is to fit the student to be able to design, estimate the cost of and construct such buildings as are best adapted to meet farm conditions.

HORTICULTURE

Equipment. The work of the experiment station in Horticulture is carried on on a tract of land consisting of about twenty acres, devoted to orchard and ornamental planting. The legislature of 1907 provided $16,000 for the purchase of a fruit breeding farm which will probably be bought at an early date.

The campus of the School of Agriculture is planted out with a collection of trees, shrubs and herbaceous plants suitable for this section, the specimens of which are labeled with their common and botanical names. The parks, greenhouses, orchards and nurseries of the near vicinity afford convenient and satisfactory illustrations of the best commercial methods and ornamental planting. Our facilities in this line are unexcelled perhaps by any other college in this country.

The greenhouses, laboratories and class rooms of the Division of Horticulture are well equipped with modern apparatus. The Division library contains a large number of horticultural works and is further supplemented by a card index to all its literature.

VETERINARY MEDICINE AND SURGERY

Equipment. The veterinary building gives ample facilities for laboratory and clinical work. The hospital furnishes a variety of cases for study and demonstration and the dissecting room affords material and opportunity for studying the digestive organs and locomotor apparatus. A large and well stocked museum contains ample material for illustration.

Instruction is given by text-books, 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 locomotion, conformation, the digestive organs, and the higher physiology of digestion are given prominence.

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.

COURSE IN FORESTRY

The course in Forestry is a four-year course intended to prepare men to take charge of private forest properties or for the government forestry service, or for positions as teachers. It leads to the Degree of Bachelor of Science in Forestry.

The first year in this course, for those who enter other than from the Minnesota School of Agriculture deals with the elementary agricultural subjects with which it is important for every manager of rural properties to be familiar. The forester is largely thrown upon his own resources and should be capable of advising as to the best way of managing the farms or grazing lands that are always included in large forest properties. The sophomore, junior and senior years include besides the course in technical forestry, courses in the College of Science, Literature and the Arts in all the auxiliary sciences which bear upon forestry in any way.

Special emphasis is laid on the value of field work and excursions. Every student is required before graduation to take four weeks' work in some lumber camp, so as to become familiar with common lumbering operations. There will also be excursions to near by forests, to lumber camps, saw mills, wood manufacturing and paper mills; to the Boom Company's work on the Mississippi river; to near by 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.

Equipment. The vast lumbering operations in the northern part of the state offer the best opportunities for a study of that branch. The establishment of the Chippewa Forest Reserve and its management by the Forest Service give opportunities which few other sections possess to study the best methods of forest management. The State has twenty-one thousand acres of timber to be used as a forest and game preserve, on which student help will be largely used. Itasca State Park, 22,000 acres in extent, is used by the Forestry School as a demonstration forest and experiment station. Every student spends about twelve months in the park during his course and does practical work in all branches. The use of this park gives the Minnesota Forestry School a forest equipment which is unsurpassed anywhere.

Throughout the year, special lectures will be given by the State Forestry Commissioner, the State Game Warden, the State Fish Commissioner and prominent lumbermen and lumber manufacturers of Minneapolis and St. Paul. This touch with the commercial side of the lumber business is very important and the situation of the school makes it possible to offer a great deal of it. Other special lectures will be presented as opportunity offers.

COURSE IN HOME ECONOMICS

The course in home economics offered in the College of Agriculture is open to graduates from the School of Agriculture who have taken the work of the intermediate year, and to graduates of approved high and normal schools. It 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 in collective housekeeping. A four-year course is offered in home economics, leading to the degree of Bachelor of Science in Home Economics.

In addition, a short two-year normal course (page 1) is offered in home economics, which includes all the special technical subjects given in the four-year course in the College of Agriculture at the University Farm, but does not include the required general cultural studies which are given in the College of Science, Literature and the Arts. Those who complete this course receive a certificate.

Graduates of other reputable colleges can here secure a Bachelor's degree by devoting two years to the subject of Home Economics. The major work must be done in Home Economics and one or both of two minors must be completed under the advice of the college committee in one of the other divisions of the College of Agriculture, or in the College of Science, Literature and the Arts. When aproved by the dean and college committee, other subjects given in these colleges may be submitted 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' credit in music and art together.

DOMESTIC ART

This course is planned to give students a thorough training in all those branches which bear upon the decorating and furnishing of the home and upon the healthfulness and appropriate clothing of the body. It is intended to develop independence and resourcefulness in the creation of beautiful surroundings through a familiarity with the scientific, economic and artistic principles governing the material shaping of the household to the needs of its occupants. Architecture is studied in relation to the practical needs of the home as well as the economical and tasteful arrangement of the interior of the house and its furnishings. The underlying principles of true decorative art are emphasized—those principles which

embody taste rather than a great expenditure of money. The same principles are applied to the clothing of the body and to all departments of design, whether for dress, furniture or decoration.

The course is not confined to sewing or actual home adornment but covers a number of branches of hand work connected with the home and adapted to the public schools and to industrial education. Needle work, leather work, pottery, weaving, basketry, rug making, crocheting and knitting are included. Each subject is considered in its simplest form for teaching very young children and in its possibilities of greater skill for more advanced grades.

Equipment. The instruction in domestic art is given in the Administration building of the Department of Agriculture. Two large class rooms, a lecture room, a museum and rooms for special work are provided. The class rooms are commodious and especially equipped for instruction in sewing, garment drafting and the study of textile fabrics. The museum contains collections for the study of household art, including useful and ornamental materials for the home, and collections illustrating the quality of fabrics as affected by manufacturing. The museum is also used as a laboratory for advanced students.

OUTLINE OF COURSE IN AGRICULTURE.

(Numbers after subjects indicate hours per week.)

FRESHMAN YEAR.

DIVISION "A."

For graduates of the School of Agriculture.

FIRST SEMESTER.	SECOND SEMESTER.
Mathematics, [3]	Mathematics, [3]
German, [5]	German, [5]
Botany or Zoology (long) [6]	Botany or Zoology (long) [6]
Geology, [3]	Drawing I. [4]
Rhetoric, [3]	Rhetoric, [3]
Hort. and Dairy Practicums [3]	Hort. and Dairy Practicums [3]
Military Drill, [2]	Military Drill, [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 description of these courses see statement under School of Agriculture.

FIRST HALF OF FIRST SEMESTER.

Farm development, [3]	Entomology, [3]
Forestry, [3]	Fruit Growing, [3]
Dairy Chemistry, [3]	Library Classification, [5]
Carpentry [4]	Field Crops [4]

AGRICULTURAL SCHOOL YEAR.

FIRST TERM.

Dairy Husbandry, [3]
Breeding, [2]
Agricultural Chemistry, [5]
Fruit Growing [3]
Veterinary, [2]
Entomology, [5]
Physics, [5]
Forestry, [3]
Military Drill, [2]
Gymnasium, [2]
Carpentry [4]

SECOND TERM.

Dairy Husbandry, [3]
Feeding, [2]
Soils and Fertilizers, [5]
Vegetable Gardening, [3]
Veterinary, [2]
Study of Breeds, [5]
Drawing [4]
Economics, [3]
Blacksmithing [4]
Military Drill, [2]
Gymnasium, [2]
Farm Accounts, [4]

LAST HALF OF SECOND SEMESTER.

Chemistry, [3]
Poultry, [3]
Farm Accounts, [4]
Blacksmithing [4]
Plant Propagation, [4]
Farm Machinery [4]
Farm Development, [3]
Stock Judging, [2]
Live Stock Practicums, [2]
Field Crops, [4]
Drawing, [4]
Veterinary, [2]

SOPHOMORE YEAR.

Botany or Zoology, long, (A) [6]
Botany or Zoology, long, (A) [6]
Botany, short, (B) [6]
Zoology, short, (B) [6]
Scientific German or French, [3]
Chemistry, [3]
Agricultural Physics, [3]
Rhetoric, [1]
Agricultural and Animal Husbandry Practicums [4]
Military Drill, [2]

JUNIOR YEAR.

FIRST SEMESTER.

Industrial Botany, [6]
Foods, [2]
Thremmatology, [3]
Taxonomy, (B), [6]
Agricultural elective, (A), [3]
Academic elective, [3]
Principals of Feeding, [3]

SECOND SEMESTER.

Plant Pathology, [3]
Soils and Fertilizers, [4]
Farm Management, [3]
Veterinary elective, [2]
Taxonomy, (B), [6]
Farm Structures I. [3]

SENIOR YEAR.

Field Crops, [2]
Farm Structures I. [2]
Comparative Physiology, [3]
Elective, [3]
Elective, [3]
Elective, [3]
Stock Judging, [3]
Agricultural elective, [3]
Horticultural elective, [3]
Elective, [3]
Elective, [3]
Elective, [3]

JUNIOR AND SENIOR ELECTIVES.

AGRICULTURE.

Animal taxonomy.
Greehouse management and floriculture.
Animal Breeding.
Plant breeding (Horticulture).
Plant breeding (Agriculture).
Agricultural Engineering.
Dairy management.
Chemistry III, VII, VIII, laboratory.
Chemistry IV, V, lectures.
Diseases of animals.
Bacteriology.
Economic Entomology.
Field crops and seeds.
Agricultural Economics.
Bibliography of agricultural literature.
Research (dairy, animal husbandry, horticulture, agriculture.)

ACADEMIC.

Botany.
Economics.
Literature.
Geology.
Psychology.
History.
Education
Rhetoric.

ANIMAL HUSBANDRY

Students who wish to specialize in Animal Husbandry are recommended to arrange their courses in the Junior and Senior years as follows, and, in addition, elect the long course in zoology and the short course in botany.

JUNIOR YEAR.

Zoology, (long) [6]
Meats and judging, [3]
Thremmatology, [3]
Principles of Feeding, [3]
Elective, [3]
Elective, (animal husbandry) [3]

Zoology, (long) [6]
Stock Breeding, [3]
Elective, (animal husbandry) [3]
Farm Structures I. [3]
Elective, [3]
Elective, [3]

SENIOR YEAR.

Animal feeding, [3]
Farm Structures II. [3]
Animal Husbandry Research, [3]
Comparative Physiology, [3]
Academic Elective, [3]
Elective [3]

Veterinary Elective, [2]
Animal Nutrition Studies, [3]
Animal Husbandry Research, [3]
Academic Elective, [3]
Elective, [3]
Elective, [3]

JUNIOR AND SENIOR ELECTIVES.

Anatomy.
Dissection.
Stock Judging.
Agricultural Economics.
Foods.
Stock Farm Management.
Animal Taxonomy.
Home Dairying.

Dairy Stock and Dairy Farm Management.
Diseases of Animals.
Animal Mechanics.
Stock Records and Compilations.
Bibliography of Agr. Literature.
Field Crops and Seeds.
Animal by-products.
Advanced Meats and Judging.

OUTLINE OF COURSE IN FORESTRY.

(Numbers after subjects indicate number of hours per week.)

FRESHMAN YEAR.

Same as Freshman year in the Course in Agriculture.

SOPHOMORE YEAR.

FIRST SEMESTER.

Botany, [6]
Rhetoric, [1]
Zoology, [6]
Elements of Silviculture, [3]
German I, [5]
Geology I, [3]
Physics [1½]
Drill, [2]
Drawing, [4]

SECOND SEMESTER.

Botany, [6]
Rhetoric, [1]
Zoology, [6]
Trigonometry, [3]
German I, [5]
Economics IX, [3]
Physics [1½]
Drill, [2]
Drawing, [4]

JUNIOR YEAR.

FIRST SEMESTER.

Taxonomy, [6]
Economics, [3]
Lumbering, [3]
Protection, [3]
Chemistry V and VIIb, [3]
German III, [3]
Forest Entomology, [3]

FEBRUARY TO APRIL.

Land Gard. [3]
Carpentry [4]
Lumber Grading [3]
Plant Propagation [3]
Diseases of Horses [3]

ITASCA PARK—APRIL TO SEPTEMBER.

Seeding.
Surveying.
Mensuration.
Road Building.
Thinning.
Packing.

SENIOR YEAR.

FIRST SEMESTER.

Working Plans, [3]
Utility, [3]
Physiography, [3]
Dendrology, [6]
Law of Contracts, [3]
Forest Literature, [3]
Forest Management and Economics, [3]

SECOND SEMESTER.

Taxonomy, [6]
Chemistry IX, [3]
German III, [3]
Petrograhy, [3]
Dendrology, [6]
Economics IV, [3]
Ecology, [6]

OUTLINE OF COURSE IN HOME ECONOMICS.

(Numbers after subjects indicate number of hours per week.)

FRESHMAN YEAR.

DIVISION "A."

Required of those who are graduates of the School of Agriculture only.

FIRST SEMESTER.

Mathematics, [3]
Geology, [3]
German or French, [5]
Rhetoric, [3]
Drawing I. [4]
Physical Training, [2]
Domestic Science or Domestic Art Practicums, [3]

SECOND SEMESTER.

Mathematics, [3]
Chemistry I. a., [3]
German or French, [5]
Rhetoric, [3]
Designing, [4]
Physical Training, [2]
Domestic Science or Domestic Art Practicums, [3]

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 description of these courses, see statement under School of Agriculture.

SEPTEMBER.

Agriculture, [3]
Dairy Chemistry, [3]
Fruit Growing, [3]
Library Classification, [5]
Cooking, [4]
Laundry Work, [4]
Sewing, [4]
Free Hand Drawing, [4]

AGRICULTURAL SCHOOL YEAR.

FIRST TERM.

Dairying, [4]
Agricultural Chemistry, [3]
Fruit Growing, [3]
Entomology, [5]
Physics, [5]
Forestry, [3]
Drawing [4]
Physical Culture, [2]
Cooking, [4]
Social Culture, [1]
Sewing, [4]
Household Art, [2]

SECOND TERM.

Vegetable Gardening, [3]
Domestic Chemistry, [3]
Free Hand Drawing, [4]
Dairy Husbandry, [4]
Economics, [3]
Cooking, [4]
Home Economy, [2]
Sewing, [4]
Meats, [1]
Domestic Hygiene, [1]

LAST HALF OF SECOND SEMESTER.

Farm Accounts, [4]
Poultry, [3]
Chemistry, [3]
Designing, [4]
Home Economics, [3]
Household Art, [3]
Home Hygiene, [1]
Bacteriology, [1]
Cooking, [4]
Sewing, [4]
Meats, [3]
Vegetable Gardening, [3]

SOPHOMORE YEAR.

FIRST SEMESTER.

Chemistry I. B., [3]
German or French, [3]
English Literature, [3]
Botany short, [6]
Zoology short, [6]
Elective, [3]

SECOND SEMESTER.

Chemistry II, [3]
German or French, [3]
Elements of Psychology, [3]
Botany short, [6]
Zoology short, [6]
Elective, [3]

JUNIOR YEAR.

Domestic Economics I, [3]
Domestic Economics II, [3]
Domestic Science I, [4]
Domestic Art I, [4]
History of Education, [3]
Chemistry III, [3]
Bacteriology, [1]
Domestic Science III, [4]
Domestic Art II. [3]
Chemistry IV, [3]
Chemistry VI b, [3]
History of Education, [3]
Farm Structures [3]
Elective, [3]

SENIOR YEAR.

Domestic Economics III, [3]
Psychology, [3]
English Literature, [3]
Physiology, [3]
Drawing II. [3]
Elective, [3]
Domestic Economics III, [3]
Floriculture, [3]
Practice Teaching, [3]
Domestic Science II, [4]
Domestic Art IV, [4]
Elective, [3]

NORMAL COURSE.

FIRST YEAR.

(Same as Freshman year, Division "B," of course in Home Economics.)

SECOND YEAR.

FIRST SEMESTER.

Domestic Economics I, [3]
Domestic Economics II, [3]
Domestic Science I, [4]
Domestic Art I, [4]
Bacteriology, [1]
Rhetoric, [1]
Botany short, [6]
Psychology, [3]
Chemistry I. b, [3]
Practice Teaching, [3]

SECOND SEMESTER.

Domestic Science II, [4]
Home Economics, [3]
Domestic Art III, [3]
Domestic Art IV, [4]
Drawing, [4]
Rhetoric, [1]
Botany short, [6]
Child Psychology, [3]
Chemistry IV, [3]
Practice Teaching, [3]

AGRICULTURE.

Unless otherwise specified all courses continue throughout one semester and are three credit hour courses.

Course I. Field Crops and Seeds. Senior II. Bull.
Students registering for the course must have had at least one year's work in University Botany. The course is outlined to occupy two lecture periods and two laboratory periods per week.

(*a*) ***Seeds: their identity and value.***
In this course the students are made acquainted with the physical botany, the uses, identification, vitality, testing, grading and judging of all classes of field seeds. Special attention is given to the reproducing value of seeds of various grades of grains and to the importance of testing. A thesis upon some phase of the subject of seeds is required for full credit.

(*b*) *Field Crops: their structure and use.*
In this course are considered the botany, cultivation, and economic value of the various cereal, forage, root, fiber, sugar and miscellaneous crops. Special attention is given to the subjects of meadows, pastures, soilage crops, and to the production and preservation of all kinds of dry cured and ensilaged crops.

Course II. Thremmatology. Junior I. Bull.

Heredity, variation, law 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.

Course III. Plant 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 IV. Agricultural engineering. Elective II. Wilson

Subduing prairie and timber soils, land drainage, farm land mensuration and surveying; irrigation and irrigation works; roads, their location, maintenance, laws and construction, financial support; farm fences, buildings, implements and machinery.

Course V. Agricultural economics. Elective II. Parker

Labor, farm finances, markets, rentals, agricultural statistics, production, exports, wages, land laws, ownership, taxes, organizations.

Course VI. Farm management. Junior II. Wilson

In this course are considered the planning of farms, crop rotation, tillage, and systems of farming. Special attention is given to revising and drafting farm plans and to arranging economic crop rotations, and application of business methods to farm operations.

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 AND SOILS.

Course I. (a) *General agricultural chemistry.*
[One-half semester.] Freshman II. Wilhoit

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.

Course II. Agricultural qualitative analysis. . Sophomore II. Wilhoit

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 principles 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. Elective I. Snyder

An elementary course in quantitative 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 phosphorus 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. Human and animal foods.
[One-half semester.] Junior I. Snyder

Lectures. This course treats of the composition, digestibility and nutritive value of human and animal foods. The chemistry of plant growth, particularly the factors which influence their composition and nutritive value, forms an essential part of this course. The processes employed in the preparation of foods as the milling of wheat and other cereals, the economic uses of human and animal foods, the comparative value of foods, and the methods employed in nutrition investigations, particularly in proteid and carbohydrate metabolism and the losses of energy from the body are studied. Dietary studies, the cost of foods, and influence of different methods of preparation upon their nutritive value are also included in the work. It is the object of this course to familiarize the student with the fundamental principles of nutrition and the use of the literature upon the subject. Special attention is given to the economic production of foods and their utilization for human and animal food purposes.

(This course is given only in alternate years. Given during the last half of the second semester 1909.)

Course V. Soils and fertilizers. [One-half semester.] Junior II. Snyder

Lectures. This course treats of the relation of soils and their fertility to the production of crops, and includes a study of the sources of plant food and the influence of tillage and manures upon the chemical and allied physical and biological changes which take place in the soil in rendering plant food available. Rock disintegration and soil production, the various types of

soil formed from different kinds of rocks and their agricultural value, and the inherent fertility of soils form an essential part of the work. The control of the water in the soil, soil solutions, and leachings, the presence of injurious acid compounds, and alkaline salts, the various methods employed for the improvement of soils, soil organisms and their influence upon fertility, the organic compounds of the soil and the part which they take in soil fertility, the increase and decrease of the organic matter and the nitrogen of the soil as influenced by different methods of farming, manures, and the causes of soil exhaustion and means employed, the analyses of soils, and the application and interpretation of the results, uses of commercial fertilizers and green and farm fertilizers for conservation of fertility, adaptability of crops to soils and rotation of crops as affecting the fertility of the soil are some of the topics discussed. Soil judging, rating, and scaling form a part of the work.

(This course is given in alternate years; given in the last half of the second semester 1908.)

(Courses I., II. and III. are required as preparatory work for courses VI. and VII.)

Course VI. The analysis of foods. *I. or II. Elective. Snyder*

This work includes the determination of water, ash, starch, sugar, cellulose, pentosans, fats, proteids. and the different forms of nitrogen in food stuffs, the use of the calorimeter, and the polariscope in food analysis. Before completing the work, each student makes a complete proximate analysis of some food material. This course is planned to meet the wants of those who desire to become familiar with the methods employed in the analysis of foods and in nutrition investigations.

(*b*) *Analysis of dairy and animal products. II.* [One-half semester.]

This course includes the analysis of fodders, milk, butter, cheese, and animal feces. Special features of the course are the determinations of volatile fatty acids, iodin absorption, specific gravity, and the saponification equivalent of fats. The object of this course is to meet the wants of those who desire to become familiar with the methods of investigations employed in research in dairy chemistry.

(*c*) *The technical analysis of wheat flour and cereals.* I or II.

The study of the roller process of flour production, the grading and testing of wheat for technical purposes, the testing of flour by chemical methods and the bread making value of flour as determined by comparative baking tests. Ample facilities are offered for this work as the laboratory is equipped with a complete miniature flour mill capable of producing the various grades of flour.

Course VII. The analysis of soils and fertilizers.

(*a*) *The chemical analysis of soils.* Elective. Snyder and Wilhoit.

Laboratory practice in the chemical analysis of soils and the study of the chemical methods employed in soil investigations. Particular attention is given to the study of the organic compounds of soil, and an opportunity is offered for the study of experimental soil work applied to field investigations.

(*b*) *The physical analysis of soils.* Junior I. [One-half semester.]

Laboratory practice in the physical analysis of soils by means of Hilgard's elecutrator, 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.

Course VIII. Special problems. Elective. Snyder, Hummel and Wilhoit.

Seminar and laboratory work in the study of special problems in Agricultural Chemistry, as the analysis of water for irrigation purposes, the adulteration of foods, dietetics, and problems in agricultural technology.

Course IX. Chemistry of forest by-products. Senior II. Hummel.

In this course a special study is made of the products of the for-

est other than for timber and fuel. The products studied include cellulose for the manufacture of paper, sugar, tanning materials, turpentine, tar, oils, resin, waxes, gums, creosote, wood alcohol, acetic acid, acetone, essential oils, charcoal, camphor, and medicinal products. The subjects of paint and methods for the preservation of wood are also taken up.

At the beginning of the course, a short time is devoted to a review of organic chemistry, special attention being given to those compounds found in wood or closely related to it. A thesis on some subject relating to the chemistry of forest byproducts is required in this course.

Course X. Domestic Chemistry and Dietetics. Elective. Snyder. [One-half semester.]

Lectures given every two years; given the second semester of 1908.

ANIMAL BIOLOGY.

I. *General Zoology.*

I, II. 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.

I. *Zoology.* Extension of course I.

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.

III. *Histology.*

Prerequisite, course I, II.

Lectures, quizzes, references and laboratory work, five or six hours a week.

(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: Szymonowics-MacCallum. A Text-Book of Histology and Microscopic Anatomy; Bohm and Davidoff-Huber, Text-book of Histology; Schneider, Lehrbuch der vergleichenden Histologie der Tiere; Oppel, Lehrbuch der vergleichenden mikroskopischen Anatomie der Wirbelthiere; Hertwig, Zelle und Gewebe; Wilson, The Cell; and others.

VII. *Taxonomy.*

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

(a) Systematic Entomology.

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

(b) Ichthyology.

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

(c) Ornithology.

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

VIII. *Physiology.*

Open to all juniors and seniors. Lectures, text-book and demonstrations.

This course will alternate with course IX. It will be offered during 1908-9 and not during 1909-10.

ANIMAL HUSBANDRY.

Course I. Stock breeding. Junior II. [First half semester.] Boss

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; prepotency, 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. Principles of feeding. Junior I. [Last half semester.] Boss

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. Elective I. Gaumnitz.

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 of 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 standpoint 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 percentage of different parts of the carcasses.

Course IV. Stock farm management. .. Elective I. Wilson.

In this course, special attention is given to the crops and rotations that fit in with live stock farming, economy of feeds and pasture production, and solution of confronting problems is made the leading feature.

Course V. Animal nutrition studies. Senior II. Boss and Gaumnitz. [First-half semester.]

Original work in solving some special live stock problems related to meat production followed by a thesis; sufficient work must have been done to make it reliable.

Course VI. Animal husbandry research. Elective I or II. Boss.

This course will consist of reviewing literature upon different phases of animal husbandry production. The experiment station records and other sources of information will largely be used. This together with original work will form the basis of extended compilation of valuable material on live stock husbandry.

Course VII. Meats. Freshman II. [Last-half semester.] Boss.

A continuation of studies in meats as outlined in the school course. Supplemented by dissection and studies of muscular structures of various kinds of meats.

Course VIII. Meats and judging. Junior I. Gaumnitz.
This course is designed especially for studying meat making animals and their products. Under general guidance each student makes up rings of animals which he studies in detail, at every step from the live state until the different parts are cooked and tested at the table. Full records and conclusions as well as illustrations are required in thesis form.

Course IX. Advanced meat studies and judging. Elective II. Gaumnitz.
Work along this line is a continuation of that begun in course VIII. More attention is given the more important details concerning meat and a minute study of its physical and chemical compositions is required.

Course X. Stock records and compilation. Elective I or II. [One-half semester.] Boss and Gaumnitz.
This will consist of a thorough study of systems of keeping and compiling stock records upon stock farms and at Experiment Station. Sufficient actual practice will be required to become familiar with live stock records.

Course XI. Animal by-products. Elective II. [Last-half semester.] Boss and Tomhave.
Individual study of the by-products manufactured at the large packing houses will be required of each student. The value and place that each has in economic use is considered.

Course XII. Animal mechanics. Elective II. [One-half semester.] Gaumnitz.
A study of the mechanical effects of different relationships of bone and muscle in the animal body. This applies particularly to horses. The entire feet and legs as well as the body will be studied and made clear by apparatus and original illustrations.

BOTANY.

I. *General Botany.* I, II.
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.

II. *General Plant Morphology.* First year. I, II.
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.

III. *General Plant Morphology.* Second year. I, II.
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.

IV. *Taxonomy.* Junior or senior. I, II.
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.

V. *Cytology.* Junior or senior. I, II.
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 investigations from the time of Malpighi and Grew to the present. Assignments from the work of Strasburger, Henneguy, Hertwig, Wilson, Guignard, Beneden and Driesch will be made and methods of cytological research indicated in the laboratory. Open to those who have com-

pleted course III or IV. Open also as a major or minor to candidates for the degree of master of science.

VI. *Algology.* Junior or senior. I, II.
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 a similar course in the seaweeds, Phateophyceae 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.

VII. *Plant Ecology.* Junior or senior II.
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.

DAIRY HUSBANDRY.

Course I. Dairy stock and dairy farm management. Elective II. Haecker.
Lectures, first semester, three hours per week. Practice work one hour per week. This course is given during the first semester. The lectures cover the breeding, rearing and management of dairy stock, the points and characteristic essential in animals intended for the dairy, practice work in judging dairy stock, and the management of the dairy herd.

Course II. Principles of feeding. Junior I. [First half semester.]
Lectures first half first semester on the principles of nutrition and the scientific problems underlying animal production and economic feeding. Practice work is given in formulating rations, in estimating the comparative value of food stuffs and in other problems connected with the subject.

Course III. Factory dairying. Elective II. [Last half semester.]
This is offered during the session of the dairy school, beginning November 18. 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.

DOMESTIC ART.

Course I. Textiles. Junior I. Blair.
Animal and vegetable fibers, weaves and dyes, testing fabrics for household use and personal wear, the hygienic values of various fabrics and harmony of color. This course is designed especially to assist the teaching of sewing in graded schools, and includes the preparation, explaining and making of models suited to grade work in the public schools.

Course II. Garment drafting and dress. Junior II. Blair.
Subjects treated are the designing and drafting of children's

and adult's garments; the study of color and its relation to dress; materials in dress; dress in relation to health; history of dress from the fourteenth century.

Course III. Household Art. Senior II. Blair.
This work includes lectures and practice work; location and building of the home; color in house painting; interior arrangement and decoration; furnishing of the home in relation to the study of furniture, historic and modern, with all the details connected with comfort and adornment.

Course IV. Handicraft. Senior II. Blair
Weaving, basketry, crocheting, knitting, rug making, leather work and pottery will be studied in their simpler forms.

DOMESTIC ECONOMICS.

Junior I. Boutelle
This course deals with the problems of economics arising in the home; generic lines of expenditure; values; business methods; standards of living; constructive agencies for economic betterment in the home. Lectures, problems and recitations.

Course II. Evolution of the home. Junior II. [One-half semester.] Boutelle.
The home as a social and economic institution and its evolution from primitive conditions; evolution of industrial, social, religious and economic influences in the home; the relation of the home to civic life. Lectures and recitations.

Course III. Home administration. Senior II. [One-half semester.]
Junior I. Boutelle
The organization and maintenance of a home; the home as a place and an opportunity for the right development of the physical and spiritual natures; co-operative housekeeping; family hotels. Lectures, problems and recitations.

Course IV. Domestic hygiene. Elective II. [First half of semester.]
Reynolds
Lectures twice a week during the second half of the second semester of the freshman year. The more common ailments connected with school work and their prevention; dietetics including water, ice, milk, meat, fish and canned goods, etc.; sanitation of farm buildings and their surroundings; dangers from the uses of public conveyances, telephones, drinking cups, etc.

Course V. Bacteriology. Junior I. Beebe.
Lectures once a week during the second semester of the junior year. Domestic bacteriology; bacteriology of the common infectious diseases.

DOMESTIC SCIENCE

Course I. Food economics. Junior I. Shepperd.
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, matzoon, etc. (4) Condiments 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.

Course II. Management of kitchen and dining room.
Senior II. Shepperd

Kitchen. The kitchen is regarded as a sanitary workshop in which the home maker can utilize all available scientific knowledge in the improvement of home conditions with the expenditure of a minimum amount of energy, time and money.

Dining-room. The importance of combining beauty and utility in the construction and equipment of a dining-room without infringing on the laws of sanitation is emphasized.

Silver, glassware, china and linen are discussed along the lines of beauty, manufacture, general utility and care. Bills of fare are discussed in order that students may become familiar with conditions in rural and urban homes, boarding houses, hotels, etc.

Course III. Laundering. Junior II. [One-half semester.] Shepperd

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, etc.

DRAWING.

Course I. Free hand drawing. Freshman I or II. Clopath.

The study of nature forms including drawings from plants, landscape, animals and from figures posed. The study of perspective and drawing from objects. Exercises in composition.

Course II. Junior II. Clopath.

Exercises in the various forms of decorative work. Adaptation of plant forms, stencils, lettering. Original designs in different styles for articles of household use. Lectures on composition and principles of design.

ECONOMICS.

I. *Elements of Economics.* I. or II.

A thorough course in the elements of economics. The aim is to inculcate accepted doctrine, and show the nature and bearing of economic theory on present day problems. Given in each semester.

Text book, problems, lectures and discussions.

III. *Money and banking.* II.

A course open to students who have had course I.

Students desiring but one year's work in economics are advised to take this course following the work in elements of economics. If a longer course is desired, advanced economics should follow course III. This is an elementary course illustrated by constant references to monetary legislation. Text books, lectures, papers and discussions.

IV. *Modern industrial legislation.* II.

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.

VI. *Public Finance, Part I.* I.

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.

VII. *Public Finance, Part II.*

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

VIII. *Advanced Economics.* I.
In this advanced course further consideration is given to selected topics from the course in elementary economics. Carver's Distribution of Wealth and Taylor's Economics of Agriculture are used as texts, supplemented by readings and problems. Lectures, papers and discussions.

IX. Transportation. [2]. II.
The evolution of transportation in the United States and of railroads in particular. Economic aspects, public policy and finance of railroading.

EDUCATION.

Course I. in Philosophy and Courses I. and II. in Education are specified as necessary for the University Teacher's Certificate. One other three-hour course for a half year is required for this certificate and is elective from the courses in Education.

Graduates from Normal Schools who receive one year's credit at the University must fulfill the same conditions for the University Teacher's Certificate, but may not offer for this either course V. or course VII. in Education.

A long course in education means not less than six hours per week for one year, selected from the following list.

For additional information, consult the Bulletin of the College of Education.

I. *The history of education to the Renaissance.* Junior I.
An introductory study of early educational history, conducted by means of lectures, assigned readings, reports and discussions. The purpose of the course is to arouse an interest in educational problems, to secure some perspective for use in current investigation, with some command of the facts and some ease in the methods of educational history and study. An attempt is made to bring out education as one phase of civilization, and to show the connection of schools with other social institutions.

II. *History of Modern Education.* Junior II.
A continuation of Course I. with a somewhat intensive study of certain men, periods and systems in the history of modern education. This course is a direct preparation for an understanding of the educational systems, theories and practices of the present.

ENTOMOLOGY.

Course I. General entomology.
Freshman I. Washburn and Ruggles
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.

Course II. Economic entomology. Elective II. Washburn and Ruggles
Lectures upon injurious insects of Minnesota and best methods of combating the same. The use of insecticides and spraying machinery. Beneficial insects.

Course III. Forest entomology. Junior I. Washburn and Ruggles
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. The student will be directed in a special study of insects affecting the forest and will be encouraged in doing field work, collecting, identifying, and in the life history of forest insects.

Open only to students in the forestry course.

Course IV. Comparative anatomy and histology of insects. Elective II. Ruggles
A detailed study of structure of representatives of different orders of insects.
Six periods of laboratory work and one lecture. Must be preceded by course I. or its equivalent.

Course V. Elements of bee keeping. Elective II. Washburn
One lecture a week and work in apiary during spring term. Offered to those qualified for the work.

Course VI. Special Problems. I. or II. Washburn
For graduate students only. Consult the head of the department.

FARM STRUCTURES AND FARM MECHANICS.

(Junior or Senior Year.)

Course I. Designing and details of building construction. Junior II. Boss
Lectures and practice work are given in laying out plans for farm buildings. The questions of location, size, convenience, methods of construction, materials, heating systems, water systems, ventilation, sewage disposal, painting, durability, cost, etc., are discussed.

Course II. Design, construction and cost of buildings. Senior I. Boss
The practical application of principles given in Course I.
Each student selects an imaginary or real farm and makes drawings showing location of buildings, drives, yards, fences, etc., paying particular attention to properly locating each building and planning them so as to best meet the requirements of each individual farm and the means at hand for erecting them. Specifications and estimates of cost of buildings are also made.

Course III. Designing and details of building, construction. Junior II. Boss
Lectures and practice work in drawing. Location of farm buildings, drives, yards, etc., architectural designing, the study of plans, fittings and equipment; heating systems, ventilation, floors and wood work, painting and decorations.

Course IV. Designing, construction and cost of buildings. Elective I. or II. Boss
The practical application of the principles outlined in Course III.
Each student is required to lay out plans for an imaginary or real house, paying particular attention to location, sanitary conditions, heating, ventilating and general convenience.

FORESTRY.

Course I. Silviculture. Freshman I. [First half semester.] Detwiler
Study of forest conditions and the forests of the world. The writing of forest descriptions; the study of tree growth and the sylvics of the different species. Study of European sylvicultural methods and their adaptability to American conditions.
Lectures and field work.

Course II. Silviculture (Study of seeds and seed beds). Freshman I. [Last half semester.] Detwiler
Nursery practice. Seeding and planting of woodlands. The artificial formation and care of young forests.

Course III. Lumbering. Junior I. Cheyney
A detailed study of the methods of lumbering in use in all of the forest regions of the United States.
In connection with this course, the student is required to hand in a detailed and comprehensive report, written from actual observation, of some one logging operation. Lectures.

Course IV. Forest protection. Junior I. Detwiler
The general principles of forest protection. The study of all the methods and means of protection in use in Europe and America and their application in the different forest regions of the United States.

Course V. Surveying. Junior II. Cheyney
A course embodying all the principles of general surveying, but designed more particularly to fit the student for rough and rapid sketching methods. Practice in the use of the transit, level, plane table, sketching board, compass and barometer.

Lectures and field work.

Course VI. Utility. Senior I. Cheyney
A study of ways and means employed in the lumber business from the stump to the finished product in the yard.

Lectures and assigned reading.

Course VII. Working plans. Senior I. Detwiler
The study and discussion of the working plans in use in foreign countries. Criticisms of so-called working plans in the United States. This course requires the working up of a working plan in the United States.

Lectures and assigned reading.

Course VIII. Forest literature. Senior I. Cheyney
Assigned reading in all available forest literature and discussions thereof.

Course XI. Forest management and economics. Senior I. Green
A study of the principles governing the management of forests and the financial results from forests under management in Europe. The study of future yields.

The development of forestry in the United States and European countries; the forest conditions here and abroad and their effect upon the lumber industry; policies of different governments to forests.

Text book, lectures and recitations.

FRENCH LANGUAGE.

I. *French, beginning.* [5] I, II.
Fraser & Squair's French Grammar and Reader; modern texts.

II. *French,* second year's work. I, II.
Grammar and composition continued; modern texts will be read including selections from Merimée, Daudet and Scribe.

III. *Advanced Grammar and Composition.* I, II.
Francois' Introduction to French Composition; readings from modern authors including selections from Copée, Feuillet, Sandeau.

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

IV. *Conversation.* [2] I, II.
A course in conversational French.

Open to students taking Courses II. or II.

GEOLOGY.

I. *General Geology.* Junior and Senior I.
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, wherein stratification, displacement and veining of rock masses are described; (3) Physiographic Geology, pointing out prominent earth features and inquiring into the causes producing them; (4) An outline of Historical Geology.

Course II. Physiography of North America. Hall
A brief outline of the development of the continent is given, tracing its geological history and the forces accomplishing it. The physiographic conditions are then discussed; the distribution of forests, prairies and plains are studied, climatic conditions are traced and the physiographic and climatic in-

fluences determining the industrial development of the continent will be pointed out.

Lectures and reference work.

Course III. Geography of Forestry. Hall

This course will present the specific applications of geologic and physiographic conditions to the subject of Forestry. Forest regions will be described, their distinguishing features set forth and the causes which conspire to develop these features will be discussed. The relations of physiographic environment, particularly in rainfall and temperature will be constantly held in view.

Lectures and reference reading.

GERMAN LANGUAGE.

I. *German, beginning.* [5] I, II.

Pronunciation, grammar, selections in prose and verse. German conversation and composition (Bernhardt); short stories.

II. *German, intermediate.* I, II.

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.

IIII. *Scientific Prose, intermediate.* I, II.

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

V. *Conversation and composition.* B I, II.

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 courses II, II.

HORTICULTURE.

Course I. Fruit and vegetable growing. Freshman II. Cady.

Lectures. Geography of fruit and vegetable growing, tilling, fertilizing and irrigation of lands; seed sowing and seed testing; fruits and vegetables under glass; pollination; diseases and injurious insects and their prevention; storing, harvesting and marketing varieties of fruits and vegetables.

Course II. Systematic pomology. Elective I. Green

Lectures. A general course in the study of cultivated fruits; their cultivation and classification.

Course III. Plant breeding. Elective II. Green

Lectures and laboratory work. The fact and philosophy of variation; crossing of plants and origination of domestic varieties.

Course IV. Nursery work. Elective II. Cady

Lectures and practice work. Seedage; layerage; cuttage; graftage; planting; pruning; thinning; storage of nursery stock; tillage of nursery lands; insects and diseases injurious to the nurseries and their prevention.

Course V. Greenhouse management and floriculture. ElectiveII. Green and Cady

Lectures and laboratory work. Greenhouse construction and management; temperature; soil; watering; benches; propagation by seeds; cuttings; layers and grafting; prevention of diseases and extermination of insects in greenhouses; rest and growth periods of plants; plants for greenhouse cultivation.

Course VI. Landscape gardening. Elective I. Green
A general course in the practice and principles of landscape gardening; special attention being given to the planting of small grounds.

MATHEMATICS.

Course I. First part higher algebra. Freshman I. Snell
For those not having an entrance credit in this subject.

Course II. Solid geometry. Freshman I. Snell
For those not having an entrance credit.

Course III. Plane trigonometry. Freshman II. Snell
For those having credits in courses I. and II.
Functions of Plane Trigonometry, use of logarithm tables and numerous applications.

PSYCHOLOGY.

I. *Elements of Psychology.* I. or II.
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 books, lectures and essays. Open to sophomores, juniors and seniors.

II. *Educational Psychology.* I. or II.
The study of mental development in its relation to heredity and training. Lectures and student reports on the facts and theories of childhood and adolescence with special reference to their bearing on education. Open only to those who have completed course I.

RHETORIC.

I. *Rhetoric.* Freshman, I, II.
This course includes the study of formal Rhetoric, the writing of compositions, and the study and analysis of masterpieces of prose.

Students who have had special preparation in Debate may, by consent of the Head of the Department, substitute Argumentation for Rhetoric. This course aims at instruction in the science of argumentation and in the art of debate. The work consists of 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.

II. *Rhetoric.* Sophomore, I, II.
A continuation of course I. Open also to sophomores of whom, at entrance, Rhetoric was not required. The making of plans and outlines and writing of compositions will form the greater part of the work. Some study of models of prose will be required.

VETERINARY MEDICINE AND SURGERY.

Course I. Anatomy.
Elective I. Reynolds. [First half semester, '07 and '08]
Comparative anatomy of the digestive organs, dissection, collateral reading and recitation.

Strangeway's Veterinary Anatomy is taken as text and guide and Chauveau is used for reference and comparison.

Course II. Body nutrition.
Elective I. Reynolds. [Last half semester, '07 and '08.]

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 but students are required to do collateral reading.

Course III. Anatomy.
Elective II. Reynolds. [First half semester, '09 and '10.]

This course deals with the anatomy and mechanics of locomotion and conformation. The bones, articulations and muscles involved in locomotion and conformation are studied by text book, dissection and collateral reading. Shoeing, diagnosis and treatment of common forms of lameness may be included in course III. Strangeway's Veterinary Anatomy is used as a text book and Chauveau for reference.

Course IV. Diseases of domestic animals.
Elective II. Reynolds. [Last half semester '09 and '10]

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 School of Agriculture

Faculty

CYRUS NORTHROP, LL.D., *President.*
WILLIAM M. LIGGETT, *Dean.*
DEXTER D. MAYNE, Principal, *Economics, Practicums.*
SAMUEL B. GREEN, B. S., *Horticulture, Forestry.*
J. A. VYE, *Secretary and Treasurer, Accounts.*
HARRY SNYDER, B. S., *Agricultural Chemistry, Soils.*
T. L. HAECKER, *Dairy Husbandry.*
M. H. REYNOLDS, M. D., V. M., *Veterinary Science.*
J. M. DREW, Registrar, *Blacksmithing, Poultry.*
ANDREW BOSS, *Agriculture, Animal Husbandry.*
WILLIAM BOSS, *Carpentry, Power Machinery.*
JUNIATA L. SHEPPERD, M.A., *Cooking, Laundering, Home Economy.*
MARGARET BLAIR, *Sewing, Household Art.*
MARY L. BULL, *Cooking, Laundering.*
JOHN A. HUMMEL, B. Agr., *Agricultural Chemistry.*
FREDERICK L. WASHBURN, M. A., *Zoology, Entomology.*
COATES P. BULL, B. Agr., *Agriculture.*
LEROY CADY, *Horticulture.*
C. C. LIPP, D. V. M., *Comparative Physiology.*
EDITH SNELL, B. L., *Algebra, Geometry.*
D. A. GAUMNITZ, M. Agr., *Animal Husbandry.*
A. D. WILSON, B. Agr., *Agriculture.*
A. G. RUGGLES, M. A., *Entomology.*
W. L. OSWALD, *Agricultural Botany.*
KARL A. MACHETANZ, B. A., *Director of Gymnasium, History.*
ALVAH M. BULL, *Drawing, Farm Buildings.*
ESTELLE COOK, *English.*
GRACE B. WHITRIDGE, *Physical Training.*
FLOY KESSON, *Music.*
FANNIE C. BOUTELLE, *Preceptress, Social Culture.*
GEORGE CRAIG, *Animal Husbandry.*
A. L. EWING, M.S., *Agricultural Physics.*
D. B. HOWELL, *Mathematics.*
E. C. PARKER, B. Agr., *Agriculture.*
EDWARD SIGERFOOS, Ph. B., *Capt. 5th U. S. Infantry, Military Science and Tactics.*
E. G. CHEYNEY, A. B., *Forestry.*
L. B. BASSETT, *Farm Machinery.*
ETHEL E. BUSH, *English*
F. A. FARLEY, B. S., *Animal Husbandry.*
LETITIA VANSLYKE, *Farm Accounts.*
HELEN M. CAMPBELL, *Asst. in Cooking.*
EDITH STAPLES, *Asst. in Sewing.*
AGNES ERICKSON, *Asst. in Chemistry.*
MARTHA B. MOOREHEAD, M. D., *Lecturer in Domestic Hygiene.*

Committees, School of Agriculture

LIBRARY: Mayne, Reynolds, Snyder, McIntyre, Green.

CATALOG: Vye, Snyder, Drew.

MILITARY DRILL: Sigerfoos, Green, Haecker.

ENTERTAINMENT: Mayne, Boutelle, A. Boss.

HEALTH: Reynolds, Mayne, Boutelle, Washburn.

DAIRY SCHOOL: Haecker, Wm. Boss, Snyder.

SHORT COURSE FOR FARMERS: Mayne, A. Boss, Green.

AUDITING: Snyder, Reynolds.

ATHLETICS: Green, Mayne, Machetanz

School of Agriculture

TIME OF OPENING.

The School of Agriculture will open Monday, October 7th, 1907, and close March 25th, 1908. The fall term closes at noon, Saturday, December 21st, and the winter term begins Thursday, January 2nd, 1908.

Instruction begins promptly at the opening of each term, and students are required to be present the first day of the term and to remain until the close of the term.

Students are advised to correspond with the registrar of the school, J. M. Drew, St. Anthony Park, St. Paul, Minnesota, prior to coming to the institution and to make the necessary preliminary arrangements for registration. Students registered in the fall term will not be received after the second day of the winter term, unless a reasonable excuse is presented for the delay.

LOCATION.

The School of Agriculture is located on University Farm, St. Anthony Park, St. Paul, Minnesota, about midway between the business portions of the cities of St. Paul and Minneapolis. Directions for reaching the school are given on page 4. The School of Agriculture is a part of the University of Minnesota and is governed by the University Board of Regents.

PURPOSE.

The School of Agriculture was organized in 1888 with the object of giving a practical education to the young men and women who are unable to pursue the full college course in agriculture. It offers a practical course of study designed to fit young men and young women for successful farm life, and aims to give to its students the necessary preparation for useful citizenship.

COURSE OF STUDY.

The course of study offered covers a wide range of subjects and is largely technical in character, but provision is made for some instruction in English and mathematics. The course is briefly outlined on pages 8 and 9. Instruction is given in the work shop, laboratories, barns and fields, as well as in the class room. The course requires three winters of six months each for completion, and is co-educational. Much of the

work is taken in common by the young men and the young women. Some of the subjects, such as blacksmithing, carpentry, field work, handling grain and machinery are taken by the young men, while the young women pursue cooking, sewing, laundering and household art. The methods of instruction tend to educate students toward the farm instead of away from it, and to develop in them a love for farm life by showing them its possibilities. In this respect the school has been very successful as over 80 per cent of its graduates continue agricultural pursuits.

HOW TO GET TO THE SCHOOL.

Check all baggage to St. Paul or Minneapolis.

Monday and Tuesday, October 7th and 8th, 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 or Como-Hopkins 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.

Parents are advised not to send pupils under fifteen years of age, unless they are unusually proficient in the common branches.

Students who have completed eighth grade work in the common schools are admitted without examination.

Applicants for admission who do not have state certificates or county diplomas showing completion of eighth grade work should send to the registrar for certificates of admission which, when properly filled out by former teachers or superintendents, will be be accepted in place of entrance examinations.

Applicants whose home schools do not afford complete instruction in the common branches may be admitted with not more than two conditions which must be removed according to instructions given the student upon admission.

Students from city or grade schools will not be admitted until their former school records have been passed upon by the registrar. These records must be presented at least three weeks prior to the opening of the school.

State High School Board Certificates are accepted for work in English, physiology, algebra, geometry and civics.

HOME LIFE ON THE CAMPUS.

The life of the students while attending the School of Agriculture is subject to supervision.

Students residing in the school dormitories are not allowed to leave the grounds without permission.

The home life of each student is carefully guarded, and everything done to promote a healthful moral atmosphere.

The use of tobacco and of spirituous liquors of all kinds is strictly forbidden. No person will be admitted as a student who is known to have the cigarette habit.

Upon entrance students are provided with a copy of the rules and regulations to which they are required to subscribe.

Any one not in accord with these restrictions and not willing to lend a hand toward a strong moral growth should not come to the School of Agriculture.

CLASSIFICATION OF STUDENTS.

No student with incomplete C or preparatory work, or more than one incomplete B subject will be classified as an A, excepting high school graduates.

No student with incomplete preparatory work, or more than one incomplete C subject, excepting high school graduates, 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, also after 7 in the evening.

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.

HOLIDAYS.

On Lincoln's birthday, February 12th, the regular classes of the last two periods in the forenoon will be omitted and a suitable program substituted.

There will be no regular classes on Washington's birthday, February 22nd, but the day will be observed by appropriate exercises.

REQUIREMENTS FOR GRADUATION.

First—The completion of the prescribed course of study with an honor able standing in deportment.

Second—An essay of not less than one thousand words upon a topic connected with agriculture or home economics.

Third—For young men, a practical experience in field work at the University farm or elsewhere, as shall appear in reports received from responsible sources.

FEES.

With the exception of an entrance fee of $5 to residents, and $10 to non residents, the school makes no charge.

EXPENSES.

The necessary expenses for the year do not exceed $85. This amount does not include the cost of the required military suit for the young men, traveling and personal expense.

The cost to the student for board, heat, light and laundry is the actual cost of maintaining the table (including management), and caring for the buildings. This has not exceeded $3 per week. Each month's board is paid in advance. The buildings are all lighted by 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 absenee of less than four days. If students are compelled to be absent for that length of time they are allowed half rates if they make arrangements before leaving.

Text books are furnished at a rental of $2 per year 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 one dollar per term.

For the purpose of supplying, calcimining and painting the sleeping rooms, a reserve fund is created by assessing each one occupying them $2.00.

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 $12 board; $5 deposit; $2 book rent and reading room; $1 maintaining nurse; $5 entrance fee; $2 reserve fund; total, $27.00.

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 $12.25.

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 21st, which will hold good until 8 p. m., the first day of the following school 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.

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.

Each student should associate himself with one of these societies as early in his course as possible.

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:

Tuesday, October 9 .....Chicago Glee Club
Tuesday, November 13—"Pluck, Patience and Perseverance" .....
Dr. Jas. B. Watson
Tuesday, December 18 .....Dixie Jubilee Singers
Wednesday, January 16 .....Chas. D. Kellogg, the "Bird Man"
Wednesday, February 13—"Tallow Dips" .....Robert Parker Miles
Wednesday, March 6—"The University of Hard Knocks"..Ralph Parlette

STUDENTS' CHRISTIAN ASSOCIATIONS.

The Young Men's and the 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 is held each Sunday at 3 p. m., and a mid-week prayer meeting each Wednesday, at 6:30 p. m. The associations are non-sectarian, so that all students may find in them an opportunity for Christian activity and mutual helpfulness.

Course of Study

FIRST (C) YEAR

FIRST TERM

Agricultural botany [5]
*Drawing [2]
Music [2]
Farm Mathematics [5]

*Blacksmithing [2]
*Carpentry [2]
Military Drill [2]
Agriculture [3]
Gymnasium [2]
*Practicums [2]

or

*Cooking [2]
Physical training [2]
*Sewing [3]
Social culture [1]
Field agriculture [3]

SECOND TERM

Agricultural botany [5]
English [5]
Music or literary society work [2]
Comparative physiology [5]
Study of breeds [5]

*Carpentry [2]
*Drawing (farm buildings) [2]
*Blacksmithing [2]
Military drill [2]
Gymnasium [2]
*Practicums [2]

or

*Laundering [2]
*Drawing (farm houses) [2]
Physical training [2]

SECOND (B) YEAR

FIRST TERM

English [2]
Agricultural physics [5]
Dairy chemistry [2]
*Dairy husbandry [2½] { Dairy lectures / Dairy practice / Dairy breeds }

Fruit growing [3]
Music [2]
*Farm accounts [2½]

*Stock judging [1]
Breeding [2]
Military drill [2]
Gymnasium [1]

or

*Cooking [2]
Household art [1]
Physical training [2]
*Sewing [2]

SECOND TERM

English [2]
Agricultural chemistry [5]
*Dairy husbandry [2½] { Dairy stock lectures / Dairy practice / Dairy feeding }
Music [2]
Agricultural physics [5]
Vegetable gardening [3]

Field crops [5]
Military drll [2]
Gymnasium [1]

or

*Cooking [2]
Home management [1]
Physical training [2]
*Sewing [2]

COURSE OF STUDY—*Continued*

THIRD (A) YEAR

FIRST TERM

Agricultural chemistry [7]
Forestry [3]
Entomology and zoology [5]
Poultry [3]
Algebra [5] Optional

Handling grain & machinery [1] *Veterinary science [2½] Gymnasium [1] Music or military drill [2]	or	*Cooking [2] *Sewing [2] Music [2]

SECOND TERM

Civics or geometry [4]
Plant propagation [3]
Algebra [5] Optional

Dressing and curing meats [1] *Stock judging [1] Feeding [3] Soils and fertilizers [5] *Veterinary science [2½]	or	Meats [1] Home economy [1] *Cooking [3] Domestic chemistry [3] *Sewing [3] Domestic Hygiene [1]

*Figures in brackets indicate the unmber of periods per week in which the subject is pursued. All work in subjects marked thus * extends through double time in the daily program.

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.

During the year the list of speakers includes prominent state and national officials, business men, particularly those connected with the agricultural industries, professional men, prominent clergymen of all denominations, educators from other institutions, and successful farmers. It has been found that this plan gives to the students an opportunity to hear men of prominence discuss a wide range of topics, many of which relate to rural and agricultural problems.

Members of the graduating class at times present essays, and discuss topics as assigned.

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 plants and flowers 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 whch 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.

In this department it is the aim to enlist the student's interest in a more keen appreciaton of the principles that underlie the practices of his vocation. To this end the facts with which he is already somewhat familiar are used to reach the fundamental law. For example, from his knowledge of the relation of weight to bulk in grains, soil and water, he is led to a knowledge of volume, mass, density, weight, force, draft, specific gravity, and fluid pressure. In the laboratory he makes definite determinations along these lines. Likewise the somewhat vague and indefinite notions the young people have from their use of pulleys, eveners and other farm machinery, form fitting stepping stones to definite mathematical results readily reached by them under proper guidance.

The varied questions of soil physics, soil formation, the movements of water and air thru soil, soil temperatures, soil grains and granules, and pore space, are matters studied from the practical side and used as avenues to far reaching laws.

AGRICULTURE.

It is purposed in teaching this subject to cover the elementary principles governing soils, field and farm management. The work covers the origin, formation, and cultivation of soils; the movement and control of soil moisture; selecting and planning farms; subdividing fields; drainage; irrigation; roads; fences; buildings; water supply; groves and wind breaks; farm life; the relations of science to agriculture; a general consideration of farming as a business; and methods of farming.

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, negatve 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.

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 requred 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 buildngs.

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 relations of the state to the general government, the constitution and the power 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 special 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.

Cooking extends through five terms of the curriculum. The subjects covered in each term are as stated below:

First term. C year: Furniture and equipment needed in a home kitchen; best methods of managing kitchen work, caring for kitchen and dining room utensils, furniture, etc.; the place of measuring and weighing in cookery; the preparation and serving of vegetables, cereals and bread.

First term, B year: Cooking is again taken up, the special topics being preservation of fruits and vegetables by canning, preserving, pickling and jelly making. The selection, preparation and serving of meats of all kinds is also considered. A sufficient amount of practical work is given in each case to illustrate the principles brought out. A special study of table service is begun during this term and extends through the year, a practice dinner being given by a portion of the class in the class dining room each month.

Second term, B year: Eggs are considered as to selection, preservation, food value, different ways of cooking and serving. The preparation and serving of soups and beverages is considered together with their food value. The subject of salads is considered in a similar way.

First term, A year: This is devoted to the marketing and care of food. The preparation and serving of dairy foods and made-over dishes and dishes for invalids receive special attention.

Second term, A year: This is devoted to the preparation and serving of desserts and to the study of food rations, dietaries, bills of fare, confections, etc. A free use is made of the U. S. Bulletins during the year in the hope of arousing a greater interest in the food question.

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 instruction 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 the 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, the 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) Applicants for admission to the "C" class in English should be familiar wth the inflections of nouns, pronouns and verbs, the definitions and classifications of phrases and clauses, and the common case constructions. The first year's work consists of the study of chapters I., II., V., VII. and IX. with appendix III. in Maxwell and Smith's Writing in English, with almost daily practice in writing the simpler forms of composition. Two periods a week are given to the study of one of the classics.

(B) During the second year the study of Maxwell and Smith's Writing in English is completed. Once a week a short essay is prepared and submitted 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 include abstracts of leading magazine articles, biographical sketches, book reviews and selections from fiction. Special prominence is 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 Mnnesota. 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.

The four-footed pests of the farm—rabbits, gophers, squirrels, etc., as well as injurious and beneficial birds, are also studied.

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.

This work consists of a study of those portions of geology relating to soil formation; effect of the glaciers on the soils of Minnesota; origin of soils in the various agricultural regions of Minnesota; classification of soils; soil moisture and soil tillage; land areas and the planning of fields and farms; the classes of field crops as grain, grass, and cultivated crops; the relation of these crops to each other in a systematic rotation and in their relation to soil fertility; the origin, distributon, and uses of cereal crops and other field crops.

FIELD CROPS.

Students are admitted to this subject after having finished the work of agriculture and receive instruction as follows:

Crop rotations, farm management, and planning farms under various conditions; production and care of farm manures and green manure crops; fertility as related to weeds, crop production and profits; preparation of land; planting, cultivating, harvesting, storing, and marketing of grains, roots fiber, sugar, grass and other forage crops,; meadows and pastures; treatment of field crop diseases; selecting, breeding and judging seed.

FORESTRY.

Includes the consideration of the formation and care of wind breaks and shelter belts; the laying out and planting of home grounds; discussion of the hardiness, habits and value of our native and introduced trees; and the methods of propagating them.

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 Wells' Essentials of Plane Geometry.

GYMNASIUM WORK.

The gymnasium is a large, well lighted, two story brick building. It is well supplied with 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; adaptation of the various kinds of machinery with reference to the soil, weeds and seasons are given; adjustment with special 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 forms 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 are given 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; training the taste and emphasizing the laws of hygiene that should influence the selection of materials and styles in the finishings and furnishings of the house.

LAUNDERING.

Second term, C. year: The aim is to give the students a knowledge of the best means of cleansing all fabrics with little injury to the cloth or color. Approved methods of cleansing by the use of chemicals, as removing grease spots, stains, etc., are given.

LIBRARY.

The agricultural library now contains ten thousand books and about seven 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.

LITERARY SOCIETY WORK.

Any student belonging to a recognized literary society of the school may receive credit in the ocurse 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.

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.

MILITARY DRILL.

Under the provisions of the Act of Congress of 1862, establishing the "Land Grant Colleges" of the United States, instruction in Military Science and Tactics is required to be given at all colleges which are its beneficiaries. For this purpose the United States Government furnishes the Department of Agriculture with the necessary arms and equipments, and details an officer of the regular army to take charge of military science and tactics.

All male students of classes B. and C. not physically unfit are required to attend military drill. For the A. Class drill is an elective.

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 battalion manœuvres, guards and the theoretical and practical use of firearms.

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 "A" class; sergeants and corporals from the "B" class.

MUSIC.

A systematic training in music is given and all students are required to take the work unless they already have a credit in it.

Class quartets and octets are organized and trained for aiding in public entertainments in the school.

The Senior Class gives a concert at Commencement time.

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 toward 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 grace and suppleness in action. 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 commerial nurseries and greenhouses near by.

POULTRY.

The instruction in this subject will include the following topics: History and characteristics in the leading breeds of poultry; breeding, rearing 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, cotaining pens of the most improved breeds, incubator cellar, work-room, etc., has been provided,, where experimental work and practical instruction are carried on.

PRACTICUMS.

During the first year the young men spend four hours each week in a series of lessons and exercises in the barns and fields, taking up such practical lines of work as land surveying, laying tile drains, building fence, setting up farm machinery, soldering, pipe-fitting, splicing rope, making rope halters, etc.

SEWING.

Instruction is given in the principles and use of healthful and appropriate clothing and in the needlework of the home. The course provides for five

terms' work. During the first term instruction is given in the elements of sewing, including different stitches, seams, hems and the various kinds of mending; also practical talks on the use and care of the sewing basket, touching the history of the various implements used, and upon the textiles used—cotton, wool, linen and silk.

In the second year instruction is given in cutting and making plain garments, drafting underwear, shirt waists and cotton dresses—taught by a simple method in which only a tape line and square are used.

In the third year the more difficult work of dressmaking is taken up, pattern drafting, cutting and fitting dresses. A practical aid to the work in this subject is offered by a museum of exhibits. These exhibits are kept in the class rooms and include primitive and modern sewing implements, weaving processes and the various cloth fibers.

Lectures are given on the utilitarian and art values of various textiles, and in connection with the selection of materials practical lessons in shopping are given. Attention is paid to harmony in color.

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. Special 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.

Some of the topics studied are: The formation of soils, adaptability of crops to different kinds of soils, chemical composition of soils, physical analysis of soils, interpretaton of soil analysis, the judging, rating and scaling of soils, alkali soils, acid soils, humus and other relations to soil fertility, the factors governing the increase and decrease of the nitrogen of the soil, farm manures—their composition and uses, and their action upon soils—green manures, commercial fertilizers, special purpose fertilizers and their use; the influence of different methods of cultivation upon the fertility of the soil, the food requirements of farm crops, the rotation of crops as affecting the fertility of the soil, the income and outgo of fertility from farms where different systems of farming are followed, the general principles of soil exhaustion and soil improvement and the various factors which affect the fertility of soils. The class room work is supplemented by laboratory practice.

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 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.

The market classes of horses, cattle, sheep, and swine are taken up briefly to bring out the form, quality, and condition desirable and common to the different classes. This is followed in each class of stock with the most common and valuable breeds for the state. These are studied carefully as regards their characteristics and origination, and as to their adaptability to the different Minnesota conditions. This work is illustrated with stock from herds and flocks maintained at University Farm for this purpose.

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 and reviews and clinical work at the hospital maintained for this purpose. Lectures are illustrated by means of stereopticon charts, manikin of horse, skeleton of horse, and various other appliances.

The work covers 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, 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.

Mr. Ludden has since donated another $5,000 for a like purpose so that the yearly income is now $400

Intermediate Year

For Graduates of the School of Agriculture who wish to enter the College of Agriculture

The course of study in the School of Agriculture extends over three years, and the school year is six months long. This does not give sufficient time for preparation for college work, and it has been found necessary to supplement the course offered in the School of Agriculture by an additional year's work in general academic branches. The subjects offered in the intermediate year can be taken elsewhere in any accredited high school before entering the School of Agriculture. This intermediate year enables graduates of the School of Agriculture to enter the College of Agriculture on the same basis of preparation as students enter other departments of the University. English and mathematics are given prominence in the intermediate year.

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.
Elementary algebra [5]	Higher algebra [5]
Plane geometry [5]	Solid 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; Downey's Higher Algebra, Part I. and Wells' Essentials of Plane 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.

Students who have completed higher algebra and plane geometry in the A year of the School of Agriculture, are admitted to the freshman class in the College of Agriculture conditioned in solid geometry and English; these conditions must be removed during the freshman year.

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

CYRUS NORTHROP, LL.D., *President.*

WILLIAM M. LIGGETT, *Dean.*

SAMUEL B. GREEN, B.S., *Horticulture, Forestry.*

J. A. VYE, *Business Methods.*

HARRY SNYDER, B.S., *Agricultural Chemistry, Soils.*

T. L. HAECKER, *Dairy Husbandry.*

M. H. REYNOLDS, M.D., V.M., *Veterinary Science.*

J. M. DREW, *Poultry, Workshop Hints.*

A. BOSS, *Live Stock, Dressing and Curing Meats.*

WM. BOSS, *Farm Mechanics.*

F. L. WASHBURN, M.A., *Insect Enemies.*

COATES P. BULL, B.Agr., *Farm Implements, Grains.*

W. L. OSWALD, *Farm Botany.*

D. D. MAYNE, *Parliamentary Practice.*

A. L. EWING, M.S., *Farm Physics.*

JUNIATA L. SHEPPERD, *Domestic Science.*

MARGARET BLAIR, *Domestic Art.*

This is a course of instruction provided by the faculty of the School and College of Agriculture for the benefit of farmers who are unable to attend the regular school course.

The next term will open Jan. 10th, 1908. The first two weeks will be devoted to the judging of grains, soils and live stock, and for convenience will be known as the judging course. This will be followed by four weeks known as the lecture course during which time lectures will be given covering the more important branches of agriculture, horticulture, live stock breeding, farm botany, farm chemistry, entomology, poultry, dairying, etc., as outlined below.

During the judging course the time will be divided as follows: The judging of grains and soils will occupy the first four days, then will follow two days for the judging of sheep, two for swine, two for cattle, and two for horses.

Work will begin at 8:15 o'clock a. m., and close at 3:40 p.m. During the four weeks of the lecture course there will be no work on Monday, but this day will be spent in visiting places of interest such as the stock yards, stock farms, flour and flax mills, etc.

For the entire course a fee of $10.00 will be charged. For the judging course or any part thereof the fee will be $3.00.

A special circular of information concerning the Farmers' Short Course may be obtained on application to D. D. Mayne, Principal School of Agriculture, St. Anthony Park, St. Paul, 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 stock judging: The instruction given in judging dairy stock will be based upon the actual performance of animals bred and reared in the dairy division, the records covering a period of five years and giving the annual yield of milk and butter fat, cost of production and profits.

Dairy husbandry: The lectures in dairy husbandry will cover the characteristics of the the various breeds of dairy cattle, their comparative adaptability for the various phases of dairying and the style or type of cow that has demonstrated her ability as a large and economical producer. The scientific and practical phases of feeding for milk production will be explained and practical instruction and training given in calculating rations for milk production.

Animal husbandry: During the four weeks of lecture work a series of lectures will be given on animal breeding. These lectures will include the known laws of breeding, such as heredity, variation and atavism. Attention will be given to such features as the selection of prepotent sires and dams, to cross breeding, in-breeding, and other matters of interest to the breeder of live stock. Pedigrees will be discussed and the students made familiar with the registration and transfer of pure bred stock. The feeding and management of horses, beef cattle, sheep and swine will also be discussed. Foods suitable to each class of animals, and methods of preparing and feeding them will be among the subjects receiving attention, together with directions for the practical management of stock while in the stable and pasture.

Agricultural chemistry: Soils and foods are made prominent features of the work in agricultural chemistry. Lectures are given on 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 by the rotation of crops and by other means so as to secure the necessary changes in the soil to produce the highest degree of fertility. Lectures are also given on the composition and uses of human and animal foods. The judging of soils will be made a feature of this work.

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 in 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 methods 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; 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: 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.

Economic entomology: The entomologist will give a course of lectures on injurious and beneficail insects, and will discuss the various insecticides and methods of application. The four-footed pests of the farm—rabbits, gophers, etc., are also studied, and a few lectures are given on practical bee-keeping. 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 for practice in public speaking.

Physics: This course consists of six lectures with illustrative experiments. In these exercises the following topics are discused: The principles of draft in the horse; the causes of draft in wagons, including the effect of road-bed; the effect of grades or hills, involving the principle of the inclined plane; the various questions involved in eveners, road construction and maintenance; including the question of reducing grades, the rate a horse walks in plowing, hauling, etc.; horsepower; farm drainage; weather forecasting.

Workshop hints: 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.

Dairy School

FAULTY

CYRUS NORTHROP, LL.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.*
J. M. DREW, *Forage, Farm Buildings.*
WILLIAM BOSS, *Instructor in Practical Engineering.*
H. L. RUSSELL, Ph.D., *Dairy Bacteriology.*
E. K. SLATER, *Creamery Management.*
H. T. SONDERGAARD, *Chief Instructor.*
I. O. DYBEVICK, *Instructor in Creamery.*
E. L. ALLEN, *Instructor in Cultures and Starters.*
A. W. PARKIN, *Instructor in Cheesemaking.*
C. B. MOAK, *Instructor in Dairy Laboratory.*
M. P. MORTENSON, *Assistant in Cultures and Starters.*
J. C. JOSLIN, *Assistant in Creamery.*

The next session of the Dairy School will open Monday, November 18th, 1907, 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 high 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.

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 is 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. Practical 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; how to ripen 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 are 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-Hopkins or Como-Harriet street car and get off at Commonwealth avenue.

Address applications for admission to T. L. Haecker, St. Anthony Park, St. Paul, Minn.

CROOKSTON SCHOOL OF AGRICULTURE.

The Crookston School of Agriculture located at the northwest Experiment Farm, Crookston, Minn., was established by the legislature of 1905. It offers to the young men and young women of the Red River Valley a three-year course in practical farming and home-making. The school year for 1907-8 will open October 7, 1907 and close April 1, 1908.

THE FARM STUDENTS' REVIEW.

The Farm Students' Review is a monthly agricultural paper owned and published by the Alumni Association of the School of Agriculture. The paper is intended to be a medium by which the former students of this institution shall be kept in touch with each other and also with the School and Experiment Station. It also endeavors to bring the farmers throughout the state generally, into closer connection with the institution and to this end strives to present the latest progress in experimental work at the various Stations. It is the official organ of the Alumni Association and of the Farmers' Club.

THE FARMERS' CLUB.

The Farmers' Club of Minnesota is an organization composed of students and ex-students and members of the faculty of the School of Agriculture. Any one who has ever registered as a student in the regular, dairy or short course or who is or has been a teacher in the School of Agriculture, is eligible to membership. The objects of the Association are to foster and strengthen the ties between the School and its former students and to extend the work of the School and Experiment Station among the farmers of the state. To this end the members of the State

Club have formed County Clubs which hold annual meetings for the benefit of the farmers of the community. To quote from the annual address of its president: "The School of Agriculture is an institution of the farmers, for the farmers, and supported in a large measure by them, and each student of the School should use his knowledge to better the conditions about him. The State has invested from one to several hundred dollars in his education and expects to realize on that investment by the knowledge which he will distribute."

The Agricultural Experiment Station

STATION OFFICERS.

WM. M. LIGGETT, *Director.*
J. A. VYE, *Secretary.*

EXPERIMENTAL CORPS.

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, *Agriculturist and Animal Husbandry*
FREDERICK L. WASHBURN, M.A., *Entomologist.*
J. A. HUMMEL, B. Agr., *Assistant Chemist.*
COATES P. BULL., B. Agr., *Assistant in Agriculture.*
A. G. RUGGLES, M. A., *Assistant Entomologist.*
A. J. MCGUIRE, B. Agr., *Superintendent, Grand Rapids.*
D. A. GAUMNITZ, M. Agr., *Assistant in Animal Husbandry.*
A. D. WILSON, B. S. Agr., *Assistant in Agriculture.*
E. C. PARKER, B. S. Agr., *Assistant in Agriculture.*
WM. ROBERTSON, B.S., *Superintendent, Crookston.*
C. C. LIPP, D. V. M., *Assistant in Veterinary Science.*

The bulletins of this Station are mailed free to all residents of this state who make application for them.

The Agricultural Experiment Station of the University of Minnesota was established by National and State legislation in 1887. The function of the Experiment Station as set forth in the Hatch Act is "to aid in acquiring and diffusing among the people useful and practical information on the subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and applications of agricultural science." The funds provided by the National Government have been supplemented recently by the Adams Act which will ultimately provide $15,000 annually, and appropriations for special lines of experimental work have also been made by the State Legislature.

The Experiment Station is located at University Farm, St. Anthony Park, and is one of the Divisions of the Department of Agriculture of the University of Minnesota, and the officers of the station are also professors and insructors in the School and College of Agriculture. The chief

executive officer of the station is the Director who is also Dean of the College of Agriculture. Affiliated with the main station are a score or more of trial stations maintained by the State Horticultural Society. The Experiment Station also carries on co-operative tests and investigations with the U. S. Department of Agriculture and with farmers in various parts of the State. The Station has published since its organization in 1887, one hundred regular, twenty-six press and fifteen class bulletins.

The principal lines of work conducted at the station are as follows: Chemistry of soils and farm crops; field experiments—rotations, tests of varieties of cereals and forage crops, time and depth of seeding grains and amount of seed, methods of seeding grasses; horticultural—tests of varieties of fruits and vegetables, use of wind-breaks, testing hardy stocks for apple trees, improvement of native fruits; forestry; diseases of plants; food and nutrition of man; plant and animal breeding; feeding experiments; diseases of animals; entomology; dairying; farm management and farm statistics.

EXPERIMENT FARM AT CROOKSTON.

To provide for the conditions existing in the northwestern part of the state an experiment farm was established at Crookston in 1895. It was located about a mile north of the city and is provided with 480 acres of land, besides barns, machinery, live stock and the necessary equipment for carrying on experimental work adapted to this locality. It is in connection with this farm that the Crookston School of Agriculture has been established.

EXPERIMENT FARM AT GRAND RAPIDS.

The legislature of 1895 also provided for a second experiment farm to make possible a more thorough study of the agricultural conditions of the northeastern portions of the state. This farm was located at Grand Rapids April 16, 1896, and lies two miles east of the village. It contains approximately 375 acres of land, with the necessary farm equipment consisting of dwelling house, barns, machinery, live stock, etc.

Publications of the Department of Agriculture

BULLETINS OF THE EXPERIMENT STATION FOR 1906.

ANNUAL REPORT FOR 1906.

GENERAL BULLETINS:

No. 94 Soil Investigations.
- 1 Fertilizer Tests with Wheat and Corn.
- 2 The Loss of Nitrogen from Soils.

No. 95 Some Common Weeds and Their Eradication.

No. 96 Ornamental Trees, Shrubs, and Herbaceous Plants in Minnesota.

No. 97 The Cost of Producing Farm Products.

No. 98 Stable Ventilation, Purpose, Scope, and Need for Such Work.

No. 99
- 1 The Calculated and Determined Nutrients of Rations.
- 2 The Digestibility and Value of Emmer.
- 3 The Heat Producing Value of the Crude Fat of Fodders and Grains.

No. 100 The Cabbage Maggot and Other Injurious Insects of 1906.

PRESS BULLETINS:

No. 25 Results of Work of 1905 with the Cabbage Maggot. Suggestions to Growers of Cabbage, Cauliflower, and Radishes.

No. 26 An Entomological Calendar.

THE COLLEGE of LAW

The College of Law

FACULTY.

CYRUS NORTHROP, LL.D., President.

WILLIAM S. PATTEE, LL.D., Dean and Professor of Law.

A. C. HICKMAN, LL.D., Professor of Law.

JAMES PAIGE, A.M., LL.M., Professor of Law.

HENRY J. FLETCHER, LL.M., Professor of Law.

EDWIN A. JAGGARD, LL.D., Associate Justice of the Supreme Court.

HOWARD S. ABBOTT, B.L., of the Hennepin County Bar.

ROBERT S. KOLLINER, LL.B., of the Hennepin County Bar.

HUGH E. WILLIS, A. M., LL.M., Assistant Professor.

HUGH V. MERCER, LL.M., Minneapolis.

HOMER W. STEVENS, A.B., LL.M., Librarian.

CHARLES W. BUNN, St. Paul.
Federal Jurisdiction.

CHRISTOPHER D. O'BRIEN, St. Paul.
Criminal Procedure.

JARED HOW, LL.B., St. Paul.
Landlord and Tenant.

Special Lecturers for 1907-1908

JOHN LIND, Minneapolis, Ex-Governor of Minnesota, Interstate Commerce.

CHARLES B. ELLIOTT, Minneapolis, Associate Justice of Supreme Court, Modern Problems in International Law.

A. B. JACKSON, LL.B., Minneapolis, Conflict of Laws.

T. D. O'BRIEN, St. Paul, Proper Exercise by the State of its Police Power.

JOHN W. WILLIS, A.B., St. Paul, Ancient, Medieval and Modern Lawyers.

WILLIAM F. LANCASTER, Minneapolis, Obligation of Contracts.

ROME G. BROWN, A.M., Minneapolis, Water-rights.

DANIEL FISH, Minneapolis, Statutory Construction.

EDMUND S. DURMENT, St. Paul, Right of Eminent Domain.

JOHN F. MCGEE, Minneapolis, Federal and State Legislation.

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 faciliate 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 acuracy 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.

LAW BUILDING.

The Law building, recently enlarged, is admirably adapted to the uses for which it was constructed. It supplies ample facilities for all the varied exercises of the College. The accompanying cut shows its external form and style of architecture. The entire upper story is devoted to the library and reading room, except that portion of it conveniently arranged for the Judge's Chambers, the Court room, the Clerk's office, the Jury room, and the offices of the Dean. Upon the first floor there is a large and convenient auditorium, lecture rooms, and private offices for the professors, beside the general office for the special business of the department. Under the most recently constructed portion of the building there is a well-lighted and convenient basement, devoted to society rooms for the legal, literary, and debating organizations. As now reconstructed and arranged the building provides all the conveniences of a modern Court-house for the practice department, furnishes ample light and well-ventilated reading rooms and other excellent library facilities, and affords

sufficient room for all the other regular work of the College.

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, may be 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.*

English, Four years, including
- (a) Classics.
- (b) Principles of composition.
- (c) Practice in written expression.

Algebra, elementary, one year.

Geometry, plane, one 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 *nine* year-credits, or their equivalent, to be chosen from the following list:

Algebra, higher, one-half year.

Geometry, solid, one-half year.

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).
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.
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).
Commercial Geography, (one-half or one 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 before 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, throughout the senior year, work in the College of Law, including the elements of contracts, domestic relations, torts, criminal law and negotiable paper. The satisfactory completion of the above named subjects will give the student a six hour credit throughout the senior year, 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.

ELECTIVES IN OTHER DEPARTMENTS.

Students in the College of Law, may be permitted, after the Junior year and under proper regulations, to elect work in other departments of the University, without extra charge, so far as it does not interfere with their work in Jurisprudence. The faculty of law encourage students to avail themselves of this opportunity during the Middle and Senior years, but such election of work should be made only after consultation with the faculty. Among the subjects which may be profitably selected are English and American Constitutional History, political science, and economics. Students who elect such work must complete it in a satisfactory manner before the degree in law will be conferred upon them.

TRANSFER OF STUDENTS.

Students who matriculate in the College of Science, Literature and the Arts, or in other departments of the University, and fail in their work in such college, will not be admitted to the College of Law until such unfinished work shall have been satisfactorily completed.

The faculty earnestly advises all young men contemplating a course in law, and especially those who expect to engage in practice, to take the first two years at least, in the College of Science, Literature and the Arts, and if possible to complete the entire course there, before entering the College of Law.

DAY COURSE OF THREE YEARS.

FIRST YEAR—JUNIOR.

Contracts (including Statute of Frauds). Twelve weeks. Illustrative cases. PROFESSOR FLETCHER

Personal Property and Sales. Eight weeks. Illustrative cases. ASSISTANT PROFESSOR WILLIS

Domestic Relations. Four weeks. Illustrative cases. PROFESSOR PAIGE

Common Law Pleading. Three weeks. Phillips. PROFESSOR HICKMAN

Torts. Nine weeks. Illustrative cases. PROFESSOR PAIGE

Equity (Maxims). Four weeks. Illustrative cases. DEAN PATTEE

Blackstone (Second Book). Four weeks. Lewis' or Cooley's Blackstone. PROFESSOR PAIGE

Criminal Law. Five weeks. Illustrative cases. PROFESSOR PAIGE

Agency. Three weeks. Illustrative cases. PROFESSOR PAIGE

Commercial Paper. Four weeks. Illustrative cases. PROFESSOR PAIGE

SECOND YEAR—MIDDLE.

Wills and Administration. Four weeks. Illustrative cases. PROFESSOR PAIGE

Chattel Mortgages. Three weeks. Cases. PROFESSOR FLETCHER

Partnership. Four weeks. Illustrative cases. PROFESSOR PAIGE

Code Pleading. Seven weeks. Phillips on Code Pleading and Illustrative cases. PROFESSOR HICKMAN

Liens. Two weeks. Cases. PROFESSOR FLETCHER

Bankruptcy. Two weeks. Cases. PROFESSOR FLETCHER

Bailments and Carriers. Four weeks. Cases. ASSISTANT PROFESSOR WILLIS

Private Corporations. Five weeks. Illustrative cases.
ROBERT S. KOLLINER, LL.B.

Public Corporations. Three weeks. Illustrative cases.
HOWARD S. ABBOTT, B.L.

Insurance. Three weeks. Illustrative cases.
ASSISTANT PROFESSOR WILLIS

Equity (Doctrines). Four weeks. Illustrative cases.
DEAN PATTEE

Real Property (including Covenants and Conveyancing). Twelve weeks. Illustrative cases.
PROFESSOR FLETCHER

Landlord and Tenant. Two weeks. Illustrative cases.
JARED HOW, ESQ.

THIRD YEAR—SENIOR.

Evidence. Five weeks. Greenleaf on Evidence (First Vol.) and Illustrative cases. PROFESSOR HICKMAN

Trusts. Three weeks. Cases.
PROFESSOR FLETCHER

Minnesota Real Property. Four weeks. Cases.
PROFESSOR PAIGE

Equity (Accident, Mistake and Fraud). Four weeks. Illustrative cases. DEAN PATTEE

Mortgages and Mortgage Foreclosure. Four weeks. Illustrative cases. DEAN PATTEE

International Law. Four weeks. Davis' International Law. PROFESSOR FLETCHER

Taxation. Four weeks. Professor's Text Book and Illustrative cases. JUDGE E. A. JAGGARD

Constitutional Law. Six weeks. Illustrative cases.
PROFESSOR FLETCHER

College Court. (Each student is required to have two cases in court of Justice of the Peace).
Four cases in District Court. A. C. HICKMAN, Judge
One case in Supreme Court. W. S. PATTEE,
C. M. FERGUSON, H. E. WILLIS, Justices.

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.

Contracts and Statute of Frauds. Nine weeks. Illustrative cases. ASSISTANT PROFESSOR WILLIS

Bailments and Carriers. Four weeks. Cases. ASSISTANT PROFESSOR WILLIS

Domestic Relations. Three weeks. Illustrative cases. PROFESSOR PAIGE

Criminal Law. Five weeks. Illustrative cases. PROFESSOR PAIGE

Agency. Three weeks. Illustrative cases. PROFESSOR PAIGE

Torts. Eight weeks. Illustrative cases. ROBERT S. KOLLINER, LL.B.

Commercial Paper. Four weeks. Illustrative cases. PROFESSOR PAIGE

SECOND AND THIRD YEARS—MIDDLE AND SENIOR—FOR 1907-1908.

Wills and Administration. Four weeks. Illustrative cases. PROFESSOR PAIGE

Partnership. Four weeks. Illustrative cases. PROFESSOR PAIGE

Private Corporations. Four weeks. Illustrative cases. ROBERT S. KOLLINER, LL.B.

Public Corporations. Three weeks. Illustrative cases. ASSISTANT PROFESSOR WILLIS

Liens. Two weeks. Cases. PROFESSOR FLETCHER

Bankruptcy. Two weeks. Cases.
PROFESSOR FLETCHER

Insurance. Three weeks. Illustrative cases.
ASSISTANT PROFESSOR WILLIS

Constitutional Law. Five weeks. Illustrative cases.
PROFESSOR FLETCHER

Mortgages and Mortgage Foreclosure. Three weeks. Illustrative cases. DEAN PATTEE

Personal Property and Sales. Six weeks. Illustrative cases. ASSISTANT PROFESSOR WILLIS

(College Court Work for Seniors.)

SPECIAL COURSE.

For the benefit of those who do not care to pursue an extended course of legal instruction, but desire such a knowledge of law as will be of value to them in a business career, the foregoing regular courses are arranged so that, upon consultation with the faculty and registration as special students, such men may pursue certain special courses, embracing the following: Contracts, including statute of frauds; agency; commercial paper; partnership; bankruptcy law; liens; bailments; master and servant; insurance; sales; and such other subjects as their business life or preference may render desirable.

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 1907 and 1908 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 dollors 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 the Court House. 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 7:30 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.

All Junior and Middle day classes have six sessions a week; all night classes and the senior day class have five sessions a week, not meeting on Saturdays.

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 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, for such students as the Faculty may select because of their low grades, or because their work was, in whole or in part, taken in another school, and if any student fails to pass this examination satisfactorily to the faculty he will be denied admission to the Senior class.

EXAMINATION FOR GRADUATION.

While the grades secured by students upon examination at the end of each subject will, as a general rule stand as a final grade, yet, if a student has taken any part of his work in an office or in another law school, or for any other reason the faculty consider a review of any student's work desirable, he shall take such examination upon such subjects as the faculty may select, and only upon passing such examination satisfactorily to the faculty, shall he be entitled to his diploma.

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 practioner, 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 class-room direct from the bar, bringing with them fresh experiences and the spirit of actual contest. They all possess a high ideal of what a lawyer should be and do, and the student who enters here is expected to come with the fixed purpose of attaining a high degree of excellence in 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.

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. Students who pass their examinations with distinguished excellence will receive the degree of Bachelor of Laws, *cum laude.*

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 the 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 com-

mence, 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.

DEPARTMENT of MEDICINE

THE COLLEGE OF MEDICINE AND SURGERY

CALENDAR FOR 1907-1908

1907

MAY

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

JUNE

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

SEPTEMBER

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

OCTOBER

..	..	1	2	3	4	5
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13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..
..	..	..	..	..	..	..

NOVEMBER

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

DECEMBER

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

1908

JANUARY

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

FEBRUARY

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

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

APRIL

..	..	..	1	2	3	4
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12	13	14	15	16	**17**	**18**
19	20	21	22	23	24	25
26	27	28	29	30	..	..
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MAY

..	..	..	..	..	1	2
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10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	**30**
31	..	..	..	..	..	..

JUNE

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

1907-1908

THE UNIVERSITY YEAR

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

FIRST SEMESTER

SEPTEMBER	11 W.	Entrance and condition examinations. Registration.	
	12 Th.	Entrance and condition examinations. Registration.	
	13 F.	Entrance and condition examinations. Registration.	
	14 S.	Entrance and condition examinations. Registration.	
	16 M.	Registration and classification of students. Opening lecture, 8:00 p. m.	
	17 T.	Classes for regular work.	
	21 S.	.....	1 wk.
	28 S.	.....	2 wk.
OCTOBER	5 S.	.....	3 wk.
	12 S.	.....	4 wk.
	19 S.	.....	5 wk.
	26 S.	.....	6 wk.
NOVEMBER	2 S.	.....	7 wk.
	9 S.	.....	8 wk.
	16 S.	First quarter ends.	9 wk.
	18 M.	Second quarter begins.	
	23 S.	.....	10 wk.
	28 Th.	Thanksgiving Day. Recess three days.	
	30 S.	.....	11 wk.
DECEMBER	7 S.	.....	12 wk.
	14 S.	.....	13 wk.
	21 S.	Holiday recess begins. No classes.	14 wk.
JANUARY	7 T.	Work resumed in all classes.	
	11 S.	.....	15 wk.
	18 S.	.....	16 wk.
	25 S.	.....	17 wk.
FEBRUARY	1 S.	End of first semester.	18 wk.

SECOND SEMESTER

FEBRUARY	4 T.	Third quarter begins. Work resumed in all classes.	
	8 S.	.....	1 wk.
	12 W.	Lincoln's Birthday—Holiday.	
	15 S.	.....	2 wk.
	22 S.	Washington's Birthday—Holiday.	
	22 S.	.....	3 wk.
	29 S.	.....	4 wk.
MARCH	7 S.	.....	5 wk.
	14 S.	.....	6 wk.
	21 S.	.....	7 wk.
	28 S.	.....	8 wk.
APRIL	4 S.	Third quarter ends.	9 wk.
	6 M.	Fourth quarter begins.	
	11 S.	.....	10 wk.
	17 F.	Good Friday. Holiday two days.	
	18 S.	.....	11 wk.
	25 S.	.....	12 wk.
MAY	2 S.	.....	13 wk.
	9 S.	.....	14 wk.
	16 S.	.....	15 wk.
	23 S.	.....	16 wk.
	30 S.	Decoration Day. Holiday.	17 wk.
JUNE	5 F.	Annual Faculty meeting.	
	6 S.	End of second semester.	18 wk.

COMMENCEMENT WEEK, 1908.

Sunday,	June 7	Baccalaureate Service.
Monday	June 8	Senior Class Exercises.
Tuesday,	June 9	Phi Beta Kappa Address. Senior Promenade.
Wednesday,	June 10	Alumni Day.
Thursday,	June 11	Commencement Day—The Twentieth Annual Commencement of this College.
Friday,	June 12	Summer Vacation begins.

SCHEDULE OF EXAMINATIONS FOR ADVANCED STANDING AND TO REMOVE CONDITIONS.

September 11-14, 1907.

Wednesday, Sept. 11, 9:00 a. m.

I. Year.
II. Year Histology and Embryology, practical.
III. Year Special Pathology and Bacteriology, practical.
IV. Year.

2:00 p. m.

I. Year Histology and Embryology, practical.
II. Year General Pathology and Bacteriological, practical.
III. Year Practical Pharmacy.
IV. Year.

Thursday, Sept. 12, 9:00 a. m.	2:00 p. m.
I. Year Physiology.	I. Year Histology and Embryology, written.
II. Year Chemistry.	II. Year Histology and Embryology, written.
III. Year Principles of Surgery.	III. Year Surgery.
IV. Year Tumors.	IV. Year Surgery.

Friday, Sept. 13, 9:00 a. m.	2:00 p. m.
I. Year Chemistry.	I. Year.
II. Year Physiology.	II. Year General Pathology and Bacteriology, written.
III. Year Practice of Medicine.	III. Year Special Pathology and Bacteriology, written.
IV. Year Practice of Medicine.	IV. Year Obstetrics.

Saturday, Sept. 14, 9:00 a. m.	2:00 p. m.
I. Year Anatomy.	I. Year.
II. Year Anatomy.	II. Year Materia Medica and Pharmacology.
III. Year Surgical Anatomy.	III. Year Therapeutics.
IV. Year Clinical Microscopy.	IV. Year.

Examination for advanced standing and to remove conditions in the following third and fourth-year subjects will be held by *appointment* during September 11-14; Operative Surgery, Diseases of Children, Medical Jurisprudence, Physical Diagnosis, Nervous and Mental diseases, Gynecology, Ophthalmology and Otology, Genito-Urinary diseases, Orthopaedia, Skin and Nervous diseases, Rhinology and Laryngology, Hygiene. Elective courses.

Students must register for examinations in Dean's office at least twenty-four hours prior to any examination they may wish to take. See also under Rules, page 40.

Conditioned students will not be admitted to any examination without presenting receipt from the Cashier. for the examination fee, to the Dean and obtaining entrance ticket.

The Department of Medicine

The Department of Medicine includes the following colleges:

The College of Medicine and Surgery
FRANK F. WESBROOK, M.A., M.D., C.M., *Dean.*
THOMAS G. LEE, *B.S.*, M.D., *Librarian Department of Medicine.*

The College of Homeopathic Medicine and Surgery
EUGENE L. MANN, B.S., M.D., *Dean.*

The College of Dentistry
ALFRED OWRE, D.M.D., M.D., *Dean.*

The College of Pharmacy
FREDERICK J. WULLING, Phm.D., LL.M., *Dean.*

Each College is self-governed as to its internal affairs, having its own Faculty and an independent curriculum. The laboratories and staff of the College of Medicine and Surgery provide instruction for all students in each of the four Colleges as required in the following branches:

Gross and microscopic anatomy or embryology, physiology, chemistry, physiological chemistry, pathology and bacteriology, pharmacology, principles of surgery and clinical microscopy.

CLINICAL AND LABORATORY FACILITIES.

The medical quadrangle is located on the University Campus overlooking the Mississippi River and is between the business centers of the Twin Cities and connected therewith by two trunk trolley lines which brings the student in ready connection with all of the hospitals of the two cities. The quadrangle contains Millard Hall, Medical Science building, the laboratories of Chemistry, the laboratory of Anatomy and the Institute of Public Health and Pathology, whilst use is made of the laboratory of Animal Research of the State Board of Health which immediately adjoins the Institute of Public Health and Pathology.

The University Hospital for the College of Medicine and Surgery, the gift of the late Dr. A. F. and Mrs. Elliott and Mr. Walter J. Trask, of Los Angeles, Cal., is in the process of construction at a cost of about $120,000. The hospital is being located on a site of ten acres overlooking the river and will form a part of the present medical quadrangle. This hospital site of ten acres was purchased by means of a gift of $50,000 from generous citizens of Minneapolis to the College. Provision for the en-

largement of the hospital site and for the acquirement of the land which intervenes between it and the medical quadrangle has already been made by the last state legislature's appropriation of $450,000 for Campus extension.

The University clinical building is located across the river within a few hundred yards of the medical quadrangle and hospital. It is owned and controlled by the University and is located in a portion of the city best suited for a satisfactory outdoor service.

The Free Dispensary of St. Paul is advantageously located and under the control of the College.

The College of Medicine and Surgery is in intimate relationship with the numerous hospitals, infirmaries and dispensaries of the Twin Cities and also with the medical departments of the various state correctional and charitable institutions for which Minnesota is so justly noted. St. Mary's Hospital, Rochester, St. Mary's Hospital, Duluth and the Duluth Health Department, are in close affiliation with the College through their laboratories.

HOSPITALS

The Twin Cities with a population of over 500,000, through their several hospitals, afford clinical service to the amount of nearly sixteen hundred and twenty (1620) beds. During the last year, important additions have been made to almost every hospital in the two cities, some of them having doubled their capacity.

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 clinical cases. This makes it possible to divide the classes into small sections, so that each student has equal opportunities of observation and is in close touch with both teacher and patient.

St. Paul City and County Hospital has a capacity of four hundred (400) beds and is the largest and most complete of its kind in the northwest. One-third of the members of its staff are on the staff of this College and in their service the entire clinical facilities are at the disposal of the College. It enters over two thousand (2,000) patients annually, a large proportion of whom are of the emergency order or are suffering from acute disease. The opportunities for bedside instruction are very great and the hospital theatres, which are new and thoroughly equipped, are maintained for teaching purposes. A recent and thoroughly modern fireproof pavilion for contagious diseases is provided where the students have unexcelled opportunities to study diphtheria, scarlatina, erysipelas, etc. A separate

building is provided for midwifery and senior students see labor cases under the personal supervision of the professor or instructor in obstetrics.

The orthopedic department contains a large number of crippled and deformed children and houses the State Hospital for Crippled and Deformed Children, all of which work is under the control of the Professor of Orthopedic Surgery.

The City Hospital, Minneapolis, places its entire clinical material at the command of the clinical teachers of the University. It is a large, thoroughly modern hospital with splendid equipment and has a capacity of two hundred (200) beds. During the year 1906, one thousand eight hundred and thirty-six (1836) patients were treated in the hospital, and two thousand four hundred and fifty (2450) patients in the out-patient department and hospital dispensary. A new administration building has just been completed by the city at a cost of $55,000 and a pavilion for the care of the incurable is planned for early completion. A modern, newly erected contagious ward furnishes excellent opportunities for bedside clinical instruction in contagious diseases under the direction of the Professor of Diseases of Children. In the City Hospital, both bedside and amphitheatre, medical and surgical clinics are conducted twice weekly throughout the year by members of the Faculty. Clinics in diseases of the skin, nervous diseases, obstetrics, etc., are likewise given in the hospital throughout the school year. Special medical bedside clinics are conducted in the wards of the hospital to small sections of senior students, during the year, by members of the Faculty.

Asbury Methodist Hospital, Minneapolis, affords clinical material for the State University. The authorities have recently erected a large and beautiful building, only a portion of which is as yet occupied. It has a capacity of one hundred and sixty (160) beds, and when the building is entirely completed, the hospital will have a capacity of nearly three hundred and fifty (350) beds. Many members of the Faculty are on the staff of the Hospital and semi-weekly clinics are given by them in this hospital.

St. Joseph's Hospital, St. Paul, with one hundred and thirty (130) beds and one of the finest amphitheatres with every modern device, contributes largely to the clinical instruction. Members of the Faculty are on the staff and give clinics twice every week.

Northwestern Hospital, Minneapolis, affords splendid surgical material, available to this College alone. Semi-weekly clinics in surgery are given in its amphitheatre, and in three operating rooms and wards, by members of the Faculty. It has a capacity of one hundred (100) beds and during 1906, treated one thousand (1000) patients.

St. Luke's Hospital, St. Paul, with a capacity of one hundred (100) beds, is largely devoted to surgical clinics. Clinics of this College are held

in this hospital twice a week, by the several members of its staff who are on the College Faculty. Two operating rooms, with conveniences for students give unusual facilities and a service of the highest order.

The Swedish Hospital, Minneapolis, with a capacity of one hundred and fifteen (115) beds, is housed in a newly constructed modern building and members of this Faculty exclusively utilize the material of the hospital for teaching purposes. During the year 1906, one thousand four hundred and fifty-six (1456) patients were treated.

St. Barnabas Hospital, Minneapolis, with a capacity of one hundred (100) beds, furnishes medical and surgical material for clinics to junior and senior classes of the University. Semi-weekly clinics throughout the College year are held. During the preceding year, one thousand six hundred and seventeen (1617) patients were treated at this hospital.

St. Mary's Hospital, Minneapolis, also furnishes clinical material for the University. The Hospital is located directly across the Mississippi River from the new University Hospital. It has a capacity of one hundred (100) beds and treated twelve hundred (1,200) patients during the last year.

The Norwegian Hospital, Minneapolis, is being erected, immediately across the river from the new University Hospital and amongst other things will provide a sanatorium for the treatment of tuberculosis.

DISPENSARIES

In its clinical instruction, the Medical Department makes use of two well organized free dispensaries, each having a large outdoor service. The University Clinical building is located acros the river from the medical department proper. , at 1810 Washington Ave. S., Minneapolis. It is a large three-story building, 40x150 feet, situated in a thickly populated part of Minneapolis, and received twenty-five hundred (2,500) new patients per year or an average of thirty-three (33) daily. The staff is composed exclusively of the members of the Faculty and their assistants and is organized under a chief of staff.

The service is divided into medical, surgical, gynaecological, eye and ear, nose and throat, skin and venereal, mental and nervous departments. Senior students are required to attend daily the clinics at the free dispensary. They are drilled in the taking of histories, the making of physical examinations, etc. Sections of senior students are assigned each day to the drug room of the dispensary and to the laboratory of clinical microscopy, located in the basement of the building. The free dispensary also provides a residence service for senior students, which service is elective and open to a limited number of the senior students. Students electing this service are required to reside at the dispensary and attend the emergency,

sick and accident calls, under the direction of a resident, graduate qualified house officer. An obstetrical out-service department is also conducted and obstetrical cases are assigned to sections of senior students. These clinics are conducted under the direction of some member of the obstetrical staff.

The St. Paul Free Dispensary is centrally located in a twenty-room building and its clinical service is wholly under the control of the staff of the University instructors. Forty (40) patients daily are treated throughout the year. The students of the third and fourth years are on duty two days per week at this Dispensary and for certain of the clinical divisions attend every day.

Clinical Opportunities*

Clinical records are kept by each member of the junior and senior classes in which are listed the cases seen, with dates, name of instructor, name of hospital and other important data. These records must be filed with the heads of Departments and in the Dean's office.

During the year 1906-07,, these records were carefully kept and in order to gain an idea of the opportunities which a single student might expect to have at his disposal, the record of one of the senior students, taken at random, has been analyzed. It is not exceptional, but may be taken as representative.

Seven hundred and twenty-eight (728) cases have been reported by this single member of the senior class as coming under his observation and studied during a period of nine months. This number by no means represents the total of clinics, but simply those seen by him alone, nor are any of the junior year clinics included. Approximately, it is the work done by every member of the class, although the clinical instruction is constantly varying because of the small sections and individual teaching which form the basis of modern methods. Indeed, comparatively few clinical lectures are given to the class as a whole. Students come in close relation with patients and study them much the same as though the cases were their own.

* See also under Alumni Association, page 74.

The following is a summary of the clinics as reported by this one student:

	Number of Cases.	Number of Instructors.	Number of Hospitals and Dispensaries.
Internal medicine	168	13	8
Surgery	158	16	11
Orthopedia	48	4	4
Pediatrics	33	3	4
Neurology	68	7	4
Skin, Venereal and Genito-Urinary	72	11	5
Nose and throat	61	5	4
Gynaecology	40	8	8
Eye and ear	70	3	3
Obstetrics	10	5	4
Total	728	75	

MINNEAPOLIS CLINICS

Thursday

Hour	Subject	Clinican	Hospital
9:00-11:00	Medicine	Prof. Bell or Prof. Nootnagel and Dr. Rees	City.
11:00-12:00	Medicine	Prof. Head	
9:00-10:30	Eye and Ear	Prof. Todd	City.
11:00-12:00	Medicine	Dr. Rees	N. W. City, Asby.
9:00-10:30	Surgery	Prof. Little	City.
10:30-12:00	Gynecology	Dr. Benjamin	Asbury, City.
1:00- 2:00	Medicine	Prof. Hunter	St. Barnabas.
1:00- 2:00	Surgery	Dr. Mann	City.
1:00- 2:00	Medicine	Prof. Head	City, Clin. Building.
2:00- 3:00	Neurology	Prof. Jones	Clin. Building.
3:00- 4:00	Dermatology	Prof. Vander Horck or Dr. Wright	City, Clin. Building.
4:00- 6:00	Autopsies	Prof. White	City.

Saturday

9:00-11:00	Surgery	Prof. Moore	Northwestern.
11:00-12:00	Gynecology	Prof. Abbott or Dr. Williams	N. W., City.
9:00-11:00	Surgery	Prof. Dunsmoor	Swedish, City.
11:00-12:00	Pediatrics	Prof. Roberts	Clin. Building.
9:00-10:30	Nose and Throat	Prof. Murray	Asbury, City.
10:30-12:00	Medicine	Prof. Nippert	City.
1:00- 2:30	Orthopedics	Dr. Geist	Clinic Building.
1:00- 2:30	Pediatrics	Dr. Dart	Clinic Building.
1:00- 2:30	Gynecology	Dr. Williams	Clinic Building.
1:00- 2:30	Pharmacology	Mr. Bachmann	Clinic Building.
1:00- 2:30	Clinical Microscopy	Dr. Ulrich	Clinic Building.
1:00- 2:30	Medicine	Prof. Staples or Dr. Cross	City, N. W. Clinic Building.
1:00- 2:30	Surgery	Prof. Stewart	City, N. W.
2:30- 3:30	Obstetrics	Dr. Litzenberg	Clinic Building.
2:30- 3:30	Surgery	Dr. Farr	St. Mary's.
2:30- 3:30	Medicine	Dr. Cross	City.
2:30- 3:30	Medicine	Dr. Sheldon	City.
4:00- 6:00	Autopsies	Prof. White	City.

Contagious Diseases. During October, November and December, the senior class, one section at a time, will be given a clinic at the City Hospital by Prof. Roberts or Dr. Dart on Mondays, Wednesdays and Fridays from 11 to 12.

Practical Physical Diagnosis (for juniors) on Tuesdays, Wednesdays and Fridays, from 12:30 to 1:30, by Profs. Nippert and Nootnagel and Dr. Rees at the Clinical Building.

Parturition clinics throughout the year by Prof. Cates and Dr. Litzenberg (for seniors) at City Hospital and other places.

Bedside clinics in medicine, Monday, 4:30-5:30, at City Hospital by Prof. White. (One section.)

Bedside clinic in medicine, Wednesday, 4:30-5:30, at City Hospital by Dr. Sheldon. (One section.)

ST. PAUL CLINICS

Thursday

Hour	Subject	Clinican	Hospital
9:00-10:00	Orthopedia	Prof. Gillette	City, St. J., St. L.
10:15-12:00	Surgery	Prof. McLaren	St. L., St. J.
10:15-12:00	Surgery	Prof. O'Brien	St. Joseph.
10:15-12:00	Gynecology	Prof. Rothrock	City (2nd sem.)
1:30- 2:30	Medicine	Prof. Greene	Disp. (2nd sem.)
1:30- 2:30	Medicine	Dr. Hoff	Disp.
1:30- 2:30	Medicine	Dr. Stumm	Disp. (1st sem.)
1:30- 2:30	Surgery	Dr. Dennis	Disp. (1st sem.)
1:30- 2:30	Surgery	Dr. Goodrich	Disp. (2nd sem.)
1:30- 2:30	Neurology	Dr. Dunning	Disp.
1:30- 2:30	Neurology	Dr. Ball	Disp. (Apr. 1.)
1:30- 2:30	Ophthalmology	Dr. Appleby	Disp.
1:30- 2:30	Pediatrics	Dr. Ramsey	Disp. (2nd sem.)
1:30- 2:30	Pediatrics	Prof. Christison	Disp. (1st sem.)
1:30- 2:30	Ear, Nose, Throat.	Prof. Schadle	Disp.
2:30- 3:30	Medicine	Dr. Hoff	Disp. (1st sem.)
2:30- 3:30	Genito-Urinary	Dr. Coon	City (2nd sem.)
3:00- 4:00	Medicine	Prof. Abbott	City (2nd sem.)
4:00- 5:00	Medicine	Prof. Abbott	City (2nd sem.)
4:00- 5:00	Medicine	Prof. Senkler	City (2nd sem.)
4:00- 5:00	Pediatrics	Dr. Cook	City (2nd sem.)
4:00- 5:00	Pediatrics	Dr. Ramsey	City (1st sem.)
4:00- 5:00	Obstetrics	Dr. Leavitt	City (2nd sem.)
4:00- 5:00	Surgery	Dr. Colvin	City (2nd sem.)
4:00- 5:00	Genito-Urinary	Dr. Armstrong	City (1st sem.)
4:00- 5:00	Ophthalmology	Dr. Burch	City (2nd sem.)

Saturday

9:00-10:00	Neurology	Prof. Riggs	Dispensary, City.
10:15-12:00	Surgery	Prof. Rogers	City, St.L., St. J.
10:15-12:00	Surgery	Prof. Ohage	City, St.L., St. J.
10:15-12:00	Gynecology	Prof. Rothrock	City (2nd sem.)
1:30- 2:30	Medicine	Prof. Greene	Disp. (2nd sem.)
1:30- 2:30	Medicine	Dr. Hoff	Disp.
1:30- 2:30	Medicine	Dr. Stumm	Disp. (1st sem.)
1:30- 2:30	Surgery	Dr. Dennis	Disp. (1st sem.)
1:30- 2:30	Surgery	Dr. Goodrich	Disp. (2nd sem.)
1:30- 2:30	Neurology	Dr. Dunning	Disp.
1:30- 2:30	Pediatrics	Dr. Ramsey	Disp. (2nd sem.)
1:30- 2:30	Pediatrics	Prof. Christison	Disp. (1st sem.)
1:30- 2:30	Ear, Nose, Throat.	Prof. Schadle	Disp.
1:30- 2:30	Skin and Sypl.	Prof. Foster	Disp.
2:30- 3:30	Pediatrics	Dr. Ramsey	Disp. (1st sem.)
3:00- 4:00	Medicine	Prof. Abbott	City (2nd sem.)
4:00- 5:00	Medicine	Prof. Abbott	City (2nd sem.)
4:00- 5:00	Medicine	Prof. Senkler	City (2nd sem.)
4:00- 5:00	Pediatrics	Dr. Cook	City (2nd sem.)
4:00- 5:00	Pediatrics	Dr. Ramsey	City (1st sem.)
4:00- 5:00	Obstetrics	Dr. Leavitt	City (2nd sem.)
4:00- 5:00	Surgery	Dr. Colvin	City (2nd sem.)
4:00- 5:00	Genito-Urinary	Dr. Armstrong	City (1st sem.)
4:00- 5:00	Ophthalmology	Dr. Burch	City (2nd sem.)

Note.—When no time is mentioned, the clinics continue throughout both semesters.

Gynecology. Prof. Stone at St. Joseph's Hospital.

Gynecology. Prof. Rothrock and Dr. H. P. Ritchie, daily clinic at Dispensary. (One student.

Parturition Clinics throughout the year at the City Hospital, Maternities, Dispensary Out-service, with Prof. Leavitt and Dr. Jeanette McLaren. (One to five students.)

DISPENSARY CLINICS

At the Clinical Building from 1:00 to 3:00 p. m.

FIRST AND SECOND SEMESTERS, 1907-1908

	Monday	Tuesday	Wednesd'y	Thursday	Friday	Saturday	
Medicine	Prof. Head and Dr. Aurand	Prof. Nootnagel and Dr. Rees	Prof. Nippert and Dr. Rees	Prof. Head and Dr. Aurand	Dr. Sheldon and Dr. Adair	Dr. Sheldon and Dr. Adair	2 Sections
Surgery	Dr. Mann	Dr. Law	Dr. Mann	Dr. Condit	Dr. Law	Dr. Condit	1 Section
Nose & Throat	Dr. Campbell	Dr. Murray	Dr. Mead	Dr. Campbell	Prof. Murray	Dr. Mead	1 Section
Pediatrics	Dr. C. B. Wright	Dr. Dart	Dr. C. B. Wright	Dr. Dart	Dr. C. B. Wright	Dr. Dart	Section
Eye and Ear	Dr. Wells	Dr. Macnie	Dr. Macnie	Dr. Wells	Dr. Macnie	Dr. Wells	1 Section
Skin and Venerial	Dr. F. R. Wright	Dr. Schweitzer	Dr. F. R. Wright	Dr. Schweitzer	Dr. F. R. Wright	Dr. Schweitzer	1 Section
Neurology	Dr. Hamilton	Dr. H.W. Jones	Dr. Hamilton	Dr. H. W. Jones and Dr. Loberg	Dr. Hamilton	Dr. Loberg	1 Section
Gynaecology	Dr. Benjamin	Dr. Williams	Dr. Benjamin	Dr. Williams	Dr. Benjamin	Dr. Williams	2 Students
Pharmacology	Mr. Bachmann	Mr. Bachmann	Mr. Bachmann	Mr. Bachmann	Mr. Bachmann	Mr. Bachmann	2 Students
Clinical Microscopy	Dr. Ulrich	Dr. Ulrich	Dr. Ulrich	Dr. Ulrich	Dr. Ulrich	Dr. Ulrich	2 Students
Orthopedics	Dr. Geist		Dr. Geist			Dr. Geist	1 Section

LIBRARY OF MEDICAL DEPARTMENT

Thomas G. Lee, B.S., M.D., Librarian.

The Medical Library consists of the following collections: The general Clinical library, the libraries of the Colleges of Dentistry and Pharmacy, the departmental libraries of Pathology and Bacteriology, Histology and Embryology, Anatomy, and Physiology. These contain nearly 10,000 bound volumes, 14,000 unbound volumes, monographs, reprints, dissertations, etc., and about 175 current periodicals. In addition to the above, the libraries of the State Board of Health, of Hennepin County Medical Society, containing 4,000 volumes and 50 journals, and of the Ramsey County Medical Society with some 5,000 volumes and 150 journals, give the student additional opportunity to consult all the more important medical publications.

The general University library contains some 115,000 bound volumes, 30,000 unbound volumes and pamphlets, and several hundred current periodicals. The Public Libraries of Minneapolis, with 135,000 volumes, and of St. Paul, with some 55,000 volumes, the State Historical Library of 78,000 volumes, and the State Library of 35,000 volumes, the Library of the Minnesota Academy of Natural Sciences of some 12,000 titles, place before the student the greater part of the important literature relating to all branches of the physical and natural sciences as well as works of general culture. All of these collections are readily accessible to the student.

A noteworthy addition to the Medical Library is the recent acquisition by the department of Histology and Embryology, through the generosity of Alfred F., John S. and Charles C. Pillsbury, of a large portion of the working library of the late Professor William His, of Leipzig, containing about 8,500 titles and representing some 2,500 authors.

LABORATORY BUILDINGS AND EQUIPMENT

Over $500,000.00 is invested in the laboratories and equipment of this College exclusive of site.

The location of the Medical Quadrangle in a central portion of the campus offers all advantages to student and staff which comes from a close association with the other University departments such as, General Library, Laboratories of Physics, Chemistry, Biology, Botany, Geology, etc.

Millard Hall, a large four story brown stone and cream brick building, (65x125 ft.) the oldest of any in the quadrangle, contains a faculty room, a large amphitheatre and lecture rooms, library and reading rooms of the department together with the laboratory of Pharmacology and Materia

Medica. In addition the College of Dentistry and the College of Homeopathic Medicine and Surgery are temporarily provided with rooms.

The Medical Science building, a large four story brick building, (75x150 ft.), is especially designed for laboratories. This building houses the department of Histology and Embryology and the department of Physiology of this college. A portion of the south wing is temporaarily occupied by the College of Pharmacy.

The department of Histology and Embryology occupies the four floors of the north wing and center of the building, (about 17,000 sq. ft.), and contains a large laboratory (44x70 ft.), which is finely lighted by windows on three sides and part of the fourth. On the second floor is a laboratory of Neurology (44x35 ft), and a special laboratory of same size besides the departmental library and offices of the staff. The third floor contains a lecture room and smaller rooms for research students, as well as rooms for photographic, reconstruction and other work. On the lower floor are found numerous preparation and storage rooms for the different laboratories.

The department of Physiology occupies the greater part of the south wing and center of the building and provides large well equipped laboratories for experimental and physiological chemistry together with numerous finely equipped workshops, storage and preparation rooms, animal rooms, lecture rooms, departmental library and offices of the staff.

Chemistry is taught in two buildings. The main four story brick building (198x78 ft.) constitutes the headquarters of the School of Chemistry. The laboratory of Medical Chemistry is a one story brick building devoted to the use of this department and is included as a part of the Medical Quadrangle. It is equipped with an amphitheatre, two teaching laboratories (3,800 sq. ft.) preparation rooms, balance room, storage rooms and private offices of the staff of this department.

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 there is 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 Institute of Public Health and Pathology is the newest of any in the Medical Quadrangle.

The building, which is 213 feet over all and 100 feet deep in the central portion, consists of a central main portion 60x100 feet, with north and south wings each 56 by 75 feet.

In the south wing are housed the State Board of Health laboratories, which are connected with the adjacent Laboratory of Animal Research of the Minnesota State Board of Health. This wing also contains a suite of rooms for a Pastor Institute in which the special treatment of and research in rabies is carried on. Diagnostic laboratories are provided for the bacteriological, chemical and pathological work of the State Board of Health, workshops for the repair and making of special apparatus, unpacking, storage, shipping, washing and media rooms are also available. Research laboratories and the offices and special laboratories of the professional members of the staff are here provided together with vaults for records and offices for the clerical staff.

The central portion and north wing provide for teaching and research work in the University Departments of Pathology, Bacteriology and Public Health. The central portion of the building is 100x60 feet, being three stories in front and four stories in the rear, where three of the stories are devoted to museum and library purposes. Here special books and periodicals are provided and interesting pathological and bacteriological specimens and materials, apparatus, methods of construction and other illustrative features of public health are on exhibition. On the first floor is a preparation room for the museum and lecture room, beneath the museum and adjacent to the lecture and autopsy room. Six special laboratories and offices are provided for members of the staff. The remainder of the central portion is occupied by the lecture and autopsy amphitheatre, special research laboratories, photographic laboratories and a cold storage plant.

In the north wing the main teaching laboratory occupies the full floor space of 75x56 feet. It is lighted on three sides and by a skylight and is divided by low partitions into twelve loges, each intended for the use of a group of students. Each loge is fully equipped with all apparatus and supplies which the students may need in the practical work of pathology, bacteriology or public health, so as to render each group independent. A coat room and a room for the distribution of supplies opens off the main laboratory. Beneath this is a similar students' research laboratory containing six loges which are to be used for the teaching of such special courses as Pathology of Tumors, Neuro-Pathology, practical Public Health laboratory work, etc. Opening off this is a special laboratory for the teacher in charge, for the issuing of supplies and also a coat room. Other special laboratories, including rooms for the preparation and storage of media and the storage of stock cultures of bacteria, and living quarters for the janitor are also in this wing.

The College of Medicine and Surgery

FACULTY.

CYRUS NORTHROP, LL.D., *President.*

CHARLES A. WHEATON, M.D., *Emeritus Professor of Surgery.*

J. W. BELL, M.D., *Emeritus Professor of Medicine and Physical Diagnosis.*

FRANK F. WESBROOK, M.A., M.D., C.M., *Dean and Professor of Pathology and Bacteriology.*

AMOS W. ABBOTT, M.D., *Clinical Professor of Diseases of Women.*

EVERTON J. ABBOTT, A.B., M.D., *Clinical Professor of Medicine and Chief of Medical Clinic.*

RICHARD O. BEARD, M.D., *Professor of Physiology.*

E. D. BROWN, Phm.D., M.D., *Acting Professor of Materia Medica and Pharmacology.*

A. B. CATES, A.M., M.D., *Professor of Obstetrics.*

JAMES T. CHRISTISON, M.D., *Professor of Diseases of Children.*

FREDERICK A. DUNSMOOR, M.D., *Professor of Operative and Clinical Surgery.*

CHARLES A. ERDMANN, M.D., *Professor of Anatomy.*

BURNSIDE FOSTER, M.A., M.D., *Clinical Professor of Diseases of the Skin and Lecturer upon the History of Medicine.*

GEORGE B. FRANKFORTER, M.A., Ph.D., *Dean of the School of Chemistry. Professor of Chemistry.*

ARTHUR J. GILLETTE, M.D., *Professor of Orthopedic Surgery.*

CHARLES L. GREENE, M.D., *Professor of Medicine.*

GEORGE D. HEAD, B.S., M.D., *Professor of Clinical Microscopy and Medicine.*

CHARLES H. HUNTER, A.M., M.D., *Clinical Professor of Medicine and Chief of Medical Clinic.*

WILLIAM A. JONES, M.D., *Clinical Professor of Nervous and Mental Diseases.*

FREDERICK LEAVITT, M.D., *Clinical Professor of Obstetrics.*

THOMAS G. LEE, B.S., M.D., *Professor of Histology and Embryology, Secretary of the Faculty, and Librarian, Department of Medicine.*

J. C. LITZENBERG, B.S., M.D., *Clinical Professor of Obstetrics.*

J. WARREN LITTLE, M.D., *Clinical Professor of Surgery.*

ARCHIBALD MACLAREN, A.B., M.D., *Clinical Professor of Surgery.*
A. T. MANN, B.S., M.D., *Clinical Professor of Surgery.*
JAMES E. MOORE, M.D., *Professor of Surgery.*
WILLIAM R. MURRAY, A.B., M.D., *Clinical Professor of Rhinology and Laryngology.*
LOUIS A. NIPPERT, M.D., *Clinical Professor of Medicine.*
CHARLES NOOTNAGEL, M.D., *Clinical Professor of Medicine and Physical Diagnosis.*
HENRY J. O'BRIEN, M.D., *Clinical Professor of Surgery.*
JUSTUS OHAGE, M. D., *Clinical Professor of Surgery.*
C. EUGENE RIGGS, A.M., M.D., *Professor of Nervous and Mental Diseases.*
PARKS RITCHIE, M.D., *Professor of Obstetrics.*
THOMAS S. ROBERTS, M.D., *Clinical Professor of Diseases of Children.*
JOHN T. RODGERS, M.D., *Clinical Professor of Surgery.*
JOHN L. ROTHROCK, A.M., M.D., *Clinical Professor of Diseases of Women.*
JACOB E. SCHADLE, M.D., *Professor of Rhinology and Laryngology.*
GEORGE E. SENKLER, M.D., *Clinical Professor of Medicine.*
HENRY L. STAPLES, A.M., M.D., *Clinical Professor of Medicine.*
J. CLARK STEWART, B.S., M.D., *Professor of the Principles of Surgery.*
ALEXANDER J. STONE, M.D., LL.D., *Professor of Diseases of Women.*
ARTHUR SWEENEY, M.D., *Professor of Medical Jurisprudence.*
FRANK C. TODD, M.D., *Professor of Ophthalmology and Otology.*
MAX P. VANDER HORCK, M.D., *Professor of the Diseases of the Skin and Genito-Urinary Organs.*

S. M. WHITE, B.S., M.D., *Associate Professor of Pathology and Bacteriology.*
IRA H. DERBY, B.S., *Assistant Professor of Chemistry.*
H. W. HILL, M.D., *Assistant Professor of Bacteriology.*
JOHN BLACK JOHNSTON, Ph.D., *Assistant Professor of Anatomy of the Nervous System.*
ARTHUR W. MEYER, A.B., M.D., *Assistant Professor of Anatomy.*
WINFIELD S. NICKERSON, ScD., M.D., *Assistant Professor of Histology and Embryology.*
M. R. WILCOX, M.D., *Assistant Professor of Physiology.*
LOUIS B. WILSON, M.D., *Assistant Professor of Clinical Pathology.*
....., *Assistant Professor of Physiology.*

F. L. ADAIR, M.D., *Clinical Instructor in Obstetrics.*
E. V. APPLEBY, M.D., *Clinical Instructor in Ophthalmology.*
CHARLES R. BALL, M.D., *Clinical Instructor in Nervous and Mental Diseases.*

A. E. BENJAMIN, M.D., *Clinical Instructor in Diseases of Women.*
JNO. B. BRIMHALL, M.D., *Clinical Instructor in Orthopedic Surgery.*
R. A. CAMPBELL, M.D., *Clinical Instructor in Rhinology and Laryngology.*
A. R. COLVIN, M.D., *Clinical Instructor in Surgery.*
W. H. CONDIT, B.S., M.D., *Instructor in Therapeutics.*
GEORGE M. COON, M.D., *Clinical Instructor in Genito-Urinary Diseases.*
J. G. CROSS, M.D., *Clinical Instructor in Medicine.*
WARREN A. DENNIS, M.D., *Clinical Instructor in Surgery.*
A. W. DUNNING, M.D., *Clinical Instructor in Nervous and Mental Diseases.*
R. E. FARR, M.D., *Clinical Instructor in Surgery.*
JUDD GOODRICH, M.D., *Clinical Instructor in Surgery.*
GEORGE D. HAGGARD, M.D., *Instructor in Physiology.*
ARTHUR S. HAMILTON, M.D., *Instructor in Pathology of the Nervous System.*
E. R. HARE, B.S., M.D., *Instructor in Anatomy.*
P. A. HOFF, M.D., *Clinical Instructor in Medicine.*
H. W. JONES, M.D., *Clinical Instructor in Nervous and Mental Diseases.*
DAVID LANDO, M.D., *Clinical Instructor in Medicine.*
ARTHUR A. LAW, M.D., *Instructor in Operative Surgery.*
JEANETTE M. MCLAREN, M.D., *Clinical Instructor in Obstetrics.*
J. S. MACNIE, M.D., *Clinical Instructor in the Diseases of the Eye and Ear.*
R. H. MULLIN, B.A., M.B., *Senior Demonstrator in Pathology and Bacteriology.*
M. L. NICKERSON, A.M., M.D., *Instructor in Histology.*
CHELSEA C. PRATT, M.D., *Junior Demonstrator in Pathology and Bacteriology.*
WALTER R. RAMSEY, M.D., *Clinical Instructor in Diseases of Children.*
S. P. REES, B.S., M.D., *Instructor in Physical Diagnosis and Clinical Medicine.*
H. P. RITCHIE, Ph.B., M.D., *Clinical Instructor in Diseases of Women.*
H. E. ROBERTSON, A.B., M.D., *Demonstrator in Pathology.*
JULIUS PARKER SEDGWICK, B.S., M.D., *Instructor in Physiological Chemistry.*
W. D. SHELDON, M.D., *Clinical Instructor in Medicine and Instructor in Therapeutics.*
THOS. W. STUMM, M.D., *Clinical Instructor in Medicine.*
HENRY L. ULRICH, M.D., *Instructor in Clinical Microscopy.*
VAN H. WILCOX, M.D., *Instructor in Operative Surgery.*
H. L. WILLIAMS, M.D., *Clinical Instructor in Diseases of Women.*
F. R. WRIGHT, M.D., *Clinical Instructor in Dermatology and Genito-Urinary Diseases.*

W. H. AURAND, M.D., *Clinical Assistant in Medicine.*
JOHN M. ARMSTRONG, M.D., *Clinical Assistant in Genito-Urinary Diseases.*
HERMAN A. BOUMAN, M.D., *Clinical Assistant in Physical Diagnosis.*
FRANK E. BURCH, M.D., *Clinical Assistant in Diseases of the Eye and Ear.*
PAUL B. COOK, M.D., L.R.C.P., M.R.C.S., *Clinical Assistant in Diseases of Children.*
L. O. DART, M.D., *Clinical Assistant in Diseases of Children.*
EMIL S. GEIST, M.D., *Clinical Assistant in Orthopaedia.*
JAMES T. GILFILLAN, M.D., *Clinical Assistant in Medicine.*
E. K. GREEN, A.B., M.D., *Clinical Assistant in Medicine.*
ALEX R. HALL, M.D., *Clinical Assistant in Medicine.*
JOHN E. HYNES, M.D., *Clinical Assistant in Medicine.*
A. E. LOBERG, M.D., *Clinical Assistant in Nervous and Mental Diseases.*
S. W. SWEITZER, M.D., *Clinical Assistant in Dermatology and Genito-Urinary Diseases.*
H. JOURNEY WELLS, M.D., *Clinical Assistant in Diseases of Eye and Ear.*
ARCHA WILCOX, M.D., *Clinical Assistant in Surgery.*
CHAS. B. WRIGHT, A.B., M.D., *Clinical Assistant in Diseases of Children.*
....., *Assistant in Pharmacology.*

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.

GRADED SYSTEM OF STUDY.

FIRST YEAR.

Histology and embryology, anatomy, physiology, organic chemistry, toxicology, etc.

SECOND YEAR

Histology and embryology, anatomy, physiology, neurology, general bacteriology and pathology, materia medica, pharmacology and electives.

THIRD YEAR.

Surgical anatomy, special pathology and bacteriology, surgical pathology, operative surgery, practice of surgery, practice of medicine, diseases of children, obstetrics, medical jurisprudence, physical diagnosis, therapeutics, electives.

FOURTH YEAR.

Practice of surgery, practice of medicine, clinical obstetrics, surgical pathology, practical physical diagnosis, nervous and mental diseases, gynecology, ophthalmology and otology, clinical microscopy, genito-urinary diseases, orthopaedia, diseases of the skin, diseases of the nose and throat, hygiene, electives.

ELECTIVE COURSES

The elective system, which has been, for some years, in process of adaptation to the course of medicine and surgery in the fourth year, has been 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 one unit of elective work; those of the fourth year to elect three 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
History of Medicine (half unit)	18 hours
Ophthalmoscopy (half unit)	18 hours
Operative surgery (one and one-half units)	54 hours
Pathology of Nervous System (one and one-half units)	54 hours
Special Pathology of Tumors (one and one-half units)	54 hours
Methods of Microscopical Technique (one and one-half units)	54 hours
Comparative Histology and Histogenesis of Tissues (one and one-half units)	54 hours
Comparative Embryology of Man and Vertebrates (one and one-half units	54 hours
Microscopic Anatomy and Organogenesis (one and one-half units)	54 hours
Comparative Histology and Development of Central Nervous System (one and one-half units)	54 hours
Practical Pathology (unit)	36 hours
Applied Anatomy of Nervous System (unit)	36 hours
Animal Parasites of Man (half-unit)	18 hours
Dispensary Out-door service (half unit)	18 hours

These elective courses are open to graduate students who can occupy in their study brief periods of time, since several courses will be concentrated in each half-semester.

Six-Year Medical Course

In the year 1903-04, the University established a six years' course of study, arranged especially for students of medicine. The first two years of the course are given in the College of Science, Literature and the Arts, and the last four years are given in the College 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.

COURSES IN THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

FIRST YEAR.

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

SECOND YEAR.

1. Rhetoric.
2. German or French.
3. Chemistry.
4. Comparative Anatomy of Vertebrates.
5. Physics.

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

COURSES IN THE COLLEGE OF MEDICINE AND SURGERY.

THIRD YEAR.

1. Human Anatomy.
2. Histology and Embryology.
3. Organic Chemistry, Toxicology and Hygiene.
4. Physiology.

FOURTH YEAR.

1. Human Anatomy.
2. Histology and Embryology.
3. Medical Chemistry.
4. Physiology.
5. Pharmacology.
6. Bacteriology and General Pathology.

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.

Since all students of the College of Medicine and Surgery must present for entrance two years of college work, they are advised to choose the combined six-year course in medicine as especially calculated to meet the needs of the prospective physicians.

Courses of Instruction--Six-Year Medical Course

ANIMAL BIOLOGY.

I. General Zoology [3]
I, II...*Professor Sigerfoos, Assistant Professor Oestlund and Assistants*

Open to all students.
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.

IV. Comparative Anatomy of Vertebrates [3]
I, II. *Assistant Professor Brown*

Open to those who have completed 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 Vertebrate Animals; Owen, Comparative Anatomy and Physiology of Vertebrates; Wiedersheim, Comparative Anatomy of Vertebrates; Gegenbauer, Vergleichende Anatomie der Werbelthiere.

BOTANY.

I. General Botany. [3] I, II. *Professor Clements and Assistant Professor Tilden*

Open to all.

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.

CHEMISTRY.

Course I. Inorganic Chemistry. [3]. First year, first semester. *Professor Frankforter, Mr. West and Mr. Badger*

This course is arranged for those who have already had an elementary course in chemistry. This course includes an introduction to physical chemistry with special reference to solutions and the electrolytic dissociation theory. This work is followed by a systematic study of the non-metals from the general standpoint of the Periodic law. Special attention is given to the relationship between the different elements and their analogous compounds.

Note:—A course is offered in the College of Science, Literature and the Arts to those who have not had the elementary course.

Course II. Inorganic Chemistry. (Continuation of course I.) [3] First year, second semester. *Professor Frankforter, Mr. West and Mr. Badger.*

This course consists of lectures, recitations and laboratory work on the metals.

Course III. Qualitative Analysis. [3] Second year, first semester. *Asst. Prof. Nicholson, Mr. Anderson and Mr. Wilhoit.*

Lectures, recitations and laboratory work. The course includes the general reactions of the metals and the qualitative separation and identification.

Course IV. Qualitative Analysis. [3]. Second year, second semester. *Asst. Prof. Nicholson, Mr. Anderson and Mr. Wilhoit.*

Lectures, recitations and laboratory work. Reactions, separations and identification of the acids.

Course V. Organic chemistry. [3] Third year, second semester. *Professor Frankforter and Mr. Newton.*

This course includes a study of the different groups of carbon compounds with special reference to those groups which are closely associated with biological processes and Bio-chemistry, bacteriological, pathological chemistry, physiology and materia medica. The course consists of lectures with frequent recitations and laboratory work. The laboratory preparation work included the making and studying of one or more compounds in each important organic group. Some time is devoted to practical organic analysis, including the analytical side of the alcohols and the sugar group.

Course VI. Toxicology and Hygiene. [3] Third year, second semester. *Professors Frankforter and Harding and Mr. Newton.*

Toxicology.—This course includes the general methods for the separation and identification of the poisons both organic and inorganic. Attention will be given to the identification of poisons associated with medicines and with vegetable and animal matter. Besides this qualitative and quantitative work, attention is given to the structure of those organic groups of compounds which have poisonous properties.

Hygiene.—Chemistry lectures and laboratory work. This course includes the chemical analysis of air, water and some of the common foods, as milk, sugar and the fruit products.

FRENCH.

I. French, beginning [5] I, II. *Assistant Professor Andrist, Assistant Professor Frelin, Madame Bertin*

Open to freshmen and sophomores. Fraser and Squair's French Grammar and Reader; modern texts.

II. French, second year's work [3] I, II. *Assistant Professor Frelin and Madame Bertin*

Open to students who have completed course I. Grammar and composition continued; modern texts will be read, including selections from Merimee, Daudet and Scribe.

IV. Conversation [2] I, II. *Mr. Frelin and Madame Bertin*

Open to students taking courses II and III. A course in conversational French.

GERMAN LANGUAGE AND LITERATURE.

I. Beginning [5] I, II. *Professor Schlenker, Assistant Professors Wilkin and Juergensen, Mr. Schroedel and Mr. Williams*

Open to all who do not present German for entrance. Pronunciation, grammar, conversation and composition; selected reading in easy prose and verse.

To follow this course students may take course II or course III, and course V as a suplementary course to either.

II. Intermediate [3] I, II. *Professor Schlenker, Mr. Schroedel and Mr. Williams*

Open to students who have completed course I. First semester—Selections from modern narrative and descriptive prose; selected lyrics and ballads. Second semester—A drama of Lessing, Goethe or Schiller. This course may be supplemented by course V. To follow this course students should take course VI. Credit cannot be obtained for course IV by students who have credit for course II.

III. Scientific Intermediate [3] I, II. *Assistant Professor Juergensen*

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

This course may be supplemented by course V. To follow this course students may elect course VII or course VI, but must not elect course IV.

IV. Classic Prose and Poetry [3] I, II. *Professor Moore, Assistant Professor Wilkin, Mr. Schroedel, and Mr. Williams*

Open to students who have presented German for entrance. Not open to students who have credit for course II or course III. First semester—Meissner's Aus deutschen Landen; Goethe's Gedichte. Second semester—Schrakamp's Berühemte, Deutsche, Heine's Buch der Lieder. Review ofGerman grammar throughout the year. This course may be supplemented by course V.

V. Elementary Conversation and Composition [2] I, II. *Assistant Professor Wilkin, Mr. Juergensen and Mr. Burkhard*

Open to students who are taking or have taken course II or course III or course IV.

Translation of short English selections; conversation on topics of everyday life; narrative and descriptive essays and letter writing.

VI. The Drama [3] I, II. *Professor Schlenker, Assistant Professors Wilkin and Juergensen, Mr. Schroedel and Mr. Williams*

Open to students who have taken course II or course III or course IV.

First semester—Modern drama. Plays of Hebbel, Mauptmann

or Sudermann. Study of the present day drama in Germany. Assigned readings and reports. Second semester—Classic drama. Plays of Lessing, Goethe and Schiller. Study of dramatic structure. History of the German drama in the eighteenth century.

This course may be supplemented by course VIII.

VII. Advanced Scientific Reading. [3] I, II. *Mr. Juergensen*
Open to students who have taken course III or course IV. Reading of monographs and periodicals.

VIII. Advanced Conversation, Grammar and Composition [2] I, II. *Professor Schlenker and Assistant Professor Wilkin*
This course is intended as preparation for course XVI and is open to students who have taken or are taking course VI. It is recommended that students shall have taken course V. Required of those who desire a major recommendation toward a teacher's certificate.

Essays on assigned subjects; oral exercise in German by means of discussions on everyday subjects; debates, narration and the like.

MATHEMATICS.

III. Second Part Higher Algebra [3] Freshman and Sophomore I. *Assistant Professor Bauer, Dr. Manchester, Mr. Shumway*
Open to those having a credit in course I. Variation, quadratic equations, special higher equations, simultaneous equations of the second degree, maxima and minima of algebraic functions, differentiation of algebraic functions, development of functions, logarithms, theory of equations and solution of numerical higher equations.

IV. Trigonometry [3] Freshman and Sophomore II. *Assistant Professor Bauer, Dr. Manchester, Dr. Dunkel, Mr. Shumway*
Open to those having credits in courses I, II and III. Texts, tables, and numerous applications.

PHYSICS.

I. Mechanics (Heat, Sound) [6] I. *Professor Jones and Assistants*
Experimental lectures, recitations and laboratory work.
Open to sophomores who have completed Algebra and Trigonometry of courses III and IV.

II. Light, Electricity and Magnetism [6] II. *Professor Jones and Assistants*
Experimental lectures, recitations and laboratory work.
Open to those who have completed course I.

RHETORIC

Course I. Rhetoric. [3] Second year, both semesters. *Professor Sanford*
This course includes the study of formal rhetoric, the writing of compositions, and the study and analysis of masterpieces of prose. Specially adapted to the need of medical students.

PHYSICAL CULTURE.

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.

MILITARY SCIENCE AND TACTICS

CAPTAIN EDWARD SIGERFOOS, Ph.B., 5th U. S. INFANTRY

For the instruction in military drill and administration the students are organized into a corps of cadets, consisting of three 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, 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.

In view of the fact that, beginning with September, 1907, the College of Medicine and Surgery will require two years' College work for entrance, it becomes very desirable that students intending to take up Medicine should matriculate in the six-year course upon entering the University and thus secure both degrees.

Students who wish to enter this combined course will receive equivalent credit for College work done elsewhere.

Seven-Year Course Leading to the Degrees of A. B. and M. D.

Seniors in the College of Science, Literature and the Arts and in other colleges, who contemplate entering the College of Medicine and Surgery, are permitted to elect courses in Anatomy, Histology and Embryology, Physiology and Chemistry in this college in lieu of similar science courses in the College of Science, Literature and the Arts or in other colleges. Since the medical practice act of this state requires full four years of medical study, these students must elect this work in the College of Medicine and Surgery, in order that it may be contributive toward the two degrees given in both colleges.

AFFILIATION WITH OTHER COLLEGES

Carleton College has entered into an arrangement with the University of Minnesota whereby students from Carleton who have completed three full years' work without conditions and who have also met all the requirements for admission to the College of Medicine and Surgery may elect as the work of their Senior year the first year's work in the College of Medicine and Surgery, upon the satisfactory completion of which they will receive a bachelor's degree from Carleton College.

By this arrangement students from this college, having satisfactorily completed their four years' work in the College of Medicine and Surgery, will have received both degrees in a period of seven years.

Opportunity is offered to other colleges meeting the University requirements to enter into similar relations of affiliation for the purpose of shortening the time whereby a student can secure both degrees.

The College of Medicine and Surgery

COLLEGE YEAR

The twentieth annual course of study in this college will begin on Tuesday, September 17, 1907, and will continue nine months, or thirty-six weeks, exclusive of holidays, closing upon Saturday, June 6, 1908.

The College year is divided into two semesters; each semester is further divided into two quarters of nine weeks each; the first semester ending February 1, 1908. The last week is devoted mainly to mid-year examinations, which will be conducted in many of the departments. The second semester will begin February 4, 1908, and will close June 6, 1908. Certain of the courses of study terminate on November 16th, and April 4th. Commencement exercises will occur in common with the other departments of the University, during the week ending June 12, 1908.

Rules and Regulations of the College

REQUIREMENTS FOR ADMISSION

Candidates for admission to the College of Medicine and Surgery must present evidence of the following:

I. Graduation from a recognized college of liberal arts or science.

II. That the candidate has satisfactorily completed at least two full years of college work in arts or science that is recognized by this University as the equivalent of its own requirements.

III. Candidates who are unable to present certificates covering the entire work of the first two years in a standard college of arts or science will be required to pass an examination upon such work as may be lacking. These examinations will be conducted by the College of Science, Literature and the Arts, and will cover those parts of the work of the first two years required to admit students to the junior class in that college. (See also under Appendix A, for entrance Latin and other requirements.)

IV. Candidates for admission to the College of Medicine and Surgery may be allowed under certain circumstances to enter with not more than one condition in their second year's Academic work, but such condition

must be satisfactorily removed before the beginning of the second year's work in Medicine.

ENROLLMENT

Students are advised to matriculate or register in the office of the University Registrar on or before September 11, 1907. Entrance and condition examinations will be held September 11 to 16th. Opening lecture, September 16th. Classes called for regular work on September 17.

Students are fined 25 cents per diem who matriculate or register in the Registrar's office after September 17, 1907, for the first semester's work, or after February 4, 1908, for the second semester's work.

MATRICULATION

Students who are entering the College of Medicine and Surgery for the first time must present to the Registrar satisfactory evidence of having completed the required amount of work for admission, and obtained a preliminary classification slip. The Registrar will determine and record any deficiency in the entrance qualifications of a student, and will arrange with the student for the removal of such deficiencies.

Students who have matriculated in previous years must first obtain preliminary classification slips in the Registrar's office at the beginning of each year.

REGISTRATION

The registration of all students consists of three parts and should be carried out in the following order:

I. Matriculation and the procuring of preliminary classification slips in the office of the University Registrar, as stated above.

II. The presentation of these preliminary classification slips to the University cashier, and the payment of the semester's tuition and other fees.

III. The filing of the preliminary classification slip obtained from the Registrar, and the receipt for fees from the cashier with the Dean for final classification and registration. Students must follow this order and complete registration as promptly as possible in order to secure tickets for entrance to the various courses.

NOTE.—If there is any sufficient reason for temporary delay in payment of fees, the student must report at once to the Dean.

As the rules of the Minnesota State Board of Medical Examiners and of the Council on Medical Education of the American Medical Association, and the examining boards of several other states require four full years' work in a medical college, students are not given time credit for

work done outside a medical school. However, when a student presents *satisfactory* evidence of good work done elsewhere, he may be given subject credit for such work, and be permitted to take *optional* or *advanced* work in the branches and for the time in which he has received subject credit. It is consequently of considerable advantage to a student to be able to present subject credits.

No student may be advanced with his class or given advanced standing unless he has passed the majority of the required studies of the previous year; nor shall any student be admitted to the second semester's work of the fourth year who has any unremoved conditions of any of the preceding years.

TERMS OF TUITION

The annual tuition fee in the College of Medicine and Surgery is $100. This includes all charges for matriculation, lecture and laboratory courses, dissections and graduations, excepting a $3.00 Hospital fee for Juniors and Seniors and a rental fee for microscopes, payable by all students who do not own their own instruments. (See Microscope rental.)

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, February 4, 1908. 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

The fee of one dollar is charged for permission to take any examination to remove a condition. The student obtains a statement from the Registrar of the conditions charged against him, this he presents to the cashier and it and the cashier's receipt must be registered with the Dean at least twenty-four hours prior to the examination.

MICROSCOPE RENTAL

To students who do not own their own instruments, microscope fees are charged as follows: First year, first semester, $4.00; second year, first semester, $3.00; second semester, $4.00; third year, first semester, $4.00. Fourth year, Clinical Microscopy, $2.00.

In all elective courses requiring the use of microscopes, the fee of $1.00 for each course is charged.

BREAKAGE AND LOSS

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give a receipt.

For apparatus and material attaching to his laboratory desk he will also be held responsible. At the end of each course, if such apparatus and material are restored in good condition, this receipt will be returned to him.

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.

GRADUATE AND SPECIAL STUDENTS

Special students will pay to the accountant a fee of twenty dollars per year for each study they elect to pursue. They will be charged additional fees, varying from five to twenty dollars, for each laboratory course they may enter.

Graduate students will pay an admission of ten dollars, which will entitle them to attend any lectures they may desire in regular courses.

Additional charges varying from ten to twenty dollars per course are made for laboratory courses and microscope rental must also be paid.

EXAMINATIONS—FINAL STANDINGS

No student with an entrance condition will be allowed to register for any second-year subject, nor will any student with any first-year condition or failure be allowed to register for a third-year subject; nor will any student having a second-year condition or failure be allowed to register for any fourth-year subject.

No student will be allowed to omit any freshman work in order to make up entrance conditions, except by special permission of Department affected.

Habitual absence without satisfactory excuse, continued indifference to study, or persistently poor scholarship will subject the student to temporary or permanent suspension.

Students will not be permitted to substitute private work in any branch for the regular college courses.

Final examination in every required subject is held at the close of the work at the end of the semester or quarter, according to the extent of the course given. Opportunity is offered to remove conditions at the opening of the school year in September. The examinations at the end of semester or quarter are only for those who are taking the courses, while the September examinations are only for those who are attempting to remove conditions or are applicants for advanced standing.

The final standing of any student in a given subject shall be determined as the result of his (a) practical work (laboratory or clinical), (b) recitations, and (c) oral or (d) written examinations.

All of these factors shall be taken into consideration in making up the final grading in any subject.

Students' standings shall be determined at the end of the year by a conference of the heads of the departments in which the work is pursued during that year.

All standings shall be reported officially to and from the Dean's office at the end of the year.

Students shall be reported as Passed, Incomplete, Conditioned or Failed.

No student will be registered for any examination to remove conditions until he presents a receipt from the cashier for the fee of said examinations. (See Terms of Tuition.)

Conditions must be removed at the beginning of the school year in September. No student who has any conditions unremoved at the close of this examination is allowed to continue with his class without the express permission of the Dean on the recommendation of the Department concerned.

A condition not removed at the first opportunity becomes a failure subject to the rule governing failures.

Failures necessitate the taking of the work again in class.

A student repeating work (by reason of having "failed") must pay the fees connected with that course.

A student who is conditioned in the majority of the subjects given in any year will become a "failed" student and must repeat the whole work of that year.

Students who carry "failures" 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.

ADVANCED STANDING

All persons applying for advanced standing must present satisfactory evidence of time spent in medical studies, must present official credentials, his own record, notes, drawings, and other evidence of work covered. and pass examinations in the branches already taken by the class they seek to enter and satisfy all other admission requirements, but any student who has satisfactorily completed the requirements of any department of this College in any other medical college of recognized standing may be excused from repeating such examinations if the instruction which he has received is considered satisfactory by the head of the corresponding department in this College.

No condition of advanced standing will entitle the student to take the two years of any graded study coincidently.

Seniors in the College of Science, Literature and the Arts, or in other recognized colleges, 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 or in the other colleges.

REQUIREMENTS FOR GRADUATION

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 qualifications:

Every candidate for the degree of Doctor of Medicine must be at least twenty-one years of age, and of good moral character. He must have satisfied all the requirements for admission to the College of Medicine and Surgery, and have completed in a satisfactory manner the full four years course of study in this college.

The degree of Doctor of Medicine will also be given to candidates who have completed a portion of their medical work in some other recognized medical school, provided that they have satisfied all entrance requirements and have completed a four years course of medical study equivalent to the standards maintained here, and of which the final year must be spent in this college.

A graduate of another medical school of recognized standing may obtain the degree of Doctor of Medicine at this University by fulfilling all the requirements for undergraduates, completing the final year's work in this college, and passing satisfactory examinations.

Theses.—Every candidate for the degree of Doctor of Medicine in this college is required to prepare a thesis on some laboratory or clinical sub-

ject, done in this college. This 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.

A thesis will be required of those who have just completed their second year work in Medicine, i. e., the class of 1909, and all who have entered subsequently. Great emphasis is laid upon the careful and accurate preparation of the theses. Students are advised to make selection and begin preparation of thesis not later than the beginning of their junior year

A detailed statement of the rules and regulations governing the preparation of the theses may be obtained from the chairman of the thesis committee.

Courses of Instruction

DEPARTMENT OF HISTOLOGY AND EMBRYOLOGY

OFFICERS OF INSTRUCTION

THOMAS G. LEE, B.S., M.D., *Professor of Histology and Embryology.*
WINFIELD S. NICKERSON, ScD., M.D., *Assistant Professor of Histology and Embryology.*
JOHN BLACK JOHNSTON, Ph.D., *Assistant Professor of Anatomy of the Nervous System.*
MARGARET L. NICKERSON, A.M., M.D., *Instructor in Histology.*
JARL FERDINAND LEMSTROM, M.D., *Assistant in Micro-Technique.*
Departmental Laboratory Assistants: E. M. WATSON, B.A.,
KATE WYMAN, B.A.

The department occupies all four floors of the entire north wing and center of the Medical Science building, amounting to about 17,000 square feet. The main laboratory on the first floor measures 44x72 feet, lighted by windows on three sides and a part of the fourth. Each student is provided with a sink, gas, electric light, copper heating table, microscope locker and microscope, and a locker for the storage of apparatus and material. On the other floors there are to be found a lecture room and well equipped laboratories for courses in neurology, micro-technique, experimental work in histology and embryology, private rooms for investigators, various storage and preparation rooms, and rooms for reconstruction, chemical, photographic and photomicrographic work. These various laboratories and rooms are very well equipped with microscopes, microtomes, thermostats, a great variety of technical glassware, and other apparatus.

The departmental library contains a carefully selected collection of reference literature, both standard and periodical. There has been recently added to the library a large part of the working anatomical library of the late Professor William His of Leipzig, amounting to about 8,500 titles by 2,500 authors. In addition to this collection the other libraries of the University, together with the public libraries of Minneapolis and St. Paul, give the students access to practically all of the important literature relating to the work of this department.

The courses are made as practical as possible, the student making a large number of permanent preparations for his own use. In addition each student is loaned a number of complete embryological series of mammalian and other vertebrate embryos cut in different planes and illustrative of different stages of development.

The lecture courses are illustrated by charts and lantern slides made from histological and embryological specimens. Demonstrations are given under the projection or compound 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 the course. This instrument is an indispensable part of the outfit of a well trained physician. Suitable microscopes can be purchased from $50 to $75 which may be fitted with such other part as may be desired. Students not owning microscopes will be furnished with instruments at a rental fee.

FOR GRADUATES AND UNDERGRADUATES

Course III. General Vertebrate Morphology and Histology. First year
Lectures, recitations and laboratory, afternoons, three days per week, nine weeks, first quarter, 108 hours.
Professor Lee, Assistant Professor Nickerson
The structure and properties of protoplasm; the cell, its structure; the phenomena of cell division. A comparative study of the histology of the epitheliel connective and muscular tissues, the blood, and of the vascular and lymphatic systems of man and vertebrates.

Course IV. Elements of Vertebrate Embryology. First year
Lectures, recitations and laboratory, forenoons, three days per week, nine weeks, first quarter, 108 hours.
Professor Lee, Assistant Professor Johnston
A comparative study of reproduction; the ovum, the spermatozoan, fertilization, cleavage, formation of the blastodermic layers, the formation of the embryo and foetal envelopes, with practical work on mammalian and other vertebrate embryos.

Course V. Elements of Vertebrate Neurology. First year
Lectures, recitations and laboratory, second quarter. Prerequisite III and IV or equivalent.
Assistant Professor Johnston
An introductory study of nerve elements and of the general morphology of the central nervous system.

Course VII. Microscopic Anatomy of Man and Vertebrates. First year
Lectures, recitations and laboratory, forenoons, three days per week, nine weeks, second quarter, 108 hours. Prerequisite course III or equivalent.
Professor Lee, Assistant Professor Nickerson
A comparative study of the morphology, microscopic anatomy, origin and development of the various organs of the alimentary, respiratory, and uro-genital systems.

Course VIII. Advanced Vertebrate Embryology. First year
Lectures, recitations, and laboratory, forenoons, three days per week, nine weeks, second quarter, 108 hours. Prerequisite course IV or equivalent.
Professor Lee, Assistant Professor Johnston
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 the foetal envelope, and the details of organogenesis 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.

Course IX. Advanced Vertebrate Neurology. Second year
Lectures, recitations and laboratory, afternoons, three days per week, nine weeks, first quarter, 108 hours. Prerequisite courses V, VII and VIII, or equivalent.
Assistant Professor Johnston
A study of the central nervous system of several types of vertebrates by means of dissection and serial sections, especial attention being given to the mammalian and human brain.

Course X. Dental Histology and Embryology. First year
A modified course specially arranged and open only to dental students. Lectures, recitations and laboratory work, nine weeks, fourth quarter.
Assistant Professor Nickerson
The structure and histogenesis of the organs and tissues, the structure and development of the teeth and jaws, the mouth cavity and glands.

Course XI. Micro-technique and the Morphology of the Special Sense Organs. Second year
Lectures, recitations and laboratory, afternoons, three days per week, nine weeks, third quarter, 108 hours. Prerequisite courses VII and VIII or equivalent.
Professor Lee, Dr. Lemstrom
A detailed study of the structure of the organs of special sense together with practical exercises in micro-technique, methods of fixation, embedding, sectioning, staining, reconstruction, etc.

Course XII. Special Embryology of Man and Vertebrates. Second year
Lectures, recitations and laboratory, forenoons, three days per week, nine weeks, third quarter, 108 hours. Prerequisite courses VII and VIII or equivalent.
Professor Lee
A study of assigned problems including the elements of teratology.

Course XIII. Special and Applied Neurology. Third year
Lectures and recitations and demonstrations, afternoons, fourth quarter. Prerequisite courses IX and XI or equivalent.
Assistant Professor Johnston
Further study of nerve paths and centers in the human brain as a preparation for the clinical work in nervous and mental diseases.

Course XVII. Special Neurological Technique.
Elective course for qualified students. Forenoons, fourth quarter. Practical work in the preparation of the nervous system for gross and microscopical study.
Assistant Professor Johnston

Course XVIII. Cytology and Histogenesis.
Lectures and laboratory, afternoons, third quarter. Elective course open to students who have had course XI or equivalent.
Professor Lee

Course XIX. Neurological Research.
Problems and special work in vertebrate neurology open only to those who are qualified to carry on investigation.
Assistant Professor Johnston

Course XX. Experimental Embryology.
Special course for advanced students. Lectures and laboratory, forenoons, fourth quarter.

Course XXI. The Animal Parasites of Man.
Lectures and laboratory, afternoons, third quarter. An elective course in Medical Zoology. The general outlines of the morphology and classification of the different groups which contain members parasitic upon man, with special consideration of each species of medical importance, including its distribution, life history, methods of infection, means of diagnosis, and the chief symptoms produced by it.
Assistant Professor Nickerson

Course XXX. Research Work in Human and Vertebrate Morphology. Properly qualified students will be provided every facility for original investigation of anatomical problems.

Professor Lee

Course XL. Anatomical Journal Club and Seminar. Weekly meetings during year for reviews of the current literature and discussion of special topics in Anatomy, Histology, Embryology, and Neurology, and of the research work being carried on in the department. The department library, which is large and rapidly growing, receives all the leading anatomical journals.

Histology. Wilson's The Cell; Bohm-Davidoff-Huber's Histology; Stöhr-Lewis' Histology; Bailey's Histology; Piersol's Histology; Ferguson's Histology; Szymonowicz-MacCullum's Histology; Sobotta-Huber's Atlas; Klein's Histology; Mann's Histology; Lee's Vade Mecum; Kolliker's Gewebelehre; Oppel's Microskopischen Anatomie; Duval's Histologie; Ranvier's Histologie.

Embryology. Minot's Human Embryology; Minot's Laboratory text books; Hertwig-Mark's Embryology; McMurrich's Embryology; Heisler's Embryology; Marshall's Embryology; Kolliker's Embryologie; Schultze's Embryologie; Kollman's Embryologie; Schenk's Embryologie; Reese's Embryology.

Neurology. Johnston's Nervous System of the Vertebrates; Barker's Nervous System; Edinger's Lectures Nervous System; Gordinier's Nervous System; Van Gehucten's System Nerveux; Kolliker's Gewebelehre; Obersteiner; Sabin's Atlas.

DEPARTMENT OF ANATOMY

OFFICERS OF INSTRUCTION

CHARLES A. ERDMANN, M.D., *Professor of Anatomy.*

ARTHUR W. MEYER, A.B., M.D., *Assistant Professor of Anatomy.*

EARLE R. HARE, B.S., M.D., *Instructor in Anatomy.*

C. C. TYRELL, B.A., M.D., *Assistant in Anatomy.*

E. E. HEMINGWAY, Ph.D., *Assistant in Anatomy.*

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 subject 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, splanchnology and neurology 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 the human body and a comparative brain.

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 demontrations. The dissection of the human body is repeated 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 nervous system and 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; 12 hours of each week, 6 weeks of first semester. Practical study of the skeleton, followed by recitations from the specimen, taken by the class, first semester. Required of all first year students.

Course II. Syndesmology.
Lectures, recitations and laboratory demonstrations, 12 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. *Professor Erdmann, Assistant Professor Meyer, Drs. Hare and Tyrell*
Lectures and laboratory work in dissecting and demonstrating the thoracic, abdominal and pelvic viscera. First semester of the first year and first half of second semester of the second year. Recitations upon the subjects of the first year's work, conducted in sections.

Course V. The Nervous System. *Professor Erdmann*
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. Two hours each week for 4 weeks, third quarter, second year.

Course VI. Dissections. *Assistant Professor Meyer, Drs. Tyrell and Hare*
This work extends over a period of 9 weeks, in the first semester of the first year, and 9 weeks in the third quarter 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 Barker's Manual of Anatomy.
The second year lecture and dissecting courses are open to those having completed the first years' work in anatomy and histology.
Daily recitations, upon the subjects of the second year's course, conducted in the laboratory.

Course VII. Surgical Anatomy. *Professor Erdmann*
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; 6 hours a week, fourth quarter third year. Required of third year students.

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. Cunningham. Piersol, Morris, Gray, Spalteholtz Atlas, Barker's Laboratory Manual, Cunningham's Manual of Dissection, Erdmann's Manual of Dissection, Treve's Applied Anatomy, Barkers' Anatomy of the Nervous System.
Collateral Readings. Quain's Anatomy, Gerrish's Anatomy, Flower's Osteology of Mammals, Gegenbauer's Elements of Comparative Anatomy; Chauveau's Comparative Anatomy, Wiedersheim's Elements of Comparative Anatomy, Mc-

Clellan's Regional Anatomy, Deaver's Surgical Anatomy; Edinger's Anatomy of the Nervous System, Hildebrans's Chirurgisch Topographise Anatomie, Schultze's Applied Anatomy, Eisendrath Clinical Anatomy, Box and Eccles' Applied Clinical Anatomy.

DEPARTMENT OF CHEMISTRY

OFFICERS OF INSTRUCTION

GEORGE B. FRANKFORTER, M.A., Ph.D., *Dean of the School of Chemistry. Professor of Chemistry.*

CHAS. F. SIDENER, B.S., *Professor of Chemistry.*

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

EVERHART P. HARDING, M.S., Ph.D., *Assistant Professor of Chemistry.*

IRA HARRIS DERBY, B.S., *Assistant Professor of Chemistry.*

LILLIAN COHEN, M.S., *Instructor in Chemistry.*

FRANCIS C. FRARY, M.S., *Instructor in Chemistry.*

JOHN A. HANDY, Ph.C., *Instructor in Chemistry.*

JAMES ZIMMERMAN, B.A., *Instructor in Chemistry.*

WALTER L. BADGER, B.A., *Instructor in Chemistry.*

Chemistry is taught to the medical and all other students of the University in the School of Chemistry under the directorship of Dean Frankforter. The School of Chemistry is housed in two buildings.

The main building formerly known as Science Hall has been completely remodeled to meet the needs of the department of chemistry. The building is 198x78 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 in the general laboratory and will accommodate 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 more important journals. It contains besides these special sets, a well represented list of analytical and technical works, as well as many rare old works of great historical value. Most of the important journals are taken, thus enabling the student to keep abreast of the times. All books are easily accessible, wih only the necessary restrictions to guard against injury and loss.

The second building, which is one of the units of the medical quadrangle, contains two large laboratories with a combined floor space of 3,800 sq. ft., a smaller laboratory equipped to accommodate students in quantitative analysis, a lecture room, a preparation room, balance room, store rooms and the private laboratories of the instructors.

COURSES IN CHEMISTRY

**Course I. General Chemistry.* *Professor Frankforter, Miss Cohen and Mr. Badger*

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.* *Advanced Inorganic Chemistry.*
Professor Frankforter, Miss Cohen and Mr. Badger
This course is arranged for those who have already had an elementary course in chemistry. The course includes an introduction to physical chemistry with special reference to the laws of solutions and electrolytic dissociation theory. This work is followed by a systematic study of the non-metals from the general standpoint of the periodic law. Special attention is given to the relationship between the different elements and their analogous compounds.

**Course III.* *Inorganic Chemistry.* (Continuation of Course II.)
Professor Frankforter, Miss Cohen and Mr. Badger
This course consists of lectures, recitations and laboratory work on the metals.

**Course IV.* *Qualitative Analysis.*
Assistant Professor Nicholson and Mr. Frary
Lectures, recitations and laboratory work. The course includes the general reactions of the metals and the qualitative separation and identification.

**Course V.* *Qualitative Analysis.*
Assistant Professor Nicholson and Mr. Frary
Lectures, recitations and laboratory work. Reactions, separations and identifications of the acids.

*Note—Courses I to V inclusive, are six-year medical courses and are required for entrance to the College of Medicine and Surgery.

Course VI. *Organic Chemistry.* *Professors Frankforter and Harding*
This course includes a study of the different groups of carbon compounds with special reference to those groups which are closely associated with biological processes and bio-chemistry, bacteriological, pathological chemistry, physiology and materia medica. The course consists of lectures with frequent recitations and laboratory work. The laboratory preparation work included the making and studying of one or more compounds in each important organic group. Some time is devoted to practical organic analysis, including the analytical side of the alcohols and the sugar group.

SECOND SEMESTER FIRST YEAR

Course VII. *Toxicology and Hygiene.*
Professor Frankforter, Professor Harding and Professor Derby
Toxicology.—This course includes the general methods for the separation and identification of the poisons both organic and inorganic. Attention will be given to the identification of poisons associated with medicines and with vegetable and animal matter. Besides this qualitative and quantitative work, attention is given to the structure of those organic groups of compounds which have poisonous properties.
Hygiene.—Chemistry lectures and laboratory work. This course includes the chemical analysis of air, water, and some of the common foods, milk, sugar and fruit products. Special attention is given to food adulteration and to food preservations.

SECOND SEMESTER FIRST YEAR

For work in other special or technical lines of chemistry, numerous courses are offered (see Bulletin of the School of Chemistry). Facilities for research work are also afforded in a large number of lines.

The analysis of the urine is dealt with under physiological chemistry in the department of Physiology, in the pathology of the urinary system in the Department of Pathology, and in the clinical laboratories in connection with the microscopy of the urine.

DEPARTMENT OF PHYSIOLOGY

OFFICERS OF INSTRUCTION

RICHARD O. BEARD, M.D., *Professor of Physiology.*

M. R. WILCOX, M.D., *Assistant Professor of Physiology.*

....., *Assistant Professor of Physiology.*

JULIUS PARKER SEDGWICK, B.S., M.D., *Instructor in Physiological Chemistry.*

COURSES OF INSTRUCTION

The department of physiology occupies rooms in the medical science building, including a laboratory of experimental physiology, a laboratory of physiological chemistry, demonstration and recitation rooms, the laboratory library and the office of the chief of the department. A large amphitheatre adapted to the demonstration of major experiments adjoins the laboratories and is used by the department for lecture purposes.

In the basement of the medical science building is a well-equipped workshop for the manufacture and repair of apparatus. Here, also, are animal rooms, furnished with enclosures, breeding cages, frog-tanks and aquarium. From the animal room, supplies of animals and materials are obtained for the work in physiological chemistry and experimental physiology. The hygienic conditions of the room are carefully studied, with a view to maintaining the physiological and structural integrity of its animal occupants as perfectly as possible.

The physiological laboratories are equipped with a full supply of apparatus, instruments, etc., for experimental purposes, including artificial respiratory machines, batteries, Du Bois Reymond coils, galvanometers, rheostats, Despretz signals, chronographs, moist muscle-chambers, kymographions, spring myographs, stethoscopes, phonendoscopes, stethometers, sphygmographs, cardiographs, sphygmometers, Gaskell's clamps, oncometers, oncographs, hemometers, hemocytometers, hematocrits, ergograph, plethysmograph, and microscopes. Electric motor power is provided for driving apparatus.

The course in physiology is graded in the first and second years. Under the concentration system in vogue, something more than one-half of the student's time is occupied with this study during one semester of each of these years.

Each phase of the subject is treated as a unit: i. e., the laboratory courses in physiological chemistry, experimental physiology, physical chemistry, etc., are correlated and interwoven with the lecture courses throughout. The work is essentially practical and is individualized as much as possible.

In the first year, the student takes up the study, first, of the physiologic components of the animal body; next, the physiological and physical properties of tissue-cells in general; the nutritive media; and the neuromuscular mechanisms. He then enters upon the study of systematic physiology, taking, in turn, the circulation, digestion, secretion, respiration and excretion. Urinalysis is made a special feature of the work in physiological chemistry. The student is thoroughly drilled in the technique of analytcal and estimative methods in the study of all the body-fluids.

In the second year, these methods are applied to the problems of metabolism and nutrition. The distinctive physiological features of the successive ages of human life are discussed. The physiology of the nervous system, in general, and of the special senses, in particular, concludes the course.

A laboratory reference library is accessible to the students for purposes of collateral reading.

Course I. General Physiology.

The physiological components of the animal body; the physiological and physical properties of the tissue-cells in general; the nutritive media; including the study of methods of blood examination; the structural bases of function.

Course II. The Musculo-nervous Mechanisms.

Including the study of the principles of nerve-control in general. The student is introduced in this course to the technique of experimental study.

Course III. Systemic Physiology.

(a) The vascular mechanism, including the estimation of blood-pressure, the mapping of cardiac areas, the study of heart-sounds, and the making of sphygmograms.

(b) The digestive system, including the process of secretion, the analysis of the digestive fluids, the examination of the normal stomach contents and the conduct of digestions.

(c) The respiratory mechanism; the mechanics, physics, chemistry and nerve control of respiration.

(d) The excretory system, including the study of excretion by the air-passages, the intestinal tract, the skin and the kidney. Analysis of the physiological urine is addressed both to the determination of functional facts and to the attainment of the technique of clinical diagnosis in this field.

Courses I, II and III consist of lectures, laboratory exercises, demonstrations, recitations and theses, which occupy one-half the time of the second semester of the first year and are conducted by

Professor Beard, Assistant Professor Wilcox and Dr. Sedgwick

Course IV. Metabolism and Nutrition.

A study of metabolic and nutritional problems for the determination of nutritive balance, nitrogenous and body equilibrium, and specific dietetic results; including the further examination of normal stomach contents and of the fœcal debris, the estimation of nitrogen excretion in total and in particular forms, the relation of fat-splitting and fat-absorption, and the determination of respiratory output, etc.

Course V. The Physiology of Successive Ages.

A study of the distinctive physiologic features of fœtal and infantile life, of childhood, puberty, pregnancy, partruition, the climacteric and old age.

Course VI. The Nervous System.

The functions of the nervous system in general, including the study of nerve tracts, of central localization, of association paths, etc. The function of the special senses, with experimental studies of the methods of testing special sense acuity; of the principles of stimulation; of the influences which affect special sense function; of the property of specific sensation; of the office of conducting media; of the several phases of special sense function and of their association.

Courses IV, V and VI, consisting of lectures, laboratory exercises, demonstrations, recitations and theses, occupy one-half the time of the first semester of the second year, and are conducted by

Professor Beard, Assistant Professor Wilcox and Dr. Sedgwick

Text-Books:

First and second years—

The American Text-book of Physiology.

Howell's Text-book of Physiology.

Foster's Physiology, Sixth English edition.

Simon's Physiologic Chemistry.

Collateral Reading—Landois and Sterling's Handbook of Physiology; Van Noorden's Text-book of Metabolism; Stewart's Practical Physiology; Tigerstedt's Physiology; Blyth's Foods and their Composition; Hutchinson's Dietetics.

DEPARTMENT OF PHARMACOLOGY, MATERIA MEDICA AND THERAPEUTICS

OFFICERS OF INSTRUCTION

E. D. BROWN, Phm.D., M.D., *Acting Professor of Pharmacology and Materia Medica.*

W. H. CONDIT, B.S., M.D., *Instructor in Pharmacology and Materia Medica.*

W. D. SHELDON, M.D., *Clinical Instructor in Medicine and Instructor in Therapeutics.*

....., *Assistant in Pharmacology.*

The instruction in this department aims to give the student a knowledge of the characters and actions of drugs, and a scientific knowledge of their use in the treatment of disease.

The course comprises lectures, recitations, demonstrations, and experimental laboratory work which is done by the students.

Professor Brown

Course I. Elementary Pharmacy, General Toxicology and Principles of Prescription Writing.

The course includes the following subdivisions:

(a) Elementary pharmacy; the gross, microscopic and chemic structure of drugs; weights and measures; pharmaceutic processes; and classes of pharmaceutic preparations.

(b) General treatment of poisoning; principles of prescription writing and incompatibilities; materia medica of flavors; principles and rules of incompatibility; rules of solubility; construction of prescriptions; grammar and phrases of prescription-Latin, with class practice in writing simple prescriptions; use and materia medica of flavors.

(c) Materia medica is studied from the crude drugs and pharmaceutic preparations taken from the museum of materia medica to which the student has access at all times.

FIRST SEMESTER SECOND YEAR

Course II. General Pharmacodynamics (Experimental).

Professor Brown

Experiments on cold blooded and warm blooded animals, illustrating the actions of drugs and the methods of pharmacologic experimentation. The class is divided into sections and these sections into groups of three to six students, each group performing experiments in the same line, but by modified methods or different drugs having a similar pharmacologic action. The results are discussed at conferences, and the conclusions arrived at from the sum of the results. The knowledge thus obtained is by direct observation and serves to impress the student with the actions of drugs, and prepares him for the systematic didactic courses given in the third year.

The experimental course includes the following subdivisions:

(a) Actions of drugs on tissues outside the body, corrosives, haemoglobin, osmosis, etc.

(b) Exercises on intact mammals, absorption and excretion of drugs; racial idiosyncrasy; treatment of poisoning; emetics; convulsants and depressants; pulse; pupils; salivation, etc.

(c) Exercises on frogs, convulsants, central depressants, local anaesthetics, striped and cardiac muscle, cardiac nerves, etc.

(d) Operative work on mammals, general anaesthetics, the effects of important drugs on blood pressure, respiration, oncometric and myocardiographic work, diuresis, peristalsis, perfusion of excised organs, isolated heart, etc.

FIRST SEMESTER SECOND YEAR

Text-Books:
Pharmacology, Materia Medica and Therapeutics—Sollmann.
For reference—U. S. Pharmacopeia, National Dispensatory.

Course III. Systematic Pharmacology, Toxicology, Materia Medica and Therapeutics. *Professor Brown*

This course is the principal didactic course given in the department. The instruction is given by lectures and recitations. Each drug or group of drugs is studied in detail under the following subdivisions:

(a) *Pharmacodynamics.* The effects of drugs are studied from the experimental and clinical evidence. Constant reference is made to the results obtained in the experimental course (Course II),

(b) *Toxicology.* Symptoms and treatment of poisoning.

(c) *Materia Medica.* The student is required to be able to identify the more important drugs, learn their physical characters, doses, etc.

(d) *Therapeutics.* The conditions in which the drugs are rationally indicated or in which their empirical use has been found of value.

Second semester third year.

Course IV. Prescription Writing.

Hypothetical cases are given and the student is required to write a prescription for the treatment, using the proper drugs which have already been covered in the text.

Second semester third year.

Text-Books: Pharmacology, Sollmann.

Course V. Clinical Therapeutics. *Drs. W. D. Sheldon and W. H. Condit*

Bedside work in hospital and dispensary will be conducted having in view the therapy of cases which are under the special care of and study by the Department of Medicine.

Weekly throughout fourth year.

Course VI. Therapeutic Conferences. *Drs. W. H. Condit and W. D. Sheldon*

Conferences on assigned topics to be prepared by students from the point of view of literature and current clinic records, will be conducted weekly. These will include the therapy of some of the common diseases and also the varied application of some of the common drugs and methods.

Weekly throughout fourth year.

Course VII. Practical Pharmacy.

Professor Fredk. J. Wulling, Phm.D., LL.M., Dean, College of Pharmacy

1. U. S. Pharmacopeia.
   1. Metrology.
   2. Grades of drugs in use.
   3. Pharmacopoeial requirements as to purity.
2. Identity and impurities with U. S. Pharmacopoeial tests of six official substances.
3. Dispensing.
   1. The prescription.
   2. Compounding of prescriptions calling for the preparation of fourteen types of pharmacopoeial preparations.

Second semester third year.

DEPARTMENT OF PATHOLOGY AND BACTERIOLOGY

OFFICERS OF INSTRUCTION

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

S. M. WHITE, B.S., M.D., *Associate Professor of Pathology and Bacteriology.*

H. W. HILL, M.D., *Assistant Professor of Bacteriology.*

LOUIS B. WILSON, M.D., *Assistant Professor of Clinical Pathology.*

R. H. MULLIN, B.A., M.B., *Senior Demonstrator in Pathology and Bacteriology.*

H. E. ROBERTSON, A.B., M.D., *Demonstrator in Pathology.*

CHELSEA C. PRATT, M.D., *Junior Demonstrator in Pathology and Bacteriology.*

J. L. ROTHROCK, A.M., M.D., *Clinical Instructor in Pathology.*

ARTHUR S. HAMILTON, B.S., M.D., *Instructor in Pathology of the Nervous System.*

Hospital Laboratory Assistants: Lee A. Scace, M.D., Thos. R. Martin, B.A., M.D., Carl O. Estrem, B.A., M.D., and Tolbert Watson, A.B.

Departmental Laboratory Assistant: Lee Pollock.

The Institute of Public Health and Pathology, to which attention has already been directed, provides adequate room and facilities for teaching and research in pathology, bacteriology and public health.

The main laboratory, 56x75 feet, lighted on three sides and by a skylight, is used for the general or required courses. It is divided into twelve loges, each fully and independently equipped in every detail for the use of six students, who are responsible for all equipment therein contained. Supplies are distributed from a supply room opening off the main laboratory. Books and specimens required in teaching are easily procurable from the museum library, which is connected by a special or private passageway with the main laboratory. A combined lecture and autopsy room opens both from the main laboratory and from the hall so that autopsies, lantern demonstrations or lectures may be given during the period devoted to the laboratory exercises without interference with the practical work.

A smaller laboratory, one-half the size of the main laboratory, is provided for special work in graduate and optional courses in the Diagnosis of Tumors, Pathology of the Nervous System, Practical Public Health, etc. The same loge arrangement obtains as in the main laboratory.

The hospitals of Minneapolis, St. Paul, Duluth, Rochester and St. Peter, Minn., in which members of the staff are working, 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 received from time to time and are made available in the museum and for macroscopic and microscopic class use.

The State Board of Health laboratories for research and routine investigation are located in the Institute as well as a Pasteur Institute for the study and treatment of rabies. This affords an abundance of illustrative material for public health, pathology and bacteriology.

A full equipment of microscopes permits of the rental of an instrument to each student, if he is unprovided with one suitable for his purpose.

METHODS OF INSTRUCTION

In this Department, the center around which all instruction is grouped, is constituted by the students' own personal practical experience in the labor-

atories. This is supplemented and coordinated by lectures, laboratory and lantern demonstrations and recitations as required.

Course I. General Bacteriology.

Professor Wesbrook, Assistant Professor Hill, Dr. Mullin and Dr. Pratt

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 is dealt with.

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

Laboratory work, involving the making of their own culture media by the students, the study of bacteria in cultures and under the microscope, technique of staining and other methods, including observations of chemical and biological peculiarities, is thoroughly carried out. Testing of various germicides—chemical and physical—and the use of bacteriological methods in the examination of drinking water form an important part of the work. Bacterial activities concerned in sewage purification, etc., receives attention. 216 hours during the second semester, second year.

Course II. General Pathology. *Prof. Wesbrook, Dr. Mullin, Associate Professor White, Dr. Robertson, Dr. Pratt*

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

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

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

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

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

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

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

216 hours during the second semester, second year.

Course III. Pathology of Special Diseases (includes Bacteriology).

Disease processes will be grouped, as 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 and autopsies (human and animal) will be supplied for microscopic and cultural examination and an intimate relationship with clinical 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 experimental 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, Associate Professor White, Dr. Mullin, Dr. Robertson and Dr. Pratt

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.

Associate Professor White, Dr. Mullin, Dr. Robertson and Dr. Pratt

288 hours during the first semester of the third year.

Course IV. *Associate Professor White, Dr. Rothrock, Dr. Mullin, Dr. Robertson and Dr. Pratt*

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.

Course V. Special Pathology of the Nervous System. *Dr. A. S. Hamilton*

An elective course, limited to twenty-five students, in the fourth year.

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.

Course VI. *Associate Professor White*

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.

Course VII. Research Work in one of the following lines:

(a) General pathology.

(b) Special pathology and bacteriology and technique.

Second semester of third and throughout the fourth year, hours assigned.

Course VIII. Surgical Pathology. *Professor Stewart*

(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 two hours per week, second semester, fourth year.

Pathological Society.

The medical men of the State who are especially interested and are actually working in pathology and bacteriology formed a society in the autumn of 1901, which meets monthly from October to June, in the laboratories of the department. Papers embodying original work with illustrative specimens are presented at each meeting and once a year the society invites a

special guest of honor to give an address in pathology or some allied subject.

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.
Cattell's Post-Mortem Pathology.
Durck-Hektoen: Special Pathologic Histology.
Jakob: Nervous System.
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-Hirschfield, Pathologische Anatomie; Osler's System of Medicine; Clifford Allbutt's System of Medicine; Leukhart's die Thierische Parisiten des Menschen; Bouchard, Traite de Pathologie Generale; Eichorst, Pathologie u Therapie; Gaylord and Aschoff, Pathological Histology; Nothnagel, Encyclopedia of Practical Medicine; Wood, Chemical and Microscopical Diagnosis

Surgical Pathology—

Bland Sutton, Tumors, Innocent and Malignant.

HYGIENE

OFFICERS OF INSTRUCTION

HENRY MARTYN BRACKEN, M.D., L.R.C.S., (Edin.), *Professor of Preventive Medicine and Secretary of the Minnesota State Board of Health.*

F. F. WESBROOK, M.A., M.D., C.M., *Professor of Pathology and Bacteriology and Director of the Minnesota State Board of Health laboratories.*

F. H. BASS, *Assistant Professor and Civil Engineer in charge of Municipal and Sanitary Engineering, College of Engineering and Mechanic Arts, University of Minnesota, and Acting Sanitary Engineer, Minnesota State Board of Health.*

The fundamental portions of this subject are covered in the practical and lecture courses on chemistry of water, air, soil, milk and other food, and in the Department of Physiology in physiological chemistry.

The life histories of bacteria and parasites which act as the causes of communicable diseases are covered in pathology and bacteriology as also the bacteriology of water and milk and courses on germicides and disinfection are given.

The remaining portions of the subject and the application of these principles already inculcated in practical sanitation are given in a special course of lectures and trips of inspection in the fourth year.

The legal phases of sanitation, including federal, state and municipal hygiene, together with the sanitation of various industries and the control of epidemic and communicable diseases are fully dealt with.

The relation of the laboratory and field methods to the location of foci of infection, the practical study of selection and purification of water supplies and the sanitary disposal of sewage and garbage, are thoroughly covered as is also the matter of the sanitary construction of buildings, ventilation and practical school hygiene.

In addition to the lectures and practical work at the College, visits of inspection will be made to abbatoirs, sources of water supply, sewage disposal plants, garbage plants, detention hospitals for small pox and other communicable diseases, sanitary camps and santoria for tuberculosis, etc.

Second semester, fourth year.

DEPARTMENT OF MEDICINE.

OFFICERS OF INSTRUCTION

CHARLES L. GREENE, M.D., *Professor of Medicine.*

J. W. BELL, M.D., *Emeritus Professor of Physical Diagnosis and Clinical Medicine.*

EVERTON J. ABBOTT, A.B., M.D., *Clinical Professor of Medicine.*

CHARLES H. HUNTER, A.M., M.D., *Clinical Professor of Medicine.*

JAMES T. CHRISTISON, M.D., *Professor of Diseases of Children.*

GEORGE D. HEAD, B.S., M.D., *Professor of Clinical Microscopy and Clinical Medicine.*

LOUIS A. NIPPERT, M.D., *Clinical Professor of Medicine.*

CHARLES NOOTNAGEL, M.D., *Clinical Professor of Medicine and Physical Diagnosis.*

THOMAS S. ROBERTS, M.D., *Clinical Professor of Diseases of Children.*

GEORGE E. SENKLER, M.D., *Clinical Professor of Medicine.*

HENRY L. STAPLES, A.M., M.D., *Clinical Professor of Medicine.*

J. G. CROSS, M.D., *Clinical Instructor in Medicine.*

P. A. HOFF, M.D., *Clinical Instructor in Medicine.*

DAVID LANDO, M.D., *Clinical Instructor in Medicine.*

WALTER R. RAMSEY, M.D., *Clinical Instructor in Diseases of Children.*

SOREN P. REES, B.S., M.D., *Clinical Instructor in Medicine.*

W. D. SHELDON, M.D., *Clinical Instructor in Medicine and Instructor in Therapeutics.*

THOS. W. STUMM, M.D., *Clinical Instructor in Medicine.*

HENRY L. ULRICH, M.D., *Instructor in Clinical Microscopy.*

ASSISTANTS IN MEDICINE.

W. H. AURAND, M.D., *Clinical Assistant in Medicine.*

HERMAN A. BOUMAN, M.D., *Clinical Assistant in Medicine.*

PAUL B. COOK, M.D., L.R.C.P., M.R.C.S., *Clinical Assistant in Medicine.*

L. O. DART, M.D., *Clinical Assistant in Diseases of Children.*

JAMES S. GILFILLAN, M.D., *Clinical Assistant in Medicine.*

E. K. GREEN, A.B., M.D., *Clinical Assistant in Medicine.*

ALEX R. HALL, M.D., *Clinical Assistant in Medicine.*

JOHN E. HYNES, M.D., *Clinical Assistant in Medicine.*

CHAS. B. WRIGHT, A.B., M.D., *Clinical Assistant in Diseases of Children*

GENERAL MEDICINE

THIRD YEAR.

Course I. Case-taking and General Symptomatology.
Three times a week, first quarter
Professor Greene

(a) Lectures and recitations.
(b) Practical clinical exercises at University Clinical Building and St. Paul Free Dispensary.

Course II. Physical Diagnosis.
(a) Lectures and recitations second quarter, three times weekly. *Professor Greene*
(b) Clinical exercises throughout the junior year at the hospitals and dispensaries of Minneapolis and St. Paul.
Professors C. Nootnagel and G. A. Senkler

This course includes:
(a) The thorax, its topography and the methods of examination applied to both the normal and abnormal chest.
(b) The cardiac region, its topography and methods of examination.
(c) The lungs and pleura in health and disease.
(d) The abdominal organs including both general and special methods of examination, i. e., examination of stomach contents, practical urinary examination, etc.

In this course especial attention is given to the study of the normal as well as the abnormal chest and abdomen, and, wherever possible, opportunity is given the student to personally examine cases and watch their progress and termination.

Course III. Three hours a week, second semester. *Professor Greene*
(a) Systematic lectures, case analyses and quizzes on the diseases of the heart and blood vessels.
(b) Dieases of the lung and pleura.
(c) Diseases of the kidney.
(d) Practical clinical exercises in the form of clinical lectures and work in small sections in the wards of the various hospitals and St. Paul Free Dispensary, twice weekly, and in the University Dispensary daily throughout the whole semester.

Course IV. Acute Infectious Diseases.
Work in small sections in the city hospitals of Minneapolis and St. Paul, twice weekly (in St. Paul after January 1st).

FOURTH YEAR.

Course V. Systematic Lectures, Case Analyses and Recitations.
Twice weekly.
Covering the acute innfectious diseases. *Professor Greene*

In this connection special attention is given to the so-called tropical diseases, at the present day important because of our territorial extension.

Course VI. Clinical Exercises at the City Hospitals of the Twin Cities.
Correlated with the instruction given in course V. Minneapolis City Hospital throughout the year. St. Paul City Hospital after January 1st, each year.

Course VII.
(a) Diseases of the blood and ductless glands. Systematic lectures, case analyses and recitations, fourth quarter, twice weekly. *Professor Greene*
(b) Special instruction in sections at the hospitals and dispensaries, correlated with the course as given above.

Course VIII.
(a) Diseases of the stomach, liver and intestines. Systematic lectures and recitations twice weekly. *Professor Greene*
(b) Special clinical work in sections correlated with course given above.

The Clinical Courses I b, II b, III bb, IV, VI, VII b, and VIII b, are given for the most part to small sections of the Junior and Senior classes

in the wards and amphitheaters of the several hospitals and dispensaries of Minneapolis and St. Paul, 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. One hour a week, senior year. Dr. Geo. D. Head and Dr. S. Marx White, and Dr. W. D. Sheldon.
(b) St. Barnabas Hospital, Minneapolis, two hours a week, both years. Professor C. H. Hunter.
(c) City and County Hospital, St. Paul, two hours a week both pital, St. Paul, four hours a week, for part both years. Professor E. J. Abbott.
(d) City and County Hospital, St. Paul, two hours a week, both years. Professor C. L. Greene and Dr. Senkler.
(e) Free Dispensary at St. Paul, two hours a week, both years. Professor C. L. Greene and Drs. Ramsey and Hoff.
(f) University Clinical Building, Minneapolis, four hours a week, both years. Dr. L. A. Nippert, Dr. Geo. D. Head.

Course IX.. General Clinical Course.
In addition to the courses above named, clinical lectures are given twice weekly to both junior and senior classes At each are shown cases of unusual interest and importance The section work throughout the two years is exceptionally valuable by reason of the small size of the sections, every effort being made to bring the student closely in touch with the teacher and patient

Course X Case Analysis.
Throughout both the junior and senior year special attention is given to the analysis of actual cases illustrating those portions of the courses that have been dealt with in the lecture room or in the clinical lectures, students being this way compelled to apply practically such knowledge as they have gained and not only make a diagnosis but go thoroughly into the analysis and bearing of general symptomatology. The older method of simply quizzing in connection with lecture work has been so far as possible abandoned. Exercises throughout the year.

Professor Greene and Clinical Instructor Hoff

Text and Reference Books—*Practice of Medicine*: Osler's Practice; Tyson's Practice; Thompson's Practical Medicine; Ander's Practice. *Physical Diagnosis and Clinical Methods*: Greene's Medical Diagnosis; Butler's Diagnosis; Sahli's Diagnostic Methods; Cabot's Diagnosis; Musser's Diagnosis; Hare's Diagnosis; Bramwell's Practical Medicine; Cabot's Medical Cases; Hutchinson and Rainey's Clinical Methods. *Collateral Reading*: Cabot on the Blood; Du Costa on the Blood; Hemmeter's Diseases of the Stomach; Bons' Diseases of the Stomach; Allbutt's System of Medicine; American Text Book of Medicine; Gibson's Practice; Gibson on Diseases of the Heart and Aorta; Babcock on Diseases of the Heart; Ebstein and Schwalbe, Handbuch der Praktischen Medizen.

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 J. T. Christison

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.

Professors J. T. Christison, Dr. Ramsey and Dr. Cook

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, Dr. Dart and Dr. Wright

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.

CLINICAL MICROSCOPY

A required course given in the second semester of the senior year. The course includes:

(a) The urine; a macroscopical 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 counting of red and white cells in the blood, the estimation of hæmoglobin, the making of blood smears, and the fixing, staining, mounting and studying of all forms of normal and pathological red and white blood cells. In this course students are given specimens of blood from cases of pernicious anaemia, myelogenous leukæmia, and lymphatic leukæmia, for study.

(c) Stomach contents; the macroscopical, chemical, and microscopical study of gastric contents in various diseases of the stomach, with special reference to differential diagnosis, by lectures and demonstrations.

(d) Exudates and transudates in various diseases of the pleura and peritoneum. Nine hours a week during half of the second semester.

Professor George Douglas Head

Books of Reference:

Simon's Clinical Diagnosis
Cabot's Clinical Examination of the Blood
Ewing's Clinical Pathology of the Blood
Reider's Atlas of Urinary Sediments.
Sahli's Lehrbuch der Klinischen Untersuchungs Methoden.
Ogden's Clinical Examination of the Urine.
Boston's Clinical Diagnosis.
Wood's Chemical and Microscopical Diagnosis.
Emmerson's Clinical Diagnosis.

The senior class is divided into sections of four each and assigned to the laboratory of clinical microscopy four days of the week throughout the college year. In this work the students are required to make urine, sputum, and stomach contents examinations of the cases coming to the free dispensary. This instruction is under the charge of Dr. Henry L. Ulrich.

NERVOUS AND MENTAL DISEASES

OFFICERS OF INSTRUCTION

C. EUGENE RIGGS, A.M., M.D., *Professor of Nervous and Mental Diseases.*

WILLIAM A. JONES, M.D., *Clinical Professor of Nervous and Mental Diseases.*

A. W. DUNNING, M.D., *Clinical Instructor in Nervous and Mental Diseases.*

A. S. HAMILTON, B.S., M.D., *Instructor in Pathology of the Nervous System.*

H. W. JONES, M.D., *Clinical Instructor in Nervous and Mental Diseases.*

CHARLES R. BALL, A.B., M.D., *Clinical Instructor in Nervous and Mental Diseases.*

A. E. LOBERG, M.D., *Clinical Assistant in Nervous and Mental Diseases.*

COURSES OF INSTRUCTION

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. *Professors Riggs and Jones* (Alternating)
Lectures, recitations and demonstrations. Two hours a week, twelve weeks, first semester, fourth year.

Course II. Psychiatry. *Professors Riggs and Jones* (Alternating)
Lectures, recitations and demonstrations. Two hours a week, five weeks, first and second semesters, fourth year.

Course III. Electro-therapeutics (elective). *Dr. A. W. Dunning*
Fourth year.

Course IV. Clinical Neurology and Pyschiatry. *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, Drs. Dunning and Ball, at the City and County Hospital, St. Luke's Hospital, St. Joseph's Hospital and the Free Dispensary; and at Minneapolis by Professor Jones, and Drs. H. W. Jones and Loberg, at the City Hospital, Asbury Hospital, St. Mary's Hospital and the University Free Dispensary.

Text-Books:
Oppenheim's Diseases of the Nervous System.
Dana's Nervous Diseases.
Church and Peterson's Nervous and Mental Diseases.
Allan M. Starr's Nervous Diseases, Organic and Functional.
The Eye and Nervous System, Posey and Spiller.
Text-book of Insanity, Krafft-Ebing.
Text-book of Psychiatry, Leonardo Bianchi.
Practical Manual of Insanity, Brower and Bannister.
The Hygiene of Mind, T. S. Clouston.

Collateral Reading:
Edinger's Anatomy of the Central Nervous System; Gordinier's Anatomy of the Central Nervous System.
Gower's Diseases of the Nervous System.

DEPARTMENT OF SURGERY

OFFICERS OF INSTRUCTION

CHARLES A. WHEATON, M.D., *Emeritus Professor of Surgery.*
JAMES E. MOORE, M.D., *Professor of Surgery.*
J. CLARK STEWART, B.S., M.D., *Professor of the Principles of Surgery.*
FREDERICK A. DUNSMOOR, M.D., *Professor of Operative and Clinical Surgery.*
ARTHUR J. GILLETTE, M.D., *Professor of Orthopedic Surgery.*
J. WARREN LITTLE, M.D., *Clinical Professor of Surgery.*
ARCHIBALD MACLAREN, A.B., M.D., *Clinical Professor of Surgery.*
A. T. MANN, B.S., M.D., *Clinical Professor of Surgery.*
HENRY J. O'BRIEN, M.D., *Clinical Professor of Surgery.*
JUSTUS OHAGE, M. D., *Clinical Professor of Surgery.*
JOHN T. ROGERS, M.D., *Clinical Professor of Surgery.*
JNO. B. BRIMHALL, M.D., *Clinical Instructor in Orthopedic Surgery.*
A. R. COLVIN, M.D., *Clinical Instructor in Surgery.*
WARREN A. DENNIS, M.D., *Clinical Instructor in Surgery.*
JUDD GOODRICH, M.D., *Clinical Instructor in Surgery.*
ARTHUR A. LAW, M.D., *Instructor in Operative Surgery.*
VAN H. WILCOX, M.D., *Instructor in Operative Surgery.*
R. E. FARR, M.D., *Clinical Instructor in Surgery.*
EMIL S. GEIST, M.D., *Clinical Assistant in Orthopaedia.*
ARCHA WILCOX, M. D., *Clinical Assistant in Surgery.*

COURSES OF INSTRUCTION.

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. *Professor Stewart*
Inflammation; traumatic fevers, suppurations; acute inflammations of joints; ulceration, gangrene; thrombosis and embolism; septicemia; pyaemia; erysipelas; tetanus; surgical tuberculosis; actinomycosis, anthrax and glanders. Lectures and recitations, two hours a week, first semester, third year.

Course II. Operative Surgery. *Professor Dunsmoor*
Lectures upon the principles of operative procedure; the preparation of patient, operator and operating rooms, the principles of asepsis, antisepsis and sterilization; anæsthesia and anæsthetics; hæmostasis, ligatures and sutures; dressings, bandages, and the treatment of wounds. Two hours a week, third quarter, third year.

Course III. The Practice of Surgery. *Professor Moore*
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. Three hours a week, second semester, third year.

Course IV. The Practice of Surgery. *Professor Moore*
Surgery of the head, neck, chest, back, breast, abdomen, includ-

ing hernia, anus, rectum and urinary tract. Lectures and recitations. Three hours a week, first semester, fourth year.

Course V. Operative Surgery. *Professor Dunsmoor and Dr. Law*
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 quarter, fourth year.

Course VI. Orthopedic Surgery; including diseases of bones, joints, synoviæ and bursæ, congenital and acquired deformities; dystrophies, with the principles of treatment. Lectures and recitations. Three hours a week, fourth quarter, fourth year.
Professor Gillette

Course VII. Tumors. *Professor Stewart*
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 and lantern slide demonstrations. Lectures and recitations, two hours a week, second semester, fourth year.

Course VIII. Bandaging and Dressings. *Professor Dunsmoor and Dr. Law*
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 quarter, fourth year.

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 classes 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. Lukes' 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 St. Luke's Hospital, Professor Archibald McLaren.

At St. Joseph's Hospital, Professor H. J. O'Brien.

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 Professor J. E. Moore.

At the Asbury Hospital, Swedish Hospital or the City Hospital, Minneapolis, weekly, by Professors F. A. Dunsmoor and J. Warren Little.

At the City Hospital, Minneapolis, weekly, by Professors J. Clark Stewart, J. Warren Little and A. T. Mann.

At St. Mary's Hospital, Minneapolis, by Dr. Farr.

At the University Free Dispensary, by Professor Mann, Drs. Law and Condit.

Text-Books:
Da Costa.
International Text-Book of Surgery.
Warrens' Surgical Pathology and Therapeutics.
Surgical Diagnosis, Berg.
Bryant's Operative Surgery.
Binnie's Operative Surgery.
Scudder on Fractures.
Collateral Reading—
Moore's Orthopædic Surgery.
Bradford's and Lovett's Orthopædic Surgery.
Witman's Orthopædic Surgery.

OPHTHALMOLOGY AND OTOLOGY.

OFFICERS OF INSTRUCTION

FRANK C. TODD, M.D., *Professor of Ophthalmology and Otology.*

E. V. APPLEBY, M.D., *Clinical Instructor in Ophthalmology.*

JOHN S. MACNIE, M. D., *Clinical Instructor in Ophthalmology and Otology.*

H. JOURNEY WELLS, M. D., *Clinical Assistant in Ophthalmology and Otology.*

COURSES OF INSTRUCTION

Course I. Diseases of the Eye and its Appendages; refraction and its errors. Lectures and recitations. Illustrated with specimens and stereopticon. 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. *Professor Todd*
Clinical lectures will be given and operations performed at Asbury or Northwestern Hospital, Minneapolis, every Thursday, third and fourth year. Clinics will be given at the Minneapolis City Hospital during December, January, February and March. Third and fourth years.

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 the eye, St. Paul, *Dr. Appleby and Dr. Burch*
Diseases of eye and ear, Minneapolis, *Dr. Macnie and Dr. Wells*

Course V. Ophthalmascopy; a practical course of instruction, elective in the senior year. *Dr. J. S. Macnie*

Text-Books:
May, Diseases of the Eye.
Wood & Woodruff, Common Diseases of the Eye.
Fox's Diseases of the Eye.
Bacon's Diseases of the Ear.
Collateral Reading—DeSchweinitz's Diseases of the Eye; American Text-Book; Norris and Oliver's Ophthalmology; Politzer's Diseases of the Ear; Vassey's Diseases of the Eye; Posey Wright, Diseases of the Eye, Ear, Nose and Throat.

SKIN, GENITO-URINARY, AND VENEREAL DISEASES

OFFICERS OF INSTRUCTION

MAX P. VANDER HORCK, M.D., *Professor of the Diseases of the Skin and the Genito-Urinary System.*

BURNSIDE FOSTER, M.A., M.D., *Clinical Professor of Diseases of the Skin*

F. R. WRIGHT, M.D., *Clinical Instructor in Dermatology and Genito-Urinary Diseases.*

GEORGE M. COON, M.D., *Clinical Instructor in Genito-Urinary Diseases.*

JOHN M. ARMSTRONG, M.D., *Clinical Assistant in Genito-Urinary Diseases.*

S. W. SWEITZER, M.D., *Clinical Assistant in Dermatology and Genito-Urinary Diseases.*

COURSES OF INSTRUCTION

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 years.
Professors Vander Horck and Burnside Foster and Dr. F. R. Wright

Text-Books:
Keye's or White and Martin's Diseases of Urinary Organs.
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; Taylor's Genito-Urinary and Venereal Diseases of the Skin.

DISEASES OF THE THROAT AND NOSE.

OFFICERS OF INSTRUCTION

JACOB E. SCHADLE, M.D., *Professor of Rhinology and Laryngology.*

WILLIAM R. MURRAY, A.B., M.D., *Clinical Professor of Rhinology and Laryngology.*

R. A. CAMPBELL, M.D., *Clinical Instructor in Rhinology and Laryngology.*

COURSES OF INSTRUCTION

Course I. Anatomy and Physiology of the Nose and Throat; pathology, diagnosis and treatment. *Professor Schadle*
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.
Professor Murray and Dr. Campbell

Course III. Operative Clinics will be held at Asbury or City Hospital Minneapolis, every Thursday, third and fourth year.
Professor Murray

Course IV. 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:
Schadle's Outlines of Diseases of Nose and Throat.
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 and Wright's Diseases of the Ear, Nose and Throat; and Kyle's Diseases of the Nose and Throat.

GYNECOLOGY.

OFFICERS OF INSTRUCTION.

ALEXANDER J. STONE, M.D., LL.D., *Professor of Diseases of Women.*
AMOS W. ABBOTT, M.D., *Clinical Professor of Diseases of Women.*
JOHN L. ROTHROCK, A.M., M.D., *Clinical Professor of Diseases of Women.*
ARTHUR E. BENJAMIN, M.D., *Clinical Instructor in Gynecology.*
H. P. RITCHIE, Ph.B., M.D., *Clinical Instructor in Gynecology.*
H. L. WILLIAMS, A.B., M.D., *Clinical Instructor in Gynecology.*

COURSES OF INSTRUCTION.

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. *Professor Stone*
Two hours a week, first semester, fourth year. One hour a week, second semester, fourth year.

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 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 A. E. Benjamin, H. L. Williams, J. L. Rothrock, and H. P. Ritchie. This work 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—Penrose, Gleist and Ashton.

DEPARTMENT OF OBSTETRICS.

OFFICERS OF INSTRUCTION.

PARKS RITCHIE, M.D., *Professor of Obstetrics.*
A. B. CATES, A.M., M.D., *Professor of Obstetrics.*
FREDERICK LEAVITT, M.D., *Clinical Professor of Obstetrics.*
J. C. LITZENBERG, B.S., M.D., *Clinical Professor of Obstetrics.*
JEANETTE M. MCLAREN, M.D., *Clinical Instructor in Obstetrics.*
F. L. ADAIR, M.D., *Clinical Instructor in Obstetrics.*

COURSES OF INSTRUCTION.

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 department 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 sequelæ. 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. *Professor Ritchie*
The mechanism and conduct of normal labor, with its complications; abortions. Lectures and recitations. Two hours a week. November, December and January, third year.

Course III. Hospital Ward Work.
Twice a week, from January 1st to May 1st, small sections of the senior and junior classes will study the signs of pregnancy, pelvimetry, obstetric diagnosis, the puerperal state, the early care of infants, incubation, etc., in the maternity wards of the City and County Hospital, St. Paul.
Professor Leavitt

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 Leavitt and Litzenberg. Also a number of confinements in maternities and private homes, conducted by Doctors Fred L. Adair and Jeanette McLaren.

Course V. Manikin Demonstrations. *Professor Litzenberg and Dr. Adair*
Once a week during the third and fourth years the various positions, presentations and obstetric operations will be demonstrated by means of the manikin.

Course VI. Recitations. *Professors Leavitt and Litzenberg*
This course will be a review of the subject of practical obstetrics by recitations one hour a week during the first and second semester of the fourth year .

Text-Books:
Edgar, Williams, Jewett, Lusk, Hirst, Peterson, and the American Text-Book of Obstetrics.

THE HISTORY OF MEDICINE.

An elective course of lectures is given on 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 in history. Two hours a week, fourth year.
Professor Burnside Foster

MEDICAL JURISPRUDENCE.

A course of lectures and recitations, in the legal relations of medicine. Two hours a week, fourth year. *Professor Sweeney*

Text-Books:
Taylor's Medical Jurisprudence.
Collateral Reading—Withaus' Principles of Forensic Medicine and Toxicology; Wharton and Stille's Medical Jurisprudence; Reese's Medical Jurisprudence and Toxicology; Draper's Medical Jurisprudence.

Alumni Association

No alumni of the University are more loyal than those of the College of Medicine and Surgery nor has any group of alumni done more for the institution. The alumni of this College through its Association organized many years ago, were probably the first to take united and official action in forwarding College and general University interests. Many of the alumni of the Association are alumni also of the College of Science, Literature and the Arts or of some other College of the University and there is an increasing percentage of such persons. On this account the alumni of this College are also able and willing supporters of matters of general University import.

All graduates of this College in good standing are eligible to membership in the Alumni Association by payment of the annual dues of $1.00.

The officers of the Association for the year ending June, 1907 are as follows:

President, Dr. Geo. D. Head, Minneapolis.

First Vice-President, Dr. Geo. D. Haggard, Minneapolis.

Second Vice-President, Dr. C. N. McCloud, St. Paul.

Secretary-Treasurer, Dr. Herbert W. Jones, Minneapolis.

An advisory committee consisting of twelve graduates and the President and Secretary of the Alumni Association, by keeping in touch with teaching and practice in this and other centers, has been most helpful in suggesting improvements. Not only has it given valuable suggestions but its enthusiastic and active support is largely responsible for the securing of contributions from the citizens of Minneapolis for hospital site and in the general interest which resulted in the legislative support of the new University Hospital for the College of Medicine and Surgery. This donation perhaps did more than anything else to show the legislature the absolute need of more land for University purposes and in that way led to the generous state appropriations by which the Campus will be more than doubled.

The advisory committee for the year 1906-07 is as follows:

Dr. John C. Boehm, St. Cloud, Minn.

Dr. Frank C. Todd, Minneapolis, Minn.

Dr. L. B. Wilson, Rochester, Minn.

Dr. John T. Christison, St. Paul, Minn.

Dr. E. H. Beckman, Rochester, Minn.
Dr. W. R. Ramsey, St. Paul, Minn.
Dr. Paul Cook, St. Paul, Minn.
Dr. A. E. Hedback, Minneapolis, Minn.
Dr. W. A. Dennis, St. Paul, Minn.
Dr. C. J. Ringnell, Minneapolis, Minn.
Dr. A. E. Benjamin, Minneapolis, Minn.
Dr. Chas. Bray, Biwabik, Minn.
Dr. Geo. D. Head, President.
Dr. Herbert W. Jones, Secretary-Treasurer.

All medical alumni should join the Alumni Association so as to keep in touch with their fellow alumni, and with the College and University, and thus place themselves in a position to loyally serve their alma mater. Subscription to the Alumni Weekly should be made by all. The cost is $1 per year, if paid in advance. The editor, Mr. E. B. Johnson, is giving his whole time to this work and the work as Secretary of the General Alumni Association, and he is anxious to get into and keep in touch with all of the alumni of the University.

The College of Medicine and Surgery is maintaining a Bureau of Information for its graduates. Amongst other things, hospital positions, new openings for practice, opportunities for *locum tenens* work, etc., are recorded.

There were available in the Dean's office, hospital interneships for each member of the graduating class, and all of our available graduates who had served as internes were provided with desirable salaried positions or suitable locations. More than fifty other men could have been given similar advantages. This is the result of the first year's informal operation of the Bureau of Information and the mutual advantages are apparent.

It is very important that the exact address of each alumnus be on file in the office, and the Board of Regents has authorized the publication of the alumni which follows.

Each alumnus is earnestly requested to scrutinize the directory carefully, and if any mistakes are seen either concerning himself or anyone else, it will be taken as a kindness if the proper information will be forwarded to the Dean's office. Furthermore, at this time request is made of each alumnus that he keep the office informed as to his movements and his progress in professional work, including appointments, publications or honorary recognitions which may come to him. It is desired to keep on file all data concerning our alumni for historical purposes.

All correspondence relative to Medical Alumni Association matters should be addressed to Dr. Herbert W. Jones, Secretary-Treasurer. Pillsbury Building, Minneapolis, Minn.

Alumni College of Medicine and Surgery

University of Minnesota (Including year 1906-07)

Abbott, Claude U., '04 ..... Minneapolis
Abbott, William P., '06 ..... St. Paul
Adams, Bertram S., '01 ..... Hibbing
B. S., University of Minnesota.
Adams, J. W., '86 ..... Philadelphia, Pa.
Adams, Rollin T., '93 ..... Mantorville
B. S., Carleton.
Agnew, Anna M., '99 ..... Hudson, Wis.
*Ahlstrom, Alfred E., '00 ..... St. Peter
Aitkins, Herbert B., '93 ..... Le Sueur Center
B. A., Manitoba University.
Alexander, Frank H., '97 ..... Barnesville
Alger, Edmund W., '02 ..... Minneapolis
Allen, Harry W., '00 ..... Minneapolis
M. S.
Allen, Mason, '97 ..... St. Paul
Alley, Albert G., '05 ..... Buffalo
Anderson, Arnt G., '04 ..... Hillsboro, N. D.
Anderson, August R., '91 ..... Sioux City, Ia.
Anderson, Carl A., '05 ..... Deer Creek
Anderson, Christopher A., '92 ..... Rush City
Anderson, Edwin C., '97 ..... Billings, Mont.
Anderson, Wilmar L., '04 ..... Minneapolis
Anderson, William S., '03 ..... Houston
Angell, William A., '95 ..... Canby
Appleby, E. Villiers. '94 ..... St. Paul
Arey, Hugh C., '02 ..... Excelsior
Argue, George Wm., '01 ..... Breckenridge
Argue, Hiram S., '05 ..... Bathgate, N. D.
Armstrong, John M., '01 ..... St. Paul
Arneberg, John G., '05 ..... Leeds, N. D.
Aronsohm, David M., '05 ..... St. Paul
*Arslandides, Michael T., '94 ..... Caesarea, Asia Minor
B. A., Anatolia College.
Arzt, Carl P., '95 ..... St. Paul
Arzt, Phillip G., '05 ..... St. Paul
Ashley, E. Mayo, '06 ..... Missoula, Mont.
Ashley, Paul L., '06 ..... Frazee
Aspelund, Joseph S., '06 ..... Minneapolis
Aubin, Louise M., '93 ..... Racine, Wis.
Aurand, William H., '01 ..... Minneapolis
Aurness, Peter A., '92 ..... Minneapolis
Austin, William J., '05 ..... Watkins
Avery, J. Fowler, '99 ..... Aitkin
Axilrod, David R., '03 ..... Hutchinson
Bacon, Harry P., '97 ..... Milaca, Minn.
Bacon, Knox, '94 ..... St. Paul
Bailey, John Wm., '94 ..... Seattle, Wash.
Baillie, Williams F., '03 ..... Hunter, N. D.
Baker, Mary K., '00 ..... St. Paul
Bakke, Peter R., '92 ..... Grantsburg, Wis.

* Deceased.

*Bakke, Peter H., '91 ..... Kenyon
Baldwin, Louis B., '97 ..... Lakota, N. D.
Baldwin, William P., '01 ..... Casselton, N. D.
Ball, Chas. R., '94 ..... St. Paul
B. A., Ohio Wesleyan.
Barclay, Alexander, Jr., '07 ..... St. Paul
Barre, William de la, '95 ..... Minneapolis
Barsness, Nellie O., '02 ..... St. Paul
Barton, Harry J., '06 ..... Lake City
Bassett, Mary E., '95 ..... Hastings
B. S.
Batchelder, Edwin J., '93 ..... New Richland
Batcheller, Oliver T., '99 ..... Brainerd
Baxter, Stephen H., '02 ..... Minneapolis
Beaudoux, Henry A., 95 ..... Fargo, N. D.
Bebb, Rose A., '99 ..... Seattle, Wash.
B. L.
Beckman, Emil H., '01 ..... Rochester
B. A., Grinnell, '94.
Beebe, Dan G., '96 ..... Minneapolis
Beek, R. Hudson, '94 ..... Lakota, N. D.
Belden, Geo. G., '04 ..... Spokane, Wash.
Belt, W. E., '89 ..... Dodge Center, Minn.
Benedict, Erle E., '01 ..... Racine, Minn.
Benham, Edward W., '95 ..... Amboy
Benjamin, Arthur E., '02 ..... Minneapolis
Bennett, Chas. E., '95 ..... Aneat, N. D.
Bennett, O. E., '90 ..... Correll
Bennion, Percival H., '02 ..... St. Paul
Benoit, Frank T., '05 ..... Crookston
Benson, Geo. E., '00 ..... Minneapolis
Benson, Oscar T., '05 ..... Appleton
Benson, Theo. J., '04 ..... Minneapolis
Bergan, O. K., '91 ..... Fort Worth, Texas
Bergh, L. N., '06 ..... St. Paul
Bernard, John A., '89 ..... Minneapolis
Bertelson, Oskar L., '00 ..... Crookston
Best, Robert A., '99 ..... Mankato
Bevans, T. F., '03 ..... Perley
Bickford, Frank J., '02 ..... Milroy
Biederman, Jacob, '04 ..... Somerset, Wis
Bierbauer, B. W., '88 ..... Brooklyn, N. Y.
Bigelow, Chas. E., '04 ..... Dodge Center
Binder, Geo. A., '92 ..... St. Paul
Birdsall, A. T., '96 ..... Brooklyn, N. Y.
B. L.
Birnberg, Tobias, '04 ..... St. Paul
Bissell, Frank S., '02 ..... Maple Lake
Bjelland, Adolph O., '96 ..... Mankato
Bjornstad, Gisle, '94 ..... Albert Lea
Blackman, Ernest L., '01 ..... Alden
B. S., Coe College, Ia.
Blais, Chas., '04 ..... Minneapolis
Blake, Jas., '01 ..... Hopkins, Minn.
Blanchard, H. G., '97 ..... Waseca
Boeckmann, M. W. H., '03 ..... Thief River Falls
Boehm, John C., '93 ..... St. Cloud
Bohland, Fuchs F. J., '91 ..... Belle Plaine
Boleyn, E. Sydney, '94 ..... Stillwater
Bolkcom, Geo. W., '94 ..... Minneapolis
Bomberger, Franklin J., '02 ..... Mapleton
Booker, Gertrude, '97 ..... Dover
*Borchardt, Edward A., '93 ..... St. Paul
Bouman, H. A., '97 ..... Minneapolis
A. H.
Boyum, Peter A., '07 ..... Rushford
Braasch, Wm. F., '03 ..... Minneapolis

* Deceased.

Brabec, Frank J., '93 ..... Perham
B. S., '90.
Brand, Wm. A., '04 ..... Redwood Falls
Brandt, Albert M., '05 ..... Forest City
Branton, Berton J., '05 ..... Atwater
Bratrud, Theo. '99 ..... Warren
Bray, Chas. W., '95 ..... Biwabik
B. A.
Bray, E. R., '06 ..... St. Paul
Brede, Wm. G., '06 ..... St. Paul
Brigham, Chas. F., '02 ..... St. Cloud
Brigham, Frank T., '05 ..... St. Cloud
Brimhall, Silas J., '02 ..... San Diego, Calif.
Brooks, Geo. F., '00 ..... Faribault
Brown, Chas. E., '04 ..... Highland, Kan.
Brown, Harry, '96 ..... Rolling Stone
Brown, Paul, '05 ..... Eveleth
Brown, William G., '02 ..... Park River, N. D.
Brown, Walter M., '02 ..... Grand Rapids, Mich.
Brunelle, Adelaid, '86 ..... Cloquet
Brush, Fred H., '05 ..... St. Paul
Bryant, Oliver R., '05 ..... Minneapolis
Buck, Carroll D., '97 ..... San Isidro, P. I.
Buckley, Daniel, '98 ..... Seattle, Wash.
B. S.
Budworth, Benj. F., '02 ..... Shelly
Buell, Mary C., '97 ..... Minneapolis
Bulkley, N. C., '06 ..... Danbury, Conn.
Burch, Frank E., '97 ..... St. Paul
Burgan, Jas. H., '99 ..... Minneapolis
Burns, M. Alpheus, '96 ..... Milan
Burns, Robert M., '05 ..... St. Paul
Bussen, L. H., '02 ..... Valley City, N. D.
Butler, David R., '94 ..... Minneapolis
Butler, John, '02 ..... Minneapolis
Button, A. J., '06 ..... Bowdle, S. D.
Cahoon, Grace W. W., '97 ..... Butte, Mont.
Caine, Chas. E., '96 ..... Morris
Caley, G. Ross, '00 ..... Princeton
Call, Alfred M., '03 ..... Stoum, Wis.
Callerstrom, G. W., '06 ..... Gowrie, Ia.
Cameron, John A., '02 ..... St. Paul
Campbell, Charlotte P., '00 ..... Mantorville
Campbell, D. R., '05 ..... Litchfield
Campbell, Geo. E., '95 ..... Rochester
Campbell, John E., '01 ..... Minneapolis
M. S., University of Minnesota '00.
Campbell, Lorne A., '04 ..... Campbell
Campbell, Paul E., '03 ..... St. Paul
Campbell, Robt. A., '96 ..... Minneapolis
Campbell, Robert W., '05 ..... Tracy
Canfield, Harry E., '06 ..... Halton, N. D.
Carlson, E. L., '06 ..... Missoula, Mont.
Carman, Chas. L., '97 ..... St. Paul
Carman, Jas. E., '01 ..... Brooks
Carpenter, Carrol C., '97 ..... Bird Island
Cassel, Rufus J., '01 ..... Detroit
Cater, G. N., Miss. '01 ..... Muskegan, Mich.
Catlin, John F., '03 ..... Buffalo
Cavanaugh, Jas. O., '97 ..... St. Paul
Chamberlain, Henry W., '01 ..... La Crosse, Wis.
Chambers, W. C., '05 ..... Stillwater
Chapple, Chas. L., '98 ..... Rochester
B. S.
Chase, R. R., '89 ..... Eau Claire, Wis.
Chase, E. Frank, '05 ..... Adams
Cheleen, Sigfrid, 06 ..... St. Paul
Cheney, W. W., '89 ..... Port Angeles, Wash.
Chesley, Albert J., '07 ..... Minneapolis
Chilgren, G. Arthur, '92 ..... Sauk Rapids

Chilton, Leo W., '04 ..... Canyon City, Idaho
Chowning, Wm. M., '01 ..... Minneapolis
B. A., Johns Hopkins.
Crewe, John E., '96 ..... Rochester
Christenson, Chas. R., '96 ..... Starbuck
Christison, Jas. T., '01 ..... St. Paul
M. D., Long Island, Col.
Clark, Howard S., '97 ..... Glencoe
B. S.
Clarke, Robert, '03 ..... Elysian
Claydon, Leonard E., '95 ..... Red Wing
Clement, L. O., '02 ..... Lamberton
Cleveland, Hiram E., '01 ..... Northfield
Coffin, Samuel D., '04 ..... Minneapolis
Cohen, H. A., '01 ..... Minneapolis
Coleman, Harry M., '97 ..... Barron, Wis.
Condit, Wm. H., '99 ..... Minneapolis
B. S., University of Minnesota, '95.
Cook, Paul B., '00 ..... St. Paul
Coon, William F., '03 ..... Eau Claire, Wis.
Corbett, J. Frank '96 ..... Minneapolis
Cosgrove, Joseph H., '06 ..... Montevideo
Coria Leon, '04 ..... Minneapolis
Corse, Chas. A., '97 ..... Verndale
Corwin, G. P., '89 ..... Pomona, Calif.
*Cotton, Henry, '94 ..... Prescott, Wis.
Coulter, C. F., '93 ..... Wadena
Coulter, Herbert R., '03 ..... Azusa, Calif.
Cowles, Danforth C., '01 ..... Minneapolis
Crewe, John, '96 ..... Devils Lake, N. D.
Crommett, H. B., '96 ..... Amory, Wis.
Crossette, Geo. D., '04 ..... Minneapolis
Cuff, Wm. S., '97 ..... St. Paul
Culver, Chas. F., '99 ..... Chetek, Wis.
Cummings, J. H., '02 ..... St. Paul
Cutts, Geo., '07 ..... Minneapolis
Cutts, Geo. A. C., '00 ..... Grove City
*Cutts, Rollin E., '93 ..... Forest City
B. S., '90.
Dahlquist, Gustav W., '93 ..... Cokato
Dahlstedt, N. G., '89 ..... Elliott, Ill.
Danner, E. W., '95 ..... New York City, N. Y.
Darling, Walter R., '95 ..... St. Peter
D'Arms, Harry L., '92 ..... Hector
Dart, Leslie O., '01 ..... Minneapolis
Davidson, James, '92 ..... Minneapolis
Davis, Frederick U., '02 ..... St. Clair
Davis, F. W., '03 ..... Kasson
Davis, Luther A., '01 ..... Dalton
Dawson, Albert M., '05 ..... Minneapolis
Day, Floyd McA., '01 ..... Charnelton, Eugene, Ore.
Dean, F. W., '90 ..... Council Bluffs, Ia.
*Dean, Sidney W., '00 ..... Minneapolis
DeCoster, W. G., '97 ..... Windom
De La Barre, Wm. Jr., '95 ..... Minneapolis
Dennis, Warren A., '96 ..... St. Paul
B. L., University of Wisconsin.
Denton, Herbert D., '97 ..... Eveleth
Deslauriers, A. A., '03 ..... Duluth
Devine, J. L., '04 ..... Lansford, N. D.
Dickman, Lester A., '01 ..... Lismore
Dittman, Geo. C., '04 ..... St. Paul
Dix, Geo. E., '04 ..... Canby
Dodge, Albert A., '94 ..... Faribault
B. S., '91
Dodge, Warren M., '93 ..... Farmington
B. S., '90.
Dohm, Chas. L., '95 ..... St. Paul

* Deceased.

Donovan, John Jos., '01 ..... Eden Valley
Dougherty, Edwin B., '04 ..... Duluth
Dougherty, Louis E., '04 ..... Duluth
Doyle, J. W., '01 ..... Minneapolis
Drake, Frederick A., '96 ..... Lanesboro
Dreschler, Herman, '02 ..... St. Paul
Drew, Geo. F., '00 ..... Crary, N. D.
Dugan, Rollo C., '90 ..... Eyota
Dunn, J. T., '04 ..... Wykoff
Durand, Jay I., '05 ..... Crookston
Dutton, Chas. E., '89 ..... Minneapolis
Dyar, Burt A., '05 ..... St. Charles
Earl, Robt. O., '96 ..... St. Paul
Eberlein, Edw. A., '01 ..... Glenwood
Eby, Cyrus B., '93 ..... Spring Valley
Eby, J. R., '93 ..... Elko, Nevada
Edgerton, W. M., '96 ..... Faulkton, S. Dak.
*Edholm, Edw. A., '89 ..... Minneapolis
Edlen, E. A., '92 ..... Moline, Ill.
Edsall, Jos. L., '92 ..... Bradley, S. D.
Edward, Geo., '97 ..... Sebringville, Ont.
Egan, John M., '07 ..... Osseo, Minn.
Egge, Thrond S., '93 ..... Moorhead
Eisengraeber, G. A., '01 ..... Young America
Eklund, Elmer J., '07 ..... Young America, Minn.
Eklund, John J., '85 ..... Superior, Wis.
Ellis, Benj. Jas., '00 ..... Reardon, Wash.
Ellis, Burton K., '03 ..... Sparta
Ely, O. S., '06 ..... St. Paul
Emmerson, William S., ... Port Perry, Ont.
Endress, Karl John, '89 ..... St. Paul
Erb, Fred'k R., '02 ..... Minneapolis
Erdmann, Chas. A., '93 ..... Minneapolis
Erickson, John G., '92 ..... Minneapolis
Estrem, Carl O., '07 ..... New London
Evans, Owen, '01 ..... La Crosse, Wis.
Ewing, C. F., '01 ..... Wheaton
*Fanset, John J., '96 ..... Milbank, S. D.
Farmer, J. C., '95 ..... McKinley
Farmer, Sidney S., '01 ..... Owatonna
Farrand, Corydon, '93 ..... Oronoco
Farrish, Robt. C., '01 ..... Sherburne
Ferguson, Jas. C., '01 ..... St. Paul
Ferguson, Jas. Cory, '01 ..... Olivia
Field, Merton, '02 ..... Minn. Lake
Finstad, G. J., '93 ..... Menomonie, Wis.
Fisher, Otto F., '97 ..... Houston
Fitzgerald, Don. F., '03 ..... Minneapolis
Fjelde, Herman O., '95 ..... Abercrombie, N. D.
Fjelstad, Carl A., '92 ..... Glenwood, Minn.
Fligman, Louis H., '01 ..... Helena, Mont.
Ford, Corydon, L., '90 ..... Ann Arbor, Mich.
Forrest, Chas. G., '99 ..... Bagley
*Foster, Alson James, '01 ..... St. Paul
Foster, Olson J., '01 ..... St. Paul
Foster, W. C., '02 ..... Gulch, Colo.
Foster, William B., '07 ..... Hector
Fowler, H. A., '95 ..... Washington, D. C.
Fowler, Paul H., '03 ..... Rochester
Franchere, Frederick E., '90 ..... Lake Crystal
Frazier, Geo. W., '05 ..... Detroit City
Freeburg, H. M., '04 ..... Watertown, S. D.
Freeman, Charles D., '04 ..... St. Paul
Freeman, Geo. H., '05 ..... Hector
French, E. J., '00 ..... Plainview
French, Ernest A., '03 ..... Plainview
French, Leigh H., '94 ..... Minneapolis
Frost, W. S., '04 ..... Willmar

* Deceased.

Fullerton, Ellen, '03 ..... Rochester
Fulton, Thos. C., '02 ..... White Bear
Gaard, R. R., '04 ..... Roland, Ia.
Gaffney, T. J., '97 ..... Lakeville
Gaines, Everett C., '00 ..... Buffalo Lake
Gallagher, Patrick J., '04 ..... Graceville
Gallup, G. D., '04 ..... River Falls, Wis.
Gans, Edward M., '05 ..... St. Cloud
Gerber, Lou M., '93 ..... Jasper
Garrison, J. F., '00 ..... Oldham, S. Dak.
Gates, Chester E., '04 ..... Rochester
Gates, Jos. A., '95 ..... Kenyon
Gauger, E. C., '05 ..... Chamberlain, S. D.
*Geiger, John, '96 ..... Osceola Mills, Wis.
Geist, Emil S., '00 ..... Minneapolis
George, Jas. Woodward, '02 ..... Aitkin
Germo, Chas., '95 ..... Balaton
Gerrish, W. A., '96 ..... Enderlin, N. D.
Geyerman, P. T., '99 ..... Worthington
Gibbon, Luther L., '97 ..... Lowry
*Gibbs, Thomas C., '91 ..... Lake City
Giere, Eric, '92 ..... Madison
*Gilbertson, Julius C., '91 ..... Minneapolis
Gilkinson, Andrew J., '93 ..... Osakis
Gilfillan, Jas. S., '97 ..... St. Paul
*Glenn, William, '93 ..... Minneapolis
Goddard, N. A., '97 ..... Sand Point, Idaho
*Godfrey, Harvey B., '02 ..... Minneapolis
Goehrs, Henry W., '05 ..... Minneapolis
Goldsworthy, Wm., '97 ..... Two Harbors
Goodman, Minerva R., '02 ..... Stockton, Calif.
Goodrich, Judd U., '95 ..... St. Paul
Gowenlock, Harry J., '04 ..... Barnesville
Grafton, G. A., '99 ..... Hayward, Wis.
Gramenz, F. H., '00 ..... Bryant, S. D.
Granger, Gertrude B., '97 ..... Rochester
Grant, A. T., '94 ..... West Concord
Gray, Clyde E., '03 ..... Minneapolis
Gray, Geo. A., '98 ..... Spokane, Wash.
Greeley, Liston, '96 ..... Duluth
Green, Eugene Q., '03 ..... Minneapolis
Greene, Chas. Lyman, '99 ..... St. Paul
Green, G. H., '06 ..... Minneapolis
Griffin, Miriam E., Miss, '05 ..... St. Paul
Griswold, F. E., '97 ..... Hoffman
Grout, Sam E., '99 ..... Hillman, Ala.
Guilford, Harry M., '98 ..... Minneapolis
Gunn, F. H., '95 ..... Independence
Gunz, A. N., '04 ..... Center City
Guthrie, Chas. E., '02 ..... Columbia, Wash.
Guthrie, J. D., '97 ..... Seattle, Wash.
Haas, Chas. A., '94 ..... St. Paul
Hack, Chas. W., '97 ..... Minneapolis
Hagaman, Geo. K., '03 ..... Anoka
Hagen, Olaf J., '06 ..... Abercrombie, N. D.
Haggard, Geo. D., '93 ..... Minneapolis
Halgren, Harry A., '97 ..... Watertown
Hall, Charlotte C., '99 ..... St. Paul
Halvarson, K. K., '89 ..... Audubon
Hammerel, Ambrose, '05 ..... St. Cloud
Hammes, E. M., '06 ..... St. Paul
Haney, Claude L., '06 ..... Duluth
*Hanscom, William H., '89 ..... Minneapolis
Hanson, Marius, '94 ..... Hendrum
Hanson, Martin O., '01 ..... Lemond
Hardin, Cath. C., '03 ..... Minneapolis
Hare, Earl R., '00 ..... Minneapolis
Harrington, Chas. D., '95 ..... Minneapolis

* Deceased.

Harrison, E. E., '97 ..... West Concord
Hart, Alfred B., '03 ..... Canton
Hart, Milan J., '95 ..... LeRoy
Hartshorn, W. E., '98 ..... New Haven, Conn.
B. Ph., Colorado.
Hartzell, Thomas B., '94 ..... Beloit, Ohio
Haskell, A. Dair, '00 ..... Minneapolis
Haugen, Gilbert, '05 ..... Maynard
Haugseth, Enoch, '02 ..... Lake Park
Haverfield, Addie, '95 ..... Minneapolis
Haynes, Fred'k, '99 ..... Minneapolis
Hazeltine, Harry H., '01 ..... Ashland, Wis.
Head, Geo. D., '95 ..... Minneapolis
B. S.
Heath, Albert C., '94 ..... St. Paul
B. A., Dartmouth.
Hebard, Sue., '03 ..... Mondovi, Wis.
Hedback, Axel E. '97, ... Barron, Wis.
Heidekker, Arne, '02 ..... St. Paul
Heilscher, Juliana, '91 ..... Preston
Heinze, C. F., '96 ..... Clifford, N. D.
Helland, John W., '05 ..... Maynard
Hendrickson, Hans W., '95 ..... Montevideo
Hendrickson, John F., '05 ..... Montevideo
Hennemuth, J. L., '90 ..... Waterford, Calif.
Henry, Anna Mae. '99 ..... Pattonsburg, Mo.
Henry, Fanny Jae, '99 ..... Kansas City, Mo.
Hesselgrave, Sherman S., '94, ... St. Paul
Hilger, Andrew W., '05 ..... St. Paul
Higgins, John H., '03 ..... Rockford
Higgins, John Turner, '94 ..... Morgan Hill, Calif.
B. C. E.
Higgins, Irving W., '04 ..... Morgan Hill, Calif.
Hillger, David D., '05 ..... St. Paul
Hilbert, Ferd, '92 ..... Albany
Hilbert, Pierre A., '93 ..... Melrose
Hilger, Andrew W., '05 ..... St. Paul
Hill, Eleanor J., '02 ..... Jamestown, N. D.
Hirschfield, Adolph, '93 ..... Minneapolis
Hoff, Peder A., '00 ..... St. Paul
Hoffman, Walter F., '04 ..... Minneapolis
Hoffman, Wm. L., '04 ..... Sioux Falls, S. D.
Holbrook, John S., '96 ..... Mankato
Holdale, Andrew D., '04 ..... Tracy
Holmes, Walter B., '94 ..... Ada
B. S., '88
Holst, Claude Fred'k, '01 ..... Little Falls
Holst, J. Burton, '95 ..... Little Falls
Holte, Halvor, '93 ..... Crookston
Hopkins, Mary P., '01 ..... St. Peter
Hotvelt, Ingvald M. J., '99 ..... Minneapolis
Houston, C. A., '01 ..... Grand Marais
Hovde, Anders G., '03 ..... Biwabik
Howard, Seth E., '93 ..... Minneapolis
Hubbard, F. G., '03 ..... Cayuga, No. D.
Hubert, R. I., '98 ..... St. Cloud, Minn.
Hughes, Helen M., '96 ..... Mankato
*Huhn, Carl, '98 ..... Minneapolis
B. A., '95 (M. D. post ob.)
Humiston, Ray, '03 ..... Worthington
*Hutchinson, Henry J., '04 ..... Lynn, Mass.
Huxley, F. R., '00 ..... Faribault
Hynes, John E., '04 ..... Winnebago City
Hyslin, E. R., '00 ..... Kindred, N. D.
Ilstrup, Francis O., '94 ..... Grasston
Ilstrup, Orlando, '99 ..... Cokato
Irish, P. H., '00 ..... Akeley
Irvine, Harry G., '03 ..... Minneapolis
Ivers, M. W., '02 ..... Abercrombie, N. D.

* Deceased.

Ivers, M. U., '02 ..... Christine, N. D.
Iverson, L. U., '97 ..... Christine, N. D.
Jacobs, J. C., '05 ..... Spicer
Jacobson, Leonard H., '05 ..... Luverne
James, Ralph C., ... Mankato
Janson, Eiliv, '92 ..... Minneapolis
Janson, Evar, '92 ..... Minneapolis
Jennings, Geo., '07 ..... Cavalier, N. D.
Jennison, J. E., '94 ..... De Lamar, Nev.
Jensen, Marius J., '02 ..... Minneapolis
Jenson, Charles A., '02 ..... Brighton
Jenson, Jas. C., '03 ..... Hendricks
Jewell, Emory, '02 ..... Pine Island
Johnson, A. Einar, '03 ..... White Rock, S. D.
Johnson, Andrew E., '91 ..... Cloquet
Johnson, Asa, M., '96 ..... St. Paul
Johnson, Hans, '04 ..... Murdock
Johnson, Ed. Martin, '98 ..... Albuquerque, N. Mex.
Johnson, H. M., '01 ..... Dawson
Johnson, Nimrod A., ... Winthrop
Johnson, Oscar V., '05 ..... Sebeka
Johnston, W. W., '02 ..... Lafayette
Jones, Chas. H., '90 ..... Tempe, Ariz.
Jones, Elmer H., '07 ..... Minneapolis
Jones, Herbert W., '01 ..... Minneapolis
Jonsson, Gunlaugur, '04 ..... Grand Forks, N. D.
Judd, Edward S., '02 ..... Rochester
Judson, William E., '07 ..... Forman, N. D.
Juliar, Richard O., '03 ..... Alice, N. D.
Justice, O. M., '97 ..... Los Angeles, Calif.
Kaess, Andrew J., '03 ..... Moorhead
Kane, Jos. P., '05 ..... Minneapolis
Karn, Burt, R., '07 ..... Ortonville
Kaukel, Otto Wm., '00 ..... Fertile
Kearney, B. F., '04 ..... Bismarck
Keene, Ralph Kendall, '97 ..... Mankato
Kelly, S. M., '05 ..... Canby
Kelly, T. C., '04 ..... Garden City
Kelsey, Carleton G., '07 ..... Minneapolis
Kennedy, Jane F., '00 ..... Minneapolis
Kibbe, Orel A., '05 ..... Hampton, Ia.
Kiefer, Michael A., '04 ..... Sleepy Eye
Kiehle, F. A., '01 ..... West Jordan, Utah
B. A., '94.
King, E. E., '91 ..... Alexandria, N. D.
King, J. C. Elliott, '86 ..... Portland, Ore.
Kirk, Geo. P., '96 ..... East Grand Forks
Kirkwood, Sam'l M., '92 ..... St. Paul
Kistler, Chas. M., '93 ..... Minneapolis
Kittleson, Theo., '02 ..... Fergus Falls
*Kjos, Knute A., '89 ..... Minneapolis
Klein, Henry N., '05 ..... St. Paul
Klemer, Carl A., '04 ..... Faribault
Klove, Lewis, '03 ..... Dunbar, Ia.
Knauff, Muhlenberg K., '95 ..... St. Paul
Knight, Ray R., '06 ..... *Minneapolis*
*Koch, John C., '02 ..... Blooming Prairie
Kohler, Christian H., '98 ..... Minneapolis
Koivulpalo, Edward H., '95 ..... Calumet, Mich.
Koren, Finn., '01 ..... Appleton
B. A., '98.
Kranz, Martin, 05' ..... Lake Crystal
Krch, Geo. C., '96 ..... St. Paul
Krueger, Louis W., '96 ..... Mapleton
Kuhlman, August, '05 ..... Duluth
Kuth, Jos., '04 ..... Duluth
Labbett, LaRoy H., '07 ..... Detroit
Lamb, H. L., '02 ..... Sauk Center

* Deceased.

Landeen, F. G., '94 ..... Stillwater
LaRose, V. J., '01 ..... Bismarck, N. D.
Larsen, Anders, '93 ..... Herman
Larsen, Oscar, '07 ..... River Falls, Wis.
Larson, Frank E., '02 ..... Winthrop
Law, Arthur Ayer, '94 ..... Minneapolis
Leavitt, Fred'k, '94 ..... St. Paul
Lee, Wm. P., '94 ..... Fairfax
Lees, R. B., '01 ..... White, S. D.
Lemstrom, Jarl F., '07 ..... Minneapolis
Lenfest, J. W., '03 ..... Bowbells, N. D.
Lenont, Chas. B., '99 ..... Virginia
LeVasseur, Irma R., '00 ..... Quebec, Can.
*Levinson, Archibald E., '01 ..... Minneapolis
Lewis, Wm. W., '02 ..... St. Paul
Liedloff, Adolph, '02 ..... Mankato
Liland, Ragnvald, '95 ..... Kenyon
Limburg, A. M., '03 ..... Bowbells, N. D.
Lind, Alfred, '91 ..... Minneapolis
Lindstrom, Josephine, '03 ..... Oberon, N. D.
Linjer, Ole E., '89 ..... Minneapolis
Linneman, Nicholas L., '02 ..... Duluth
Linton, Laura A., '00 ..... Rochester
Litzenberg, Jennings C., '99 ..... Minneapolis
B. S., '94.
Loberg, Adolph E., '01 ..... Minneapolis
Loe, A. O., '97 ..... Seattle, Wash.
Lohrbauer, E. R., '02 ..... Northwood, N. D.
Lommen, Andreas P., '95 ..... Lanesboro
Loomis, Earl A., '07 ..... Owatonna
Ludemann, A. H., '06 ..... St. Paul
Ludtke, Gustav H., '99 ..... Fairmont
Lund, Axel Luther B., '06 ..... St. Paul
Lundmark, Lambert, '04 ..... Cumberland, Wis.
Lyman, Fred V., '03 ..... Caledonia
Lynde, Roy '05 ..... Ellendale, N. D.
Lyng, John, '90 ..... Minneapolis
McCarthy, W. F., '99 ..... Maple Lake
McCloud, C. Nauman, '01 ..... St. Paul
Phm. G.
McCreery, W. B., '02 ..... Tacoma, Wash.
McCuery, Charles R., '02 ..... *Northfield*
MacDonald, Irving C., '02 ..... Minneapolis
McDonnell, Wm. N., '03 ..... Detroit
McGroarty, John J., '07 ..... Rosemount
McGuigan, Henry F., '01 ..... Mazeppa
McKibben, H. E., '04 ..... Hector
McKinnon, J. J., '93 ..... Wadena
McLaughlin, Ernest W., '96 ..... Willmar
McLaughlin, J. E., '06 ..... Granada
McLung, Alberta V., '97 ..... St. Paul
McMahon, Chas. G., '06 ..... Minneapolis
MacMillan, Mary A., '07 ..... St. Peter
McNerthney, J. B., '99 ..... Tacoma, Wash.
Mackel, Bertha K., '99 ..... Ada
Magnusson, Herman V., '03 ..... Clinton
Makinson, H. A., '03 ..... Manhattan, Kans.
Maland, Clarence, '07 ..... Rushford
Maloney, Thos. J., '01 ..... St. Paul
Manson, F. M., '99 ..... Worthington
B. S., '94.
Marshall, Nelson, H., '92 ..... Chaska
Martin, Thomas R., '07 ..... Mantorville
Maschger, Albert P., '05 ..... St. Paul
Mathon, John Albert '04 ..... Dassel
Matthews, Justus A., '05 ..... Rochester
Matthieu, A. L., '05 ..... St. Cloud
Maurer, Edwd. L., '04 ..... Clara City

* Deceased.

Mayer, L. P., '00 ..... Hudson, Wis.
Mayland, Louis L., '96 ..... Bagley
Mayland, Martin R., '92 ..... Faribault
Meckstroth, Chas. W., '95 ..... Brandon
Meckstroth, Louis W., '93 ..... Wahpeton, No. D.
D. D. S., '91.
Mee, Patk. Henry, '03 ..... Gaylord
Meighen, J. W., '96 ..... Ulen
Melby, Benedict, '03 ..... Blooming Prairie
Merrill, Jas. E., '96 ..... Amboy
Merrill, Rose M., '96 ..... McMillan, Mont.
Mesker, Geo. H., '96, ... Olivia
Metcalf, J. H., '06 ..... Minneapolis
Meyerding, Edward A., '02 ..... St. Paul
Meyer, E. L., '05 ..... Walnut Grove
Midford, F. J., '04 ..... Grand Forks, N. D.
Miller, Arthur W., '97 ..... St. Paul
Miller, H. W., '06 ..... Spokane, Wash.
Millett, Josiah, L., '02 ..... Graceville
Millet, Melvin C., '95 ..... Rochester
Miner, Clarence J., '91 ..... Manilla, P. I.
Moeh, John K., '93 ..... Windom
Mohn, Frederick Voss, '92 ..... Minot, N. Dak.
Moir, W. W., '06 ..... Minneapolis
Moore, Albert H., '97 ..... Minneapolis
B. S.
Moore, G. W., '92 ..... Hopkins
Moren, Edward, '06 ..... Minneapolis
Morrill, Robert A., '05 ..... Byron
Movius, Arthur J., '04 ..... Lidgerwood, N. D.
Moynihan, A. F., '03 ..... Sauk Center
Muir, E. S., '94 ..... Winona
Munns, J. F., '03, ... Bremerton ,Wash.
Munro, A. T., '97 ..... Kalispell, Mont.
Nelson, Henry S., '93 ..... Minneapolis
Nelson, Kent, '00 ..... Litchfield, Ill.
Nelson, Louis A., '96 ..... St. Paul
Nessa, Nelins J., '05 ..... Brewster
Nevitt, Orme R., '00 ..... Lakefield
Newgord, J. G., '03 ..... Missoula, Mont.
Newman, Gustavus A., '95 ..... New London
Nicholson, Jos., '03 ..... Brainerd
Nickerson, Bernd. S., '03 ..... Glencoe
Nickerson, Margaret L., '04 ..... Minneapolis
Nickerson, Winfield S., '05 ..... Minneapolis
Nicholson, D. A., '97 ..... Seattle, Wash.
Nicholson, Elmer, '05 ..... Strout
Nielson, Niels, '06 ..... China
Norton, Harvey H., '00 ..... St. Paul
*Norred, W. R., '02 ..... Chicago, Ill.
Noth, H. W., '03 ..... Marine Mills
Nuzum, H. B., '95 ..... St. Louis, Mo.
Nyquist, Jacob E., '05 ..... Cloquet
Nyquist, J. E., '05 ..... Hibbing
O'Brien, Henry B., '06 ..... St. Paul
O'Connor, D. F., '90 ..... Maxbass, N. D.
O'Connor, John V., '95 ..... St. Paul
*O'Connor, Timothy, '90 ..... Annandale
Olander, J. E., '04 ..... St. Paul
Old, Herbert Wm., '03 ..... St. Paul
Olson, Geo., '04 ..... Minneapolis
Olson, J. W., '00 ..... Troy, Idaho
Olson, O. A., '02 ..... Missoula, Mont.
Olson, Sterling H., '01 ..... Milaca
O'Malley, Wm. P., '02 ..... Waunake, Wis.
Oppliger, Gottlieb, '96 ..... Minneapolis
Osborn, Lida, '00 ..... Mankato
Owen, Geo. B., '00 ..... Anaconda, Mont.

* Deceased.

*Palmquist, John Emil, '96 ..... Princeton, Ill.
Parker, H. G., '01 ..... Madison Lake
Parker, Owen W., '00 ..... Ely
Parrot, Byron W., '97 ..... Long Prairie
Parsons, Geo. E., '05 ..... Elk River
Parsons, J. G., '98 ..... Brookings, S. D.
Patton, Frederic J., '99 ..... Duluth
Peabody, Percy D., '02 ..... Webster, S. D.
Pearce, Nay O., '05 ..... Duluth
Pederson, Harold, '07 ..... Grand Forks, N. D.
Perkins, Geo. A., '97 ..... Dickinson, N. D.
Pederson, R. M., '06 ..... Minneapolis
Perry, G. R., '97 ..... Amery, Wis.
Peterson, J. R., '97 ..... Willmar
Peterson, Olans L., '05 ..... Cokato
Peterson, V. N., '06 ..... St. Paul
Pettit, Chas. W., '03 ..... Minneapolis
*Pettit, Loretta J., '94 ..... Minneapolis
Phelan, Richard, '03 ..... Lake Falls, Ia.
Phillips, Geo. W., '89 ..... St. Paul
Phillips, Wm. H., '94 ..... Jordan
Pineo, Willard Byther, '85 ..... Minneapolis
*Pitblado, John D., '96 ..... Minneapolis
Platt, John T., '95 ..... St. Paul
Poehler, Franklin T., '96 ..... Minneapolis
B. S.
Poppe, Frederick H., '07 ..... Minneapolis
B. A.
Porter, O .M., '05 ..... Bellingham
Powell, Chas. B., '94 ..... Bellingham
Pratt, Chelsea, '06 ..... Minneapolis
Preisinger, Jos. W., '04 ..... Renville
Pretlow, C. L., '95 ..... Fairmont, Ind.
Prim, Jos. A., '99 ..... Comfrey
Prinzing, J. R., '01 ..... Ontario, Ore.
Putnam, Cath. E., '01 ..... St. Paul
Quain, E. P., '98 ..... Bismarck, N. D.
Quist, Henry W., '07 ..... Chisago City
Ramaley, Louis, '05 ..... St. Paul
Ramsey, Walter R., '96 ..... St. Paul
Ph. B., Hamline.
Ramstad, N. O., '99 ..... Bismarck, N. D.
Rankin, A. A., '00 ..... Waconia
*Ranson, Geo., '95 ..... Dodge Center
Ranson, Mary E., '98 ..... Dodge Center
Read, Harry K., '98 ..... Minneapolis
Reed, Chas. A., '98 ..... Minneapolis
B. S.
Rees, Soren P., '97 ..... Minneapolis
B. S.
Regner, J. A., '89 ..... Evansville
Reimestad, Christian S., '96 ..... Brainerd
*Reimstad, Sven S., '95 ..... Minneapolis
Reiter, Henry W., '93 ..... Shakopee
Reynolds, James S., '05 ..... New Hampton, Ia.
Ribbel, Geo. B., '04 ..... La Moure, N. D.
Rice, C. P., '06 ..... Minneapolis
Rice, Geo. D., '03 ..... Pipestone
Richards, Wm. G., '04 ..... Sanborn
Richmond, Charles D., '05 ..... Windom
Ridgway, Alfred M., '96 ..... Annandale
Ringnel, Clark J., '91 ..... Minneapolis
Ringnell, Frank O., '95 ..... Orion, Ill.
Ritchie, Harry P., '96 ..... St. Paul
Ph. B., Yale.
Roadman, Ira McC., '98 ..... Minneapolis
Robitshek, Emil '03 ..... Minneapolis
Rodgers, Charles L., '07 ..... Farmington

* Deceased.

Rogers, John L., '05 ..... Rice Lake, Wis.
Rogers, J. T., '91 ..... St. Paul
Robbins, Ray P., '04 ..... Portland, Ore.
Rose, Frank R., '01 ..... Spokane, Wash.
Rosen, Sam'l, '04 ..... Minneapolis
Rosenthal, Ignatius P., '07 ..... St. Paul
Rothschied, Harold J., '05 ..... St. Paul
Rothwell, W. P., '92 ..... Pawtucket, R. I.
Rousseau, Victor, '05, ... French Lake
Rowe, O. W., '03 ..... Towner, N. D.
Rudell, Gustaf L., '06 ..... St. Paul
Rulien, Frank W., '97 ..... New Richmond, Wis.
Russell, Clarence W., '03 ..... Augusta, Wis.
Ryley, Marie J., '95 ..... Minneapolis
Sanborn, Courtland R., '07 ..... Minneapolis
Savage, Frank J., '01 ..... St. Paul
Sawyer, H. P., '95 ..... Goodhue
Sanford, Jas. A., '01 ..... Minneapolis
Scace, Lee Arbor, '07 ..... Pringhor, Ia.
Schacht, F. E., '03 ..... Seattle, Wash.
Schaleben, H. O., '03 ..... Lake Benton
Schmidt, Walter R., '05 ..... Chisholm
Schneider, H. A., '01 ..... Jordan
Schneider, J. P., '06 ..... Minneapolis
Schoonmaker, Edward P., '99 ..... Perham
Schuldt, Fred C., '03 ..... St. Paul
Schulze, Albert G., '04 ..... Duluth
Schutt, J. P., '06 ..... Minneapolis
Seaberg, S. P., '06 ..... Minneapolis
Seashore, David E., '02 ..... Duluth
Seashore, Gilbert, '02 ..... Minneapolis
Senkler, Geo. E., '92 ..... St. Paul
Serkland, J. C., '00 ..... Rothsay
*Setnan, John M., '99 .....
Sewall, Ralph J., '95 ..... Nashwauk
Shaleen, Arthur W., '02 ..... Hallock
Shaw, Albert Wm., '99 ..... Buhl
Shellman, John L., '03 ..... Nashwauk
Sheppard, Fred, '95 ..... Hutchinson
Sheppard, P. E., '91 ..... Hutchinson
Sherwood, G. E., '94 ..... Kimball
Siemins, Abram, '90 ..... Mountain Lake
Slippern, Halfdan, '95 ..... Fosston
Smith, Arthur E., '05 ..... Minneapolis
Smith, Ernest V., '07 ..... Minneapolis
Smith, F. Dale, '05 ..... Oronoco
Smith, Fred L., '06 ..... Duluth
Smith, H. Wm., '97 ..... Crookston
Smith, Martha J., '91 ..... Yankton, S. D.
Smith, M. Isabel, '06 ..... Minneapolis
*Smith, William S., '92 ..... Waseca
Soderlind, Andrew, '02 ..... Minneapolis
Sogge, Louis, '05 ..... Jackson
Soper, John E., '96 ..... Norwood
*Sorenson, Anthony N., '99 ..... Minneapolis
*Sorg, John A., '96 ..... Hastings
Sorkness, P. R., '95 ..... Fargo, N. D.
South, J. R., '89 ..... Ouray, Colo.
Spottswood, E. W., '93 ..... Missoula, Mont.
Stack, Geo. F., '96 ..... Independence, Wis.

B. A.

Stahl, Harriet S., '97 ..... Harmony
Staley, J. C., '03 ..... Bismarck, N. D.
*Stebbins, Albert M., '94 ..... Glenwood
Steel, Darwin Edwin '89 ..... Mankato
Stemsrud, A. A., '01 ..... Dawson
Stephan, E. Leonard, '93 ..... Hinckley
Stephenson, John L., '95 ..... Monango, N. D.

* Deceased.

Sterner, O., '03 ..... Cambridge
Stevens, Charles S., '07 ..... Farmington
B. A.
Stevens, John, Jr., '97 ..... Belfast, Me.
Stewart, Allan B., '91 ..... Owatonna
Stewart, M. A., '02 ..... Omemee, N. D.
Stierle, Adolph, Jr., '01 ..... St. Paul
Ph. G., New York.
Stimpson, E. W., '03, ... Newport, Ore.
Stockman, B. G., '96 ..... Woodville, Wis.
Stolpestad, Harold L., '01 ..... St. Paul
Stowell, Joab, Jr., '90 ..... North Amherst, Mass.
Strang, David M., '07 ..... Alexandria
Strathern, Fred P., '95 ..... St. Peter
B. S., '94.
Strathern, Moses Lane, '07 ..... Rich Valley
B. A.
Strout, G. E., '01 ..... Winthrop
Stuhr, Henry C., '00 ..... Argyle
Swanson, Cephas, '07 ..... Minneapolis
B. A.
*Swartz, West J., '00 ..... Forest Lake
Sweitzer, Sam'l E., '01 ..... Minneapolis
Swenson, G. B., '00 ..... Baldwin, Wis.
Taylor, Wm. W., '00 ..... Kalispell, Mont.
Tebbitt, R. L., '04 ..... Laramie, Wyo.
Teisberg, Carl B., '06 ..... St. Paul
Tenneant, Russell W., '99 ..... Brookings, S. D.
Tenny, Jacob S., '95 ..... Alma, Wis.
Tennyson, Falk, '93 ..... Minneapolis
Thabes, John A., '96 ..... Brainerd
Thelen, W. P., '02 ..... Wilton, N. D.
Thomas, Geo., '04 ..... St. Paul
Thompson, Albert, '05 ..... St. James
Thomson, A. M., '04 ..... South Park, Wash.
Thoraldsen, Thorfinn, '01 ..... Cottonwood
Thorpe, A. C., '97 ..... Los Angeles, Calif.
Thrane, Marcus M., '94 ..... Madison
Thyng, Date Kimball, '96 ..... Willow City, N. D.
Tilderquist, David L., '93 ..... Duluth, Minn.
Tirrell, J. M., '00 ..... Portal, N. D.
Titus, Wm. S., '04 ..... Mora
Todd, Frank C., '92 ..... Minneapolis
Todd, G. D., '03 ..... Melina, N. D.
Towers, Mary E., '98 ..... Minneapolis
Tripp, G. A., '99 ..... South Bend, Wash.
True, Augusta Isabella, '94 ..... Minneapolis
Truscott, Jos. R., '01 ..... Binford, N. D.
Trutna, Thomas J., '05 ..... Silver Lake
Tuohy, Edward L., '05 ..... Duluth
Tupper, Eugene L., '97 ..... Minneapolis
*Turner, Arthur L., '94 ..... Faribault
Turner, Mrs. Frances E., '95 ..... Rose Creek
Tyler, Frank A., '06 ..... St. Paul
Tyrrell, C. C., '06 ..... Minneapolis
Vallentine, W. H., '00 ..... Tracy
Vallely, Rose V., '01 ..... Minneapolis
Van Slyke, Chas. A., '91 ..... St. Paul
Van Valkenberg, B. F., '93 ..... Long Prairie
Varco, Albert Raymond, '07 ..... Austin
Verne, V. E., '06 ..... St. Paul
Vigen, Jorgen G., '94 ..... Fergus Falls
Vinje, Syver, '02 ..... Henning
Vistaunet, Peter, '06 ..... St. Paul
Vistaunet, P. L., '92 ..... Thief River Falls
Voges, Adolph, '04 ..... St. Paul
Wagar, Wm. D., '98 ..... Michigan City, N. D.
Wallace, C. J., '04 ..... Superior, Wis.

* Deceased.

Walter, Guy F., '06 ..... Lake City
Walters, Eugene, '95 ..... London, England
Wangelin, Hugo E., '91 ..... Minneapolis
Wanous, Ernest Z., '97 ..... Minneapolis
Ward, A. L., '00 ..... Boulder, Mont.
Warner, Eugene F., '92 ..... St. Paul
Warren, Frank S., '96 ..... Faribault
Watkins, F. A., '89 ..... Wilkesbarre, Pa.
Watson, T. R., '95 ..... Zumbrota
Webster, A. M., '04 ..... Alma, Wis.
Wheeler, Frederick L., '04 ..... Minneapolis
Weishaar, Charles, '05 ..... Osseo
Wells, H. Journeay, '01 ..... Minneapolis
Wells, Horace Renselaer, '98 ..... North Yakima, Wash.
Westeen, Anders A., '92 ..... Grand Forks, N. D.
Wethal, Anton G., '03 ..... Minneapolis
Weyrens, Joseph P., '07 ..... St. Cloud
B. S.
Weyrens, P. J., '00 ..... Ivanhoe
Wheelon,, F. E., '00 ..... Esmond, N. D.
Whipple, Clarence D., '03 ..... Minneapolis
Whitacre, J. Clifford, '01 ..... St. Paul
White, Jas. B., '91 ..... Faribault
Wiger, N. N., '03 ..... River Falls, Wis.
Wiik, Johan C., '07 ..... Minneapolis
Wilcox, M. Russell, '97 ..... Minneapolis
Wilcox, Van H., '02 ..... Minneapolis
Wilkinson, Stella L., '03 ..... Duluth
Will, William W., '05 ..... Mapleton
Williams, Archie E., '00 ..... Minneapolis
B. A., '94.
Williams, S. E., '04 ..... River Falls, Wis.
Williams, Ulysses G., '89 ..... Minneapolis
Willson, H. S., '04 ..... Crystal, N. D.
Wilson, Louis B., '96 ..... Rochester
Winberg, Oesten K., '92 ..... Lake Park
Wiseman, Robert L., '97 ..... Pine City
Witham, Carl A., '06 ..... Minneapolis
Wolner, Oscar H., '02 ..... St. Anthony Park
Wolski, R. A., '00 ..... Winona, Minn.
Woods, Ernest A., '99 ..... Clear Lake
Wright, Chas. O., '90 ..... Luverne
Wright, Franklin R., '94 ..... Minneapolis
Wunder, Henry E., '92 ..... Soudan
Wylie, A. R., '06 ..... Faribault
Yoseph, Yoseph David, '94 ..... Minneapolis
Youngs, Alfred H., '07 ..... Minneapolis

APPENDIX A*

The College of Science, Literature and the Arts

ADMISSION

Every applicant for admission to this college must take an examination in writing, spelling, and English composition. (For details see page 33.)

Aside from this test, admission is either by diploma or by examination.

No student, however, shall be admitted to the work of the second semester unless such student bring a certificate of advanced standing from another college showing his qualifications to continue the second semester's work.

I. ADMISSION BY DIPLOMA

Graduates of the following courses, provided they present credits for four years of English and one year each of elementary algebra and plane geometry, are admitted to the freshman class without conditions other than that imposed by the above examination in English.

(a) Any four-year course of a Minnesota state high school.

(b) A four-year course of other accredited schools in the state.

(c) A four-year course of schools in any other state accredited to the state university of that state.

(d) The advanced Latin or English course of the Minnesota state normal schools.

II. ADMISSION BY EXAMINATION

Entrance examinations are offered at the university the opening week of the university year. The program for the year 1907-8 is printed in this bulletin on pages 9-10. Certificates of Minnesota State High School Board examinations will be accepted in place of university entrance examinations in whole or in part.

Students who enter by examination, besides the test in English composition, must pass examinations in secondary school subjects as follows:

(1) The six year-credits under "A" below, and

(2) Nine year-credits selected from the list of electives under "B," provided that, if the total of entrance conditions does not exceed three half-year credits, the applicant shall be admitted conditionally and be given one year in which to make up the entrance conditions.

A. SUBJECTS REQUIRED OF ALL

English, four years, including

(a) Classics

*NOTE.—Students desirous of entering the College of Medicine and Surgery must present credits sufficient to admit them to the Junior year of the College of Science, Literature and the Arts, therefore the following detailed information is given.

(b) Principles of composition
(c) Practice in written expression

Mathematics
(a) Elementary Algebra, one year
(b) Plane Geometry, one year

B. ELECTIVES, NINE YEAR-CREDITS REQUIRED

Mathematics, one year
Higher Algebra, one-half year
Solid Geometry, one-half year

Latin, four years
Grammar, one year
Caesar, four books, one year
Cicero, six orations, one year
Virgil, 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

Swedish, Danish-Norwegian, Icelandic, 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

American Government, one-half year

Political Economy, one-half year

Physics, one year

Chemistry, one year

Botany, one half or one year

Zoölogy, one half or one year
Astronomy, one half-year
Geology, one half-year
Physiography, one half-year
Commercial History and *Commercial Law,* one year
Freehand Drawing, one year
Mechanical Drawing, one year

ENTRANCE EXAMINATION IN ENGLISH

Every applicant for admission to the College of Science, Literature, and the Arts must be examined in writing, spelling, and English composition. The examination will be given in two parts, the second of which is optional.

Part I. Elementary. (Required of all.) Those who fail to pass this test satisfactorily are required to take a special three-hour preparatory course in composition through their first year or longer if necessary. This work shall not receive credit toward a degree. Students pursuing it shall not take more than the maximum of seventeen hours of work a week including this course. These students must take freshman rhetoric, but not until the preparatory work has been completed. At any time during the first half of the first semester the department of rhetoric may transfer promising students from the preparatory class to the regular freshman rhetoric.

Part II. Advanced. (Not obligatory.) This examination is designed as a test of ability to express thought in a clear and orderly manner and a fair knowledge of elementary rhetoric. Those who do not take this test and those who fail to pass it with a grade of good or excellent shall be registered for freshman rhetoric as a required subject. Those who do pass this test with a grade of good or excellent are not required to take freshman rhetoric.

The entrance examination will be given at the University in the chapel of the library building, Saturday, May 18, and Wednesday, Sept. 11, at 9:00 a. m.

The examination in May will be sent, upon application, to the principals of state high and other accredited schools in the state, to be offered in each school at the option of the principal, to members of the senior class who expect to enter the University. The examination, if given, must be held on Saturday, May 18, under the general rules which govern State High School Board examinations. All papers must be sent immediately after examination to the Registrar of the University and will be marked by the proper University authority.

Students who enter the freshman class after the regular September examination without having taken the test in English may be given a special test if the department of rhetoric sees fit, or shall be registered for preparatory rhetoric with the provision that, if found proficient during the first six weeks, they may be promoted to the freshman rhetoric class. Such students must be prepared to suffer any further change in registration necessitated by the program and rules of the college.

SYLLABI

The following statements indicate in a general way the preparation which the university expects in 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. To satisfy this requirement a four years' course of not less than four hours per week must be pursued. 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: Shakespeare'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 know the leading facts connected with the author and his time; he should become familiar with the subject matter of the work and thoroughly at home with the story, and should 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, is desirable. The following works are noted as indicative of the minimum amount of work expected: at least two of Shakespeare'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.

Caesar (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 test. 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.

Virgil (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 Virgil 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 topically 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 influence 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.

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 Charta, 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.

American Government (one-half year)

This should be a study of our government, national, state and local, as it is organized and actually operated today. Students should be made familiar with the purpose and salient features of important instruments of government and other public acts like the Declaration of Independence, Articles of Confederation, Constitution of the United States, Constitution of Minnesota, and a local city or village charter.

In no case, however, should the instruction consist wholly or largely of an analysis of documents. It should rather aim to impart information essential to intelligent, active citizenship, such as the division of the government into departments, their organization and function; the methods of nominating, electing and appointing men to office; of framing and amending constitutions, city charters and statutes; of drawing grand and petit juries and the duty of the citizen to serve on them; the distinction between common law, state law and constitutional law, between equity, civil, and criminal cases.

To make the government seem a real working organization to the student, he should be encouraged to observe public proceedings by attending school meetings, town meetings, sessions of the county commissioners, city council, state legislature, a trial in court, and party primaries and conventions. He should also be led to read about and observe public affairs for himself. To that end let him collect statistics and accounts of work done by particular offices and departments from published reports and by personal inquiry.

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, bimetallism, 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 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.

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 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 and 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 subdivisions 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, the leading facts relating to the atmosphere and its phenomena, including some acquaintance with the work of the U. S. Weather Bureau; Land Sculpture, as it treats of the origin, development and decadence of land forms, and the influence of these processes on the physical environment of man.

Commercial Geography (one-half or one year)

The work usually provided in high schools will answer this requirement.

LIST OF ACCREDITED SCHOOLS

The following High Schools are accredited:

Ada
Adrian
Aitkin
Albert Lea
Alden
Alexandria
Amboy
Annandale
Anoka
Appleton
Argyle
Arlington
Atwater
Austin
Barnesville
Belle Plaine
Bemidji
Benson
Bird Island
Blooming Prairie
Blue Earth City
Brainerd
Breckenridge
Browns Valley
Buffalo
Caledonia
Cambridge
Canby
Cannon Falls
Cass Lake
Chatfield
Cloquet
Cokato
Cottonwood
Crookston
Dawson
Delano
Detroit
Dodge Center
Duluth
Eagle Bend
E. Grand Forks
Elbow Lake
Elgin
Elk River
Ely
Elmore
Eveleth
Excelsior
Fairfax
Fairmont
Faribault
Farmington
Fergus Falls
Fertile
Fosston
Frazee
Fulda
Gaylord
Glencoe
Glenwood
Graceville
Grand Meadow
Grand Rapids
Granite Falls
Hallock
Halstad
Harmony
Hastings
Hawley
Hector
Henderson
Herman
Heron Lake
Hibbing
Hopkins
Houston
Howard Lake
Hutchinson
Jackson
Janesville
Jordan
Kasota
Kasson
Kenyon
Lake Benton
Lake City
Lake Crystal
Lakefield
Lamberton
Lanesboro
Le Roy
Le Sueur
Le Sueur Center
Litchfield
Little Falls
Long Prairie
Luverne
Mabel
Madelia
Madison
Mankato
Mantorville
Mapleton
Marshall
Mazeppa
Milaca
Minneapolis—
Central
East Side
North Side
South Side
Minneota
Montevideo
Montgomery
Monticello
Moorhead
Mora
Morris
Morton
Mountain Lake
New Prague
New Richmond
New Ulm
Northfield
North St. Paul
Olivia
Ortonville
Osakis
Owatonna
Park Rapids
Paynesville
Pelican Rapids
Perham
Pine City
Pine Island
Pipestone
Plainview
Preston
Princeton
Red Lake Falls
Red Wing
Redwood Falls
Royalton
Renville
Rochester
Rush City
Rushford
St. Charles
St. Cloud
St. Louis Park
St. James
St. Paul—
Central
Cleveland
Humboldt
Mechanic Arts
St. Peter
Sandstone
Sauk Centre
Shakopee
Sherburn
Slayton
Sleepy Eye
South St. Paul
Springfield
Spring Grove
Spring Valley
Staples
Stephen
Stewartville
Stillwater
Thief River Falls
Tracy
Two Harbors
Virginia
Wabasha
Wadena
Warren
Waseca
Waterville
Wells
West Concord
Wheaton
White Bear
Willow River
Willmar
Windom
Winnebago
Winona
Winthrop
Worthington
Zumbrota

The following private schools are also accredited to the University:

St. Mary's Hall, Faribault
St. Paul Academy
Shattuck Military Academy, Faribault
Stanley Hall, Minneapolis
Windom Institute, Montevideo
Concordia College, Moorhead
Pillsbury Academy, Owatonna
St. Joseph's Academy, St. Paul
St. Paul's College, St. Paul Park
The Loomis School, St. Paul
The Backus School for Girls, St. Paul
The College of St. Catherine, St. Paul
St. Margaret's Academy, Minneapolis
The Winona Seminary, Winona
St. John's College, Collegeville

ADMISSION TO ADVANCED STANDING

1. FROM OTHER COLLEGES

This college 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 college. In bringing records from other institutions, the certificate must be upon the official blank of the institution granting the certificate, and should show:

(a) The subject studied; if a language, the books read, etc.
(b) The time spent upon each subject.
(c) Ground covered in laboratory work in case of laboratory subjects.
(d) The result. It is sufficient to state that the subject was completed creditably.

Records from institutions whose entrance requirements are not as high as those of this college will not be accepted for equivalent rank. The credits to be allowed in such cases will be determined by the Enrollment Committee.

2. FROM MINNESOTA NORMAL SCHOOLS

Graduates of the "advanced graduate course" of a Minnesota State Normal School are admitted with advanced standing equivalent to one year's credit, and receive the degree of Bachelor of Arts upon completing in this college ninety-six credits including freshman mathematics, courses III and IV, provided the usual requirements regarding majors and minors on page 43 be complied with. Such students will not be permitted to elect courses V or VII in education, I or II in mathematics, freshman rhetoric or reading, or history I, and upon registering for mathematics III and IV will be required to make good any deficiency in preparatory mathematics.

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.

ADMISSION AS UNCLASSED STUDENTS

Whenever in the judgment of the Enrollment Committee an applicant presents satisfactory reasons for not taking the regular course, such applicant may be admitted as an unclassed student. He must take the same examinations or present the same credentials as are required of those who enter the freshman class. Exceptions can be made only upon vote of the Faculty.

Unclassed students must take the same number of hours as regular students, and, unless advanced standing is obtained through credits from other institutions, four-fifths of the work during the first year must be taken from subjects offered to freshmen. A new application must be made each semester to the Enrollment Committee.

ADMISSION TO STUDY MUSIC

Students who enter the University for the express purpose of studying music, must take the same examinations or present the same credits that are required of those who apply for admission to the freshman class. Such students are required to register for courses I and IV in music, and at least six credits in other courses outside the department of music, to be selected with the approval of the Enrollment Committee.

DAILY ROUTINE

The daily session is divided into eight recitation periods of fifty minutes each, four in the morning and four in the afternoon. The morning session begins at 8:30 and closes at 12:35 o'clock. A general assembly of the faculty and students is held at 10:25 o'clock. The noon hour extends from 12:35 to 2 o'clock. The afternoon session begins at 2:00 o'clock and continues until 5:40. With the exception of Saturday afternoon work extends thru 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 semester 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 of 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.

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. 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 the various fee courses:

Animal Biology, I to VI, each	$3.00
Animal Biology, VII	1.00
Botany, I, II, III, V, VI, each	3.00
Chemistry, I (a), I (b), II, III, each	5.00
Chemistry, IV, V, VI, each	7.00
Geology IX and X, each	1.00
Mineralogy, I, II, III, and IV, each	3.00
Music, I, II, III, VI, VII, each	4.00
Music IV	$25.50 to 85.00
Music V	2.00
Physics I, II, III, IV, VI and VIII, each	3.00
Physics VII and IX, each	5.00

Military drill and gymnasium are required of all men. The price of military uniform, consisting of blouse, trousers, vest and cap is $15. The suit for gymnasium costs $2.

GRADUATION

Students completing the course of study to the satisfaction of the faculty of the college, are entitled to receive the baccalaureate degree. (For details see page 43.) 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* that examination, in every case, be held before a committee of the faculty appointed for that purpose.

THE UNIVERSITY STATE TEACHER'S CERTIFICATE

Graduates of the College of Science, Literature, and the Arts may apply for and receive upon vote of the faculty the University State Teacher's Certificate under the following conditions:

First: They must have maintained a good average of scholarship thruout the four years of college study.

Second: They must have the recommendation of at least one department concerned with high school studies.

Third: They must have completed one semester of Psychology and three semesters of Education, including courses I and II.

This certificate by state law authorizes students to teach in the public schools of Minnesota for two years from date. After that time, upon satisfactory evidence of success, the certificate may be made permanent by the endorsement of the State Superintendent of Public Instruction and the President of the University.

Requirements for the Degree of Bachelor of Arts

The degree of Bachelor of Arts will be conferred upon any student who fulfills the conditions as to amount, grade, and distribution of work stated under A, B, and C, below:

A. AMOUNT OF WORK—

The student must earn from the courses offered in the college 126 credits in addition to the required exercises in drill, gymnasium, and physical culture.

A credit is one hour per week through one semester.

Juniors and seniors pursuing beginning language courses (not including Greek and Hebrew), English I and II, Mathematics I and II, Chemistry I (a), Rhetoric I and VII, or History I, shall receive only half credits.

No student shall receive credit for more than two beginning modern language courses, save by special permission.

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

A notation [n] indicates the number of exercises per week and [n^2] indicates the number of double periods per week.

B. GRADE—

In at least one-half his work (63 credits), the student must secure a grade of "good." (For the system of grades see page 86.) For the purpose of this count each "excellent" shall balance one "pass," making an average of "good" for both records.[1]

[1]This rule will go into operation in September, 1907, provided that for the graduates of 1907-8, it shall be applied only to work for the senior year; for graduates of 1908-9 to work of the junior and senior years, and for graduates of the year 1909-10 to work of the sophomore, junior and senior years.

C. DISTRIBUTION OF WORK—

1. The student must complete a major and four minors. A major is not less than 18 credits, and a minor is not less than 12 credits in one department. Two minors, or a major and a minor, may be combined in one department, but at least one of the five subjects shall be chosen from each of the following groups:
   (a) English, French, German, Greek, Latin, Rhetoric
   (b) Animal Biology, Astronomy, Botany, Chemistry, Geology and Mineralogy, Physics
   (c) History, Philosophy, Economics and Politics, Sociology

   In the statement of courses, departments may indicate any courses which shall not count toward a major or minor, and in no case shall the following courses be so counted: the first year of beginning languages (excepting Greek and Hebrew), English I and II, Mathematics I and II, General Chemistry I(a), Rhetoric I and VII, and History I.
2. Each student must choose his major subject before the end of the sophomore year.
3. Upon the choice of his major subject the department in which the student has made his selection shall assign him to an adviser in that department.
4. The student shall choose, under the advice and approval of his adviser, a sufficient amount of work to make with his major, a total of forty-eight credits, the additional subjects being such as to reinforce the major.

Appendix B

The University Summer School

This school begins shortly after Commencement and lasts about six to eight weeks. Courses are given in both Elementary and University work. These courses may be utilized to enable students to make up entrance deficiencies and to remove a portion of their academic work.

Full information concerning these courses may be obtained from the Registrar.

CONTENTS

THE COLLEGE OF HOMEOPATHIC MEDICINE
AND SURGERY

The College of Homeopathic Medicine and Survey 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.

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, save in the studies of anatomy, physiology, chemistry, histology and embryology. These studies, so for as they are required in the various courses, are pursued by all students of the department in common.

BUILDINGS AND EQUIPMENT

The department is resident in six buildings, five of which are situated upon the University Campus, viz: Medical hall, the Medical Science building, the Laboratory of Chemistry, the Laboratory of Anatomy and the Institute of Public Health and Pathology. In addition, two more buildings, a University Hospital and a building for Operative Surgery, are provided for and will be erected.

Medical Hall contains the offices of the deans of the college of homeopathic medicine and surgery and of the college of dentistry; a large amphitheatre and lecture rooms for 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 inflrmary.

The Medical Science building is a large three-story and basement building, 75x150 ft., especially designed for laboratory uses. The south 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. A large lecture amphitheatre, especially arranged for demonstrative work in physiology, the laboratories of experimental physiology and of physiologic chemistry, the offices, library and recitation rooms of this department are also situated in this wing. Upon the basement floor are laboratory stock rooms, work shop, and the animal rooms devoted to physiologic purposes.

The north wing and center are occupied by the department of Histology

and Embryology. Each of these branches has its large, well-lighted laboratories, preparation rooms and private study rooms for research. In addition there are lecture and recitation rooms, smaller laboratories for micro-technique and neurology; animal rooms and operating rooms for experimental work; rooms for photography and photomicrography, for reconstruction work and the making of models and charts; chemical laboratory, department library, a vault for the storage of the very valuable collection of series of embryos and sets of histological slides; store rooms and the offices of the professors and assistants.

The Laboratory of Medical 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 professional assistants.

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 there is 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 institute of Public Health and Pathology, which is 213 feet over all and 100 feet deep in the ecntral portion, consists of a central main portion 60 by 100 feet, with north and south wings each 56 by 75 feet.

In the south wing are housed the State Board of Health laboratories, which are connected by an underground passage with the adjacent Laboratory of Animal Research of the Minnesota State Board of Health. This wing contains a suite of rooms for a Pasteur Institute in which the special treatment of and research in rabies will be carried on. Diagnostic laboratories are provided for the bacteriological, chemical and pathological work of the State Board of Health, workshops for the repair and making of special apparatus, unpacking, storage, shipping, washing and media rooms are also available. Research laboratories and the offices and special laboratories of the professional members of the staff are here provided together with vaults for records and offices for the clerical staff.

The central portion and north wing provide for teaching and research work in the University Department of Pathology, Bacteriology and Public Health. The central portion of the building is 100 by 60 feet, being three stories in front and four stories in rear, where three of the stories are devoted to museum and library purposes. Here special books and periodicals are provided and interesting pathological and bacteriological specimens and materials, apparatus, methods of construction and other illustrative features of pubic health are on exhibition. On the first floor is

a preparation room for the museum and lecture room, beneath the museum and adjacent to the lecture and autopsy room. Six special laboratories and offices are provided for the Professor of Surgical Pathology, Assistant Professor of Pathology, Demonstrator of Pathology and Bacteriology and the Assistant Director of the State Board of Health Laboratory. The remainder of the central portion is occupied by the lecture and autopsy amphitheare, special research laboratories, photographic laboratories and a cold storage room.

In the north wing the main teaching laboratory occupies the full floor space of 75 by 56 feet. It is lghted on three sides and by a skylight and is divided by low partitions into twelve loges, each intended for the use of a group of students. Each loge is fully equipped with all apparatus and supplies which the students may need in the practical work of pathology, bacteriology or public health, so as to render each group independent. A coat room and a room for the distribution of supplies open off the main laboratory. Beneath this is a similar students' research laboratory containing six loges which are to be used for the teaching of such special courses as Pathology of Tumors, Neuro-Pathology, practical Public Health laboratory work, etc. Opening off this is a special laboratory for the teacher in charge, for the issuing of supplies and also a coat room. Other special laboratories, including rooms for the preparation and storage of media and the storage of stock cultures of bacteria, and living quarters for the janitor are also in this wing.

A University Hospital upon the Campus has been provided for through a bequest by the widow of the late Dr. A. F. Elliott; this rioney, amounting to over $125,000.00 will be used in the construction of a large, thoroughly equipped hospital designed with especal reference to teaching purposes.

The last Legislature provided for a building adjacent to the Medical quadrangle which when completed will give fine accommodation for operative surgery, pharmacology, an animal hospital and for the storage and breeding of animals.

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 numerous 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 cities with a population of 500,000 people. The location of the University be-

tween two interurban car lines enhances the value and convenience of these clinical opportunities.

A medical library, containing 4,000 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.

Calendar, College of Homeophathic Medicine and Surgery

FIRST SEMESTER.

SEPTEMBER	12	Th.	Entrance and condition examinations. Registration.
	13	F.	Entrance and condition examinations. Registration.
	14	F.	Entrance and condition examinations. Registration.
	16	M.	Registration and classification of students. Opening lecture 8:00 P. M.
	17	T.	Classes called for regular work.
	23	S.	.....1 wk.
	30	S.	.....2 wk.
OCTOBER	5	S.	.....3 wk.
	12	S.	.....4 wk.
	19	S.	.....5 wk.
	26	S.	.....6 wk.
NOVEMBER	2	S.	.....7 wk.
	9	S.	.....8 wk.
	16	S.	First half semester ends 9 wk.
	18	M.	Second half semester begins.
	23	S.	.....10 wk.
	28	Th.	Thanksgiving Day. Recess three days.
	30	S.	.....11 wk.
DECEMBER	7	S.	.....12 wk.
	14	S.	.....13 wk.
	21	S.	Holiday recess begins. No classes.
JANUARY	7	T.	Work resumed in all classes.
	11	S.	.....15 wk.
	18	S.	.....16 wk.
	25	S.	.....17 wk.
FEBRUARY	1	S.	End of first semester.
	15	S.	.....2 wk.
	18	T.	University Charter, 1868.
	22	S.	Washington's Birthday—Holiday.
	29	S.	.....4 wk.
MARCH	7	S.	.....E. *wk.*
	14	S.	.....6 wk.
	21	S.	.....G. *wk.*
	28	S.	.....8 wk.

APRIL	4	S.	.....9 wk.
	11	S.	.....10 wk.
	18	S.	.....11 wk.
	25	S.	.....12 wk.
MAY	2	S.	.....13 wk.
	9	S.	.....14 wk.
	16	S.	.....15 wk.
	23	S.	.....16 wk.
	30	S.	Semester examinations VII and VIII hour classes .....17 wk.
JUNE	1	M.	Semester examinations I hour classes
	2	T.	Semester examinations II hour classes
	3	W.	Semester examinations III hour classes
	4	Th.	Semester examinations IV hour classes
	5	F.	Semester examinations V hour classes
	6	S.	Semester examinations VI hour classes 18 wk.

COMMENCEMENT WEEK, 1908

Sunday,	June 7	Baccalaureate Service
Monday,	June 8	Senior Class Exercises
Tuesday,	June 9	Senior Promenade
Wednesday,	June 10	Alumni Day
Thursday,	June 11	Commencement Day—The Eighteenth Annual Commencement
Friday,	June 12	Summer Vacation begins

SCHEDULE OF EXAMINATIONS FOR ADVANCED STANDING AND TO REMOVE CONDITIONS

September 12-14, 1907

Thursday, Sept. 12, 9:00 a. m.	2: p. m.
I. Year Chemistry	I. Year Histology and Embryology, practical and didactic
II. Year Chemistry	II. Year Histology and Embryology, practical and didactic
Friday, Sept. 13, 9:00 a. m.	2: p. m.
I. Year Philosophy	I. Year
II. Year Philosophy	II. Year General Pathology and Bacteriology, practical and didactic
Saturday, Sept. 14, 9:00 a. m.	2: p. m.
I. Year Anatomy	I. Year
II. Year Anatomy	II. Year Materia Medica

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., *Professor.*
Andrus Building, Minneapolis.
ADOLPH W. JOHNSON, *Lecturer on Pharmacy.*

PRACTICE OF MEDICINE

ASA S. WILCOX, A. B., M. D., *Professor.*
Masonic Temple, Minneapolis.
O. H. HALL, M. D. *Professor, Renal Diseases.*
Pittsburg Building, St. Paul.
ANNA H. HURD, Phm. D., M. D., *Lecturer, Diseases of Blood and Ductless glands.*
Pillsbury Building, Minneapolis.

CLINICAL MEDICINE AND PHYSICAL DIAGNOSIS

H. M. LUFKIN, M. D., *Professor.*
Germania Life Ins. Bldg., St. Paul.
NORMAN M. SMITH, M. D., H. O. SKINNER, M. D., O. K. RICHARDSON, M. D., A. E. AHRENS, M.D., G. B. HAMLIN, M.D., *Assistants.*

SURGERY

R. D. MATCHAN, M. D., *Professor.*
Masonic Temple, Minneapolis.
W. S. BRIGGS, M. D., *Professor.*
Pittsburg Building, St. Paul.
A. E. COMSTOCK, M. Sc., M. D., *Professor, Regional Surgery.*
N. Y. Life Building, St. Paul.
A. E. BOOTH, M. D., *Professor of Orthopaedia.*
Andrus Building, Minneapolis.
W. B. ROBERTS, A. B., M. D., *Professor of General Surgery.*
Pillsbury Building, Minneapolis.
A. E. AHRENS, M. D., *Assistant.*

OBSTETRICS

B. H. ODGEN, A. B., M. D., *Professor.*
Ernst Building, St. Paul.
HUGH J. TUNSTEAD, M. D., *Professor.*
829 16th Ave. N., Minneapolis.

GYNAECOLOGY

R. R. ROME, M. D., *Professor.*
Andrus Building, Minneapolis.
H. C. ALDRICH, M. D., *Professor.*
Medical Blk., Minneapolis.
E. E. AUSTIN, M. D., *Professor.*
Andrus Building, Minneapolis.
F. G. COBB, M. D., *Associate.*

MEDICAL JURISPRUDENCE

ARTHUR W. SELOVER,
Guaranty Building, Minneapolis.

OPHTHALMOLOGY

H. H. LEAVITT, M. D., *Professor.*
Pillsbury Building, Minneapolis.

OTOLOGY-RHINOLOGY AND LARYNGOLOGY

EUGENE L. MANN, A. B., *Professor.*
Endicott Arcade, St. Paul.
GEO. M. HAYWARD, M. D., *Clinical Professor.*
Medical Building, Minneapolis.

SKIN AND GENITO-URINARY DISEASES

C. H. NEILL, M. D., *Professor.*
Medical Building, Minneapolis.

PAEDOLOGY

GEO. B. HAMLIN, M. D., *Professor.*
506 Masonic Temple, Minneapolis.

MEDICAL ECONOMICS

O. K. RICHARDSON, M. D., *Professor.*
506 Masonic Temple, Minneapolis.

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.

CHEMISTRY

GEORGE B. FRANKFORTER, A. M., Ph. D., *Professor.*
The University.

Announcement

The College of Homeopathic Medicine and Surgey 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, hygient 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 flrst 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 theoratical work is carried on in daily didactic lectures and text-book study throughout the entire course.

Special emphasis is placed upon the 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.

Rules and Regulations of the College

COLLEGE YEAR

The nineteenth annual course of study in this college will begin on September 12, 1907, and will continue nine months, closing upon Saturdey, June 8th, 1908.

The college year is divided into semesters; the first semester ending February 1, 1908. The last week is devoted maily to mid-year examinations, which will be conducted in many of the departments. The second semester will begin February 4, 1908, and will close June 8, 1908. Many of the courses of study will occupy the half semesters which terminate on November 16th and April 6th. Commencement exercises will occur in common with the other departments of the University, duding the week ending June 12, 1908.

ENROLLMENT

Students are urged to matriculate on or before September 12, 1907. Entrance and condition examinations will be held September 12 to 14. Opening lecture, September 16. Classes called for regular work, September 17.

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 and secretary of the college of homeopathic medicine and surgery, 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 the secretary. Upon admission and classification, students will report to the professors in charge of their respective studies.

REQUIREMENTS FOR ADMISSION

Candidates for admission to the College of Homeopathic Medicine and surgery for the College year of 1907-8 must present evidence of the following:

I. That the candidate has satisfactorily completed at least two years' college work in Arts or Science that is recognized by this University as equivalent to its own requirements.

II. That in addition to the above each candidate must have satisfied all of the requirements for entrance to the College of Science, Literature and the Arts of this University.

Candidates for admission to College of Homeopathic Medicine and Surgery may be allowed, under certain circumstances, to enter with a condition in their college work, but such condition must be satisfactorily removed before the beginning of the second year.

EXAMINATIONS—FINAL STANDINGS

No student with an entrance condition will be allowed to register for any second-year subject, nor will any student with any first-year condition or failure be allowed to register for a third-year subject; nor will any student having a second-year condition or failure be allowed to register for any fourth-year subject.

No student will be allowed to omit any freshman work in order to make up entrance conditions, except by special permission of Department affected.

Habitual absence without a satisfactory excuse, continued indifference to study, or persistently poor scholarship may subject the student to temporary or permanent suspension.

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.

Final examination in every required subject is held at the close of the work at the end of the semester or half semester, according to the extent of the course given. Opportunity is offered to remove conditions at the opening of the school year in September. The examinations at the end of semester or half semester are only for those who are taking the courses, while the September examinations are only for those who are attempting to remove conditions or are applicants for advanced standing.

The final standing of any student in a given subject shall be determined as the result of his (a) practical work (laboratory or clinical) (b) recitations and (c) oral or (d) written examinations.

All of these factors shall be taken into consideration in making up the final grading in any subject.

Students' standings shall be determined at the end of the year by a

conference of the heads of the departments in which the work is pursued during the year.

All standings shall be reported officially to and from the Dean's office at the end of the year.

Students shall be reported as Passed, Incomplete, Conditioned or Failed.

Conditions must be removed at the beginning of the school year in September. No student who has any conditions unremoved at the close of this examination is allowed to continue with his class without the express per misison of the Dean on the recommendation of the Departments concerned.

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

Failures must be taken over again in class.

A student taking work over again (by reason of having "failed") must pay the fees connected with that course.

A student who is conditioned in the majority of the subjects given in any year will become a failed student and must repeat the work of that year.

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.

ADVANCED STANDING

All persons applying for advanced standing must present satisfactory evidence of time spent in medical studies, must pass examinations in the branches already taken by the class they seek to enter and satisfy all other admission requirements, but any student who has satisfactorily completed the requirements of any department of this College in any other school of recognized standing may be excused from repeating such examinations if the instruction which he has received is considered satisfactory by the head of the corresponding department in this College.

No condition of advanced standing will entitle the student to take the two years of any graded study coincidently.

Seniors in the college of science, literature and the arts, or in other recognized colleges, 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 or in the other colleges.

No student may be advanced with his class or given advanced standing unless he has passed the majority of the required examinations in the studies of the previous year; nor shall any student be admitted to the

second semester's work of the fourth year who has any unremoved conditions of any of the preceding years, but an opportunity to remove such conditions shall be given to fourth-year students at the close of the first semester.

TERMS OF TUITION

The annual fee in the College of Homeopathic Medicine and Surgery is $100. This includes all charges for matriculation, lecture and laboratory courses, dissections and graduation, excepting a $3.00 Hospital fee to Juniors and Seniors and a rental fee for microscopes;* payable by all students who do not own their own instrument.

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 a the at the opening of the second semester, February 5, 1907. 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 afilure 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.

BREAKAGE AND LOSS

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give a receipt.

For apparatus and material attaching to his laboratory desk he will also be held responsible. At the end of each course, if such apparatus and material are restored in good condition, this receipt will be returned to him.

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* 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 issue is required, provided the student is not supplied with a satisfactory of his own. It is an advantage for the student to possess a microscope.

SPECIAL STUDENTS

Special students will pay to the accountant a fee of twenty dollars per year for each study they elect to pursue. They will be charged additional fees, varying from five to twenty dollars, for each laboratory course they may enter.

Graduate students will pay an admission fee of ten dollars which will entitle them to attend any lectures they may desire in regular courses.

CURRICULUM

The course in the College of Homeopathic Medicine and Surgery leads to the degree of doctor of medicine. It covers a four years course 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.

Course of Study

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, organan 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.
Orthopædic surgery.
Pædology.
Electro therapeutics.
Life insurance examination.
Clinics, medical and surgical.
Medical economics.

SIX-YEAR COURSE.

In the year 1903-4, the University established a six-year 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-year 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.

FIRST YEAR.

1. **German.*
2. *Botany.*
3. *Chemistry.*
4. *Zoology.*
5. *Higher Algebra and Plane Trigonometry.*
6. *Military Drill.*
7. *Gymnasium.*

SECOND YEAR.

1. *Rhetoric.*
2. *German or French.*
3. *Chemistry.*
4. *Comparative Anatomy of Vertebrates.*
5. *Physics.*
6. *Military Drill.*

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.

ANIMAL BIOLOGY.

I. General Zoölogy [3]
I, II. Professor Sigerfoos, Assistant Professor Oestlund and Assistants
Open to all students.
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.

IV. Comparative Anatomy of Vertebrates [3]
I, II. Assistant Professor Brown
Open to those who have completed 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 Vertebrate Animals; Owen, Comparative Anatomy and Physiology of Vertebrates; Wiedersheim, Comparative Anatomy of Vertebrates; Gegenbauer, Vergleichende Anatomie der Wirbelthiere.

BOTANY.

I. General Botany [3]
I, II. Professor Clements and Assistant Professor Tilden
Open to all.
This course comprises a general survey of the plant kingdom, with laboratory work on the cell, on algæ, lichens, fungi, mosses, ferns, gymnosperms, and flowering plants. Lectures and laboratory.

CHEMISTRY.

Course I. Inorganic Chemistry [3] First year, first semester
Professor Frankforter, Mr. West and Mr. Badger
This course is arranged for those who have already had an elementary course in chemistry. The course includes an introduction to physical chemistry with special reference to solutions and the electrolytic dissociation theory. This work is followed by a systematic study of the non-metals from the general standpoint of the Periodic law. Special attention is given to the relationship between the different elements and their analogous compounds.
Note:—A course is offered in the College of Science, Literature and the Arts to those who have not had the elementary course.

Course II. Inorganic Chemistry.. (Continuation of course I.) [3]
First year, second semester. *Professor Frankforter, Mr. West and Mr. Badger*
This course consists of lectures, recitations and laboratory work on the metals.

Course III. Qualitative Analysis [3] Second year, first semester.
Assistant Professor Nicholson, Mr. Anderson and Mr. Wilhoit
Lectures, recitations and laboratory work. The course includes the general reactions of the metals and the qualitative separation and identification.

Course IV. Quantitative Analysis [3] Second year, second semester
Assistant Professor Nicholson, Mr. Anderson and Mr. Wilhoit
Lectures, recitations and laboratory work. Reactions, separations and identification of the acids.

Course V. Organic Chemistry [3] Third year, second semester
Professor Frankforter and Mr. Newton
This course includes a study of the different groups of carbon compounds with special reference to those groups which are closely associated with biological processes and Bio-chemistry, bacteriological, pathological chemistry, physiology and materia medica. The course consists of lectures with frequent

recitations and laboratory work. The laboratory preparation work included the making and studying of one or more compounds in each important organic group. Some time is devoted to practical organic analysis, including the analytical side of the alcohols and the sugar group.

Course VI. Toxicology and Hygiene [3] Third year, second semester
Professors Frankforter and Harding and Mr. Newton

Toxicology.—This course includes the general methods for the separation and identification of the poisons both organic and inorganic. Attention will be given to the identification of poisons associated with medicines and with vegetable and animal matter. Besides this qualitative and quantitative work, attention is given to the structure of those organic groups of compounds which have poisonous properties.

Hygiene.—Chemistry lectures and laboratory work. This course includes the chemical analysis of air, water and some of the common foods, as milk, sugar and the fruit products. Special at

FRENCH.

I. French, beginning [5] *I, II. Assistant Professor Andrist, Assistant Professor Frelin, Madame Bertin*

Open to freshmen and sophomores. Fraser and Squair's French Grammar and Reader; modern texts.

II. French, second-year work [3]
I, II. Assistant Professor Frelin and Madame Bertin

Open to students who have completed course I. Grammar and composition continued; modern texts will be read, including selections from Merimée, Daudet and Scribe.

IV. *Conversation* [2] *I, II. Assistant Professor Frelin and Madame Bertin*

Open to students taking courses II or III. A course in conversational French.

GERMAN LANGUAGE AND LITERATURE.

I. Beginning [5] *I, II. Professor Schlenker, Assistant Professors Wilkin and Juergensen, Mr. Schroedel, and Mr. Williams*

Open to all who do not present German for entrance. Pronunciation, grammar, conversation and composition; selected reading in easy prose and verse.

To follow this course students may take course II or course III, and course V as a supplementary course to either.

II. Intermediate [3]
I, II. Professor Schlenker, Mr. Schroedel, and Mr. Williams

Open to students who have completed course I. First semester—Selections from modern narrative and descriptive prose; selected lyrics and ballads. Second semester—A drama of Lessing, Goethe or Schiller. This course may be supplemented by course V. To follow this course students should take course VI. Credit cannot be obtained for course IV by students who have credit for course II.

III. Scientific Intermediate [3] *I, II. Assistant Professor Juergensen*

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

This course may be supplemented by course V. To follow this course students may elect course VII or course VI, but must not elect course IV.

IV. Classic Prose and Poetry [3] *I, II. Professor Moore, Assistant Professor Wilkin, Mr. Schroedel, and Mr. Williams*

Open to students who have presented German for entrance. Not open to students who have credit for course II or course

III. First semester—Meissner's Aus deutschen Landen; Goethe's Gedichte. Second semester—Schrakamp's Berühmte Deutsche, Heine's Buch der Lieder. Review of German grammar throughout the year. This course may be supplemented by course V.

V. Elementary Conversation and Composition [2] *I, II.*
Assistant Professors Wilkin and Juergensen, Mr. Schroedel, and Mr. Williams
Open to students who are taking or have taken course II or course III or course IV.
Translation of short English selections; conversation on topics of everyday life; narrative and descriptive essays and letter writing.

VI. The Drama [3] *I, II. Professor Schlenker, Assistant Professors Wilkin and Juergensen, and Mr. Schroedel*
Open to students who have taken course II, III, or IV.
First semester—Modern drama. Plays of Hebbel, Hauptmann or Sudermann. Study of the present day drama in Germany. Assigned readings and reports. Second semester—Classic drama. Plays of Lessing, Goethe and Schiller. Study of dramatic structure. History of the German drama in the eighteenth century.
This course may be supplemented by course VIII.

VII. Advanced Scientific Reading [3] *I, II. Mr. Juergensen*
Open to students who have taken course III or course IV.
Reading of monographs and periodicals.

VIII. Advanced Conversation, Grammar and Composition [2] *I, II.*
Professor Schlenker, Assistant Professor Wilkin, and Mr. Schroedel
This course is intended as preparation for course XVI and is open to students who have taken or are taking course VI. It is recommended that students shall have taken course V. Required of those who desire a major recommendation toward a teachers' certificate.
Essays on assigned subjects; oral exercises in German by means of discussions on everyday subjects; debate, narration and the like.

MATHEMATICS.

III. Second Part Higher Algebra [3] Freshman and Sophomore I.
Professor Bauer, Assistant Professor Bussey, Dr. Manchester, Mr. Shumway
Open to those having a credit in course I. Variation, quadratic equations, special higher equations, simultaneous equations of the second degree, maxima and minima of algebraic functions; differentiation of algebraic functions, development of functions, logarithms, theory of equations and solution of numerical equations.

IV. Trigonometry [3] Freshman and Sophomore II.
Professor Bauer, Assistant Professor Bussey, Dr. Manchester, Mr. ShSumway
Open to those having credits in courses I, II, and III. Text, tables, and numerous applications.

PHYSICS.

I. Mechanics (Heat, Sound) [6] *I. Professor Jones and Assistants*
Experimental lectures, recitations and laboratory work.
Open to sophomores who have completed Algebra and Trigonometry of courses III and IV.

II. Light, Electricity and Magnetism [6] *II. Professor Jones and Assistants*
Experimental lectures, recitations and laboratory work.
Open to those who have completed course I.

RHETORIC.

I. (a) *Rhetoric.* [3] *I, II.*
Open to all freshmen who have passed the entrance test in English.
This course includes the study of formal Rhetoric, the writing of compositions, and the study and analysis of masterpieces of prose.

PHYSICAL CULTURE.

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.

MILITARY SCIENCE AND TACTICS.

CAPTAIN EDWARD SIGERFOOS, Ph. B., 5th U. S. INFANTRY.

For the instruction in military drill and administration the students are organized into a corps of cadets, consisting of three 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, 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.

In view of the fact that, beginning with September, 1907, the College of Homeopathic Medicine and Surgery will require two years' College work for entrance, it becomes very desirable that students intending to take up Medicine should matriculate in the six-year course upon entering the University and thus secure both degrees.

Students, who wish to enter this combined course will receive equivalent credit for college work done elsewhere.

Seven-Years' Course Leading to the Degrees of A. B. and M. D.

Seniors in the College of Science, Literature and the Arts and in other colleges, who contemplate entering the College of Homeopathic Medicine and Surgery, are permitted to elect courses in Anatomy, Histology and Embryology, Physiology and Chemistry in this college in lieu of similar science courses in the College of Science, Literature and the Arts or in other colleges. Since the medical practice act of this state requires full four years of medical study, these students must elect this work in the College of Homeopathic Medicine and Surgery, in order that it may be contributive toward the two degrees given in both colleges.

AFFILIATION WITH OTHER COLLEGES.

Carleton College has entered into an arrangement with the University of Minnesota whereby students from Carlton who have completed three full years' work without conditions and who have also met all the requirements for admission to the College of Homeopathic Medicine and Surgery may elect as the work of their Senior year the first year's work in the College of Homeopathic Medicine and Surgery, upon the satisfactory completion of which they will receive a bachelor's degree from Carlton College.

By this arrangement students from this college, having satisfactorily completed their four years' work in the College of Homeopathic Medicine and Surgery, will have received both degrees in a period of seven years.

Opportunity is offered to other colleges meeting the University requirements to enter into similar relations of affiliation for the purpose of shortening the time whereby a student can secure both degrees.

Courses of Instruction

DEPARTMENT OF HISTOLOGY AND EMBRYOLOGY.

OFFICERS OF INSTRUCTION.

THOMAS GEORGE LEE, B. S., M. D., *Professor Histology and Embryology.*
WINFIELD S. NICKERSON, Sc. D., M. D., *Assistant Professor of Histology.*
MARGARET L. NICKERSON, A. M., M. D., *Instructor in Histology.*
ERNEST V. SMITH, *Assistant in Histology.*
JARL FERDINAND LEMSTROM, Ph. K., *Assistant in Micro-Technique.*
AMOS S. WELLS, A. B., D. D. S., *Assistant in Dental Histology.*
FREDERICK HAROLD POPE, B. A., *Assistant in Dental Histology.*
Departmental Laboratory Assistants: **Henry Theodore Foshanger, B. S.,** Martin Oyen, Mathias Sundt, B. A., Charles Stewart Sutton, B. A.

This department occupies the entire north wing and center of the Medical Science Building, and includes two general laboratories, each 44 x 72 feet, which are finely lighted by windows on three sides and part of the fourth. These laboratories provide for the general courses in histology, microscopic anatomy, neurology, embryology, micro-technique. Each student is provided with a sink, gas, electric light, copper heating table, microscope locker and microscope, and a locker for the storage of apparatus and material. Several smaller laboratories are provided for special, elective and other courses; in addition there are preparation rooms, store rooms, animal rooms, rooms for experimental work in histology and embryology, for reconstruction, chemical, photographic and photomicrographic work.

A departmental library which contains a carefully selected collection of reference 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 students access to almost all the important literature relating to the work in this department.

These laboratories are equipped with 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. In addition, there is a valuable loan collection of several thousand specially prepared histological slides and a large number of series of mammalian and other embryos, sufficient to provide each student with several complete series of various ages and different planes for study. These collections are being constantly increased and are of sufficient value to have warranted the construction of a fire-proof vault 15x17 feet, for their preservation.

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 typ-

ical 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 fee.

Course I. General morphology and histology.
Professor Lee, Assistant Professor Nickerson and Dr. M. L. Nickerson.
Lectures, recitations, demonstrations and laboratory work. The course includes the structure and manipulation of the microscope; the structure and properties of the 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.

Course II. Elements of vertebrate embryology and histogenesis.
Professor Lee, Assistant Professor Nickerson and Dr. M. L. Nickerson.
Lectures, recitations, demonstrations and laboratory work. A comparative study of reproduction: the ovum, the spermatozoon, fertilization, cleavage, formation of blastodermic layers, the formation of the embryo, foetal envelopes, etc., with practical work on chick and mammalian 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.

Course III. Microscopic anatomy of man and vertebrates.
Professor Lee, Assistant Professor Nickerson and Dr. M. L. Nickerson.
Lectures, recitations, 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.

Course IV. Vertebrate neurology and neurogenesis.
Professor Lee, Assistant Professor Nickerson and Dr. M. L. Nickerson.
Lectures, recitations, demonstrations and laboratory work. A 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., 6 hours a week; laboratory, 18 hours a week; First half, second semester, second year.

Course V. Human embryology and organogennesis.
Professor Lee, Assistant Professor Nickerson and Dr. M. L. Nickerson.
A comparative study of human mammalian embroyos, including impregnation, segementation, 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. Lectures, etc., 6 hours a week, laboratory, 18 hours a week. First half, second semester, second year.

Course VI. Dental histology and embryology.
Professor Lee, and Drs. M. L. Nickerson and A. S. Wells.
A course modified from I, III and V especially arranged for and open only to Dental students. Lectures, recitations and laboratory work; the structure and histogenesis of the tissues and or-

gans; the structure and development of the teeth and jaws, the mouth cavity and glands. Lectures, etc., 6 hours, laboratory 12 hours per week. Second half, first semester, first year.

ELECTIVE AND GRADUATE COURSES.

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. *Professor Lee.*
The preparation and use of the various solutions employed in fixing, hardening and staining. Methods of embedding, sectioning, reconstruction, etc.

Course VII. Comparative histology and histogenesis of the tissues of man and vertebrates. Professor Lee, Assistant Professor Nickerson, Dr. M. L. Nickerson.
(a) The cell, spermatogenesis and ovogenesis.
(b) The epithelial, connective and muscular tissues.
(c) The nervous tissues.
(d) Blood and lymph.

Course VIII. Microscopic anatomy and organogenesis of man and vertebrates. Professor Lee, Assistant Professor Nickerson, Dr. M. L. Nickerson
(a) The digestive system.
(b) The respiratory system.
(c) The cutaneous system.
(d) The uro-genital system.

Course IX. Comparative histology and development of central nervous system and special sense organs. *Professor Lee*

Course X. The animal parasites of man *Assistant Professor Nickerson.*
The general outlines of the morphology and classification of the different groups which contain members parasitic upon man, with special consideration of each species of medical importance, including its distribution, life history, methods of infection, means for diagnosis, and the chief symptoms produced by it. The course is illustrated by the study of many specimens, charts, lantern slides,etc.
Open to third and fourth year students. Second half, second semester.

Course XI. Comparative embryology of man and vertebrates. *Professor Lee.*
A study of special problems in vertebrate development.

Course XII. Research work in histology and embryology. *Professor Lee.*
Every facility in the way of apparatus, material, literature and private rooms for study will be offered those who desire to take up any original investigation in vertebrate histology and embryology, human or comparative.

The following text and reference books should be consulted:

Histology. Wilson's The Cell; Bohm-Davidoff-Huber's Histology; Stohr's Histology; Bailey's Histology; Piersol's Histology; Ferguson's Histology; Szymonowicz-MacCullum's Histology; Sobotta-Huber's Atlas; Klein's Histology; Mann's Histology; Lee's Vade Mecum; Kolliker's Gewebelehre; Oppel's Microskopishchen Anatomie; Duval's Histologie; Ranvier's Histologie.

Embryology. Minot's Human Embryology; Minot's Laboratory text books; Hertwig-Mark's Embryology; McMurrich's Embryology; Heisler's Embryology; Marshall's Embryology; Kolliker's Embryolgie; Schultze's Embryologie; Kollman's Embryologie; Schenk's Embryologie; Reese's Embryology.

Neurology. Barker's Nervous System; Edinger's Vorlesungen; Lectures Nervous System; Gordinier's Nervous System; Van Gehuchten's System Nerveux; Kolliker's Gewebelehre; Obersteiner; Sabin's Atlas.

DEPARTMENT OF ANATOMY.

OFFICERS OF INSTRUCTION.

CHARLES A. ERDMAN, M. D., *Professor of Anatomy.*
HARRY K. READ, M. D., *Demonstrator of Anatomy.*
EARLE H. HARE, M. D., *Prosector of Anatomy.*
C. C. TYRELL, B. A., *Assistant in Anatomy.*
E. E. HEMINWAY, Ph. D., *Assistant in Anatomy.*

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 demonstration 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; 12 hours each week, for 5 weeks of first semester. Practical study of the skeleton, followed by recitations from the specimen, taken by the class, first semester. Required of all first year students.

Course II. Syndesmology.
Lectures, recitations and laboratory demonstrations, 12 hours each week, for 2 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 indentification of the muscles of the human body and the study of their nerve and blood supply, as well as their action.

Course IV. Splanchnology. *Professor Erdmann, Dr. Read and Dr. Hare.*
Lectures and laboratory work in dissecting and demonstrating the thoracic, abdominal and pelvic viscera. First semester of the first year and first half of second semester of the second year.
Recitations upon the subjects of the first year's work, conducted in sections.

Course V. The nervous system. *Professor Erdmann*
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.

Course VI. Dissections. *Drs. H. K. Read, E. R. Hare and Professor Erdmann*
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.
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.

Course VII. Surgical anatomy. *Professor Erdmann.*
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.

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. Cunningham, Morris', Gray, Spaltehvltz Atlas, Barktr's Laboratory Manual, Holden's Practical Anatomy, Erdmann's Manual of Dissection, Treve's Applied Anatomy, Barker's Anatomy of the Nervous System.
Collateral Readings. Quain's Anatomy, Gerrish's Anatomy, 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, Deaver's Surgical Anatomy; Edinger's Anatomy of the Nervous System, Hildebrand's Chirurgisch Topographise Anatomie.

DEPARTMENT OF PHYSIOLOGY.

OFFICERS OF INSTRUCTION.

RICHARD OLDING BEARD, M. D., *Professor of Physiology.*
M. RUSSEL WILCOX, M. D., *Demonstrator of Physiology.*
GEORGE D. HAGGARD, M. D., *Instructor in Physiology.*

COURSES OF INSTRUCTION.

The department of physiology occupies rooms in the laboratory of medical sciences, including the laboratory of experimental physiology, the laboratory of physiologic chemistry, a demonstration and recitation 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, embrology, 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 for the work in physiologic chemistry. Their outfit includes vivisection instruments, artificial respiratory machines, batteries, Du Boise-Reymond coils, galvanometers, rheostats, Despretz signals, moist muscle chambers, kymographions, spring myograph, stethometer, stethoscopes, phonendoscopes, Dudgeon's and Marey's sphygmographs, cardiographs, Runne's chronograph, Roy's tonometer, Gaskell's clamp, oncometers, hæmometers, hæmoglobinometers, hæmatocrits, plethysmograph, ergograph, 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 laboratory manufactures its own apparatus in almost every line of work.

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 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 as practical as possible and includes the study of advanced physiology, dealing in particular, with the subjects of nutrition, the physiology of development, and the functions of the central and peripheral nervous system. 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.

A laboratory reference library is accessible to the students for collateral reading.

Course I. General physiology. *Professor Beard.*

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 ephithelial tissues, as the structural bases of the animal body. Twelve hours a week, first half second semester, first year.

Course II. Systematic physiology. *Professor Beard.*

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.

Recitations upon the subject of the first year are conducted in sections of the class. *Professor Beard, Drs. M. R. Wilcox and G. D. Haggard.*

Course III. Advanced physiology. *Professor Beard.*

Lectures, recitations and demonstrations. The course includes the discussion of the subjects 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.

Recitations upon the subjects of this course are conducted in sections of the class. *Professor Beard and Drs. Wilcox and Haggard.*

Course IV. Physiologic chemistry and microscopy. *Professor Beard, Drs. M. R. Wilcox and G. D. Haggard.*

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 hæmoglobin and of the corpuscles in mass, in the spectroscopic examination of the blood, in the determination of blood tests, etc. Twelve hours a week, first half of first semester, second year. Open to those who have completed courses I and II.

Course V. Experimental physiology. *Professor Beard, Drs. M. R. Wilcox and G. D. Haggard.*

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.

Text-Books:

First and second years—
Howell's American Text-Book of Physiology.
Foster's Physiology, sixth edition.
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.

DEPARTMENT OF CHEMISTRY.

GEORGE B. FRANKFORTER, A. M., Ph. D., *Dean of the School of Chemistry, Professor of Chemistry.*

CHAS. F. SIDENER, B. S., *Professor of Chemistry.*

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

EVERHART P. HARDING, M. S., Ph. D. *Assistant Professor of Chemistry.*

IRA HARRIS DERBY, B. S., *Demonstrator in Chemistry.*

LILLIAN COHEN, M. S., *Instructor in Chemistry.*

ALBERT D. WILHOIT, B. A., *Instructor in Chemistry.*

RODNEY WEST, B. A., *Instructor in Chemistry.*

HAROLD M. NEWTON, *Instructor in Chemistry.*

Chemistry is taught to the medical and all other students of the University in the School of Chemistry under the directorship of Dean Frankforter. The School of Chemistry is housed in two buildings.

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

The second building which is one of the units of the medical quadrangle contains two large laboratories with a combined floor space of 3,800 sq. ft., a smaller laboratory equipped to accommodate students in quantitative analysis, a lecture room, a preparation room, balance room, store rooms and the private laboratories of the instructors.

COURSES IN CHEMISTRY.

Course I. General Chemistry. *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. Advanced Inorganic Chemistry. *Professor Frankforter, Mr. West and Mr. Badger.*

This course is arranged for those who have already had an elementary course in chemistry. The course includes an introduction to physical chemistry with special reference to the laws of solutions and electrolytic dissociation theory. This work is followed by a systematic study of the non-metals from the general standpoint of the periodic law. Special attention is given to the relationship between the different elements and their analogous compounds.

Course III. Inorganic Chemistry. (Continuation of Course II.) *Professor Frankforter, Mr. West and Mr. Badger.*

This course consists of lectures, recitations and laboratory work on the metals.

Course IV. Qualitative Analysis. *Assistant Professor Nicholson, Mr. Anderson, and Mr. Wilhoit.*

Lectures, recitations and laboratory work. The course includes the general reactions of the metals and the qualitative separation and identification.

Course V. Qualitative Analysis. *Assistant Professor Nicholson, Mr. Anderson, and Mr. Wilhoit.*

Lectures, recitations and laboratory work. Reaction, separations and identifications of the acids.

Course VI. Organic Chemistry. *Professor Frankforter and Mr. Newton.*

This course includes a study of the different groups of carbon compounds with special reference to those groups which are closely associated with biological processes and bio-chemistry, bacteriological, pathological chemistry, physiology and materia medica. The course consists of lectures with frequent recitations and laboratory work. The laboratory preparation work included the making and studying of one or more compounds in each important organic group. Some time is devoted to practical organic analysis, including the analytical side of the alcohol and the sugar group.

Course VII. Toxicology and Hygiene. Professor Frankforter, Professor Harding, and Mr. Newton.

Toxicology.—This course includes the general methods for separation and identification of the poisons both organic and inorganic. Attention will be given to the identification of poisons associated with medicines and with vegetable and animal matter. Besides this qualitative and quantitative work, attention is given to the structure of those organic groups of compounds which have poisonous properties

Hygiene.—Chemistry lectures and laboratory work. This course includes the chemical analysis of air, water, and some of the common foods, milk, sugar and fruit products. Special attention is given to food adulterations and to food preservations.

For work in other special or technical lines of chemistry, numerous courses are offered (see Bulletin of the School of Chemistry,) Facilities for research work are also afforded in a large number of lines.

The analysis of the urine is dealt with under physiological chemistry in the department of Physiology, in the pathology of the urinary system in the Department of Pathology and in the clinical laboratories in connection with the microscopy of the urine.

DEPARTMENT OF PATHOLOGY AND BACTERIOLOGY.

OFFICERS OF INSTRUCTION.

F. F. Wesbrook, M. A., M. D., C. M., *Professor of Pathology and Bacteriology.*

S. Marx White, B. S., M. D., *Assistant Professor of Pathology and Bacteriology.*

Hibbert Winslow Hill, M. D., *Assistant Professor of Bacteriology.*

L. B. Wilson, M. D., *Assistant Professor of Clinical Pathology.*

R. H. Mullin, B. A., M. B., *Senior Demonstrator of Pathology and Bacteriology.*

J. L. Rothrock, A. M., M. D., *Clinical Instructor in Pathology.*

A. S. Hamilton, B. S., M. D., *Instructor in the Pathology of the Nervous System.*

Hospital Laboratory Assistants:—E. L. Tuohy, B. A., M. D.; C. C. Pratt; Geo. N. Freeman, M. D.; Henry Goehrs, M. D.; Oliver M. Porter, M. D.; Nathan C. Bulkley; Lee A. Scace.

Departmental Laboratory Assistants:—John P. Schneider; Harry J. Bartron; Ed. Moren; R. A. Varco, B. A.; Earl H. Current; Thos. R. Martin, B. A., R. H. Labbitt; Carl O. Estrem, B. A.; J. P. Weydens, B. S.

The Institute of Public Health and Pathology, to which attention has already been directed, provides adequate room and facilities for teaching and research in pathology, bacteriology and public health.

The main laboratories 56x75 feet lighted on three sides and by a skylight, is used for the general or required courses. It is divided into twelve loges, each fully and independently equipped in every detail for the use of six students, who are responsible for all equipment therein contained. Supplies are distributed from a supply room opening off the main laboratory. Books and specimens required in teaching are easily procurable from the museum which is connected by a special or private passageway with the main laboratory. A combined lecture and autopsy room opens both from the main laboratory and from the hall so that autopsies, lantern demonstrations or lectures may be given during the period devoted to the laboratory exercises without interference with the practical work.

A smaller laboratory, one-half the size of the main laboratory, is provided for special work in graduate and optional courses in the Diagnosis of Tumors, Pathology of the Nervous System, Practical Public Health, etc. The same loge arrangements obtains as in the main laboratory.

The hospitals of Minneapolis, St. Paul, Duluth, Rochester and St. Peter, Minn., in which members of the staff are working, 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 received from time to time and are made available in the museum and for macroscopic and microscopic class use.

The State Board of Health laboratories for research and routine investigation are located in the Institute as well as a Pasteur Institute for the study and treatment of rabies. This affords an abundance of illustrative material for Public health, pathology and bacteriology.

A full equipment of microscopes permits of the rental of an instrument to each student, if he is unprovided with one suitable for his purpose.

Course I. General bacteriology. Professor Westbrook, Assistant Professor Hill and Dr. Mullin.

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. Bacterial activities concerned in sewage purification, etc., will receive attention. Twenty hours per week during the last eight weeks of the second semester, second year.

Course II. General pathology.
Professor Westbrook, Dr. Mullin, Assistant Professor White, and Assistant Professor Hill.

Lectures, demonstrations and laboratory work on the general processes involved in disease, to include the study of inflammation, the degenerations and tumors. Twenty hours per week during the last eight weeks of the second semester, second year.

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 and autopsies (human and animal) will be supplied for microscopic and cultural examination and an intimate relationship with clinical 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 lessons in all the organs will be illustrated from clinical and autopsy material, fresh and preserved, and supplemented by experimental work. Each student will be required to prepare and examine under the microscope selected fresh and stained specimens of morbid tissues, fluids, etc.
Professor Westbrook, Assistant Professor White, Dr. Mullin.

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. *Assistant Professor White, Dr. Mullin.*

Sixteen hours per week throughout the first semester of the third year.

Course IV. *Assistant Professor White, Dr. Rothrock and Dr. Mullin.*
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.

Course V. Special pathology of the nervous system. *Dr. A. S. Hamilton.*
An elective course, limited to twenty-five students, in the fourth year.
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.

Course VI. *Assistant Professor White.*
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 pathology 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.

Course VII. Research work in one of the following lines:
(a) General pathology.
(b) Special pathology and bacteriology and technique.
Second semester of third and throughout the fourth year, hours assigned.

Course VIII. Surgical pathology. *Professor Stewart.*
(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 two hours per week, second semester, fourth year.

Text-Books:
Pathology—
American Text-Book of Pathology.
Ziegler's General and Special Pathology.
Schumaus-Ewing: Pathology and Pathological Anatomy.
Coplin's Manual of Pathology.
Cattell's PostMortem Pathology.
Durck-Hektoen: Special Pathologic Histology.
Jakob: Nervous System.
Cont'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-Hirschfield, Pathologische Anatomie; Clifford Allbutt's System of Medicine; Leukhart's die Thierische Parisiten des Menschen; Bouchard, Traite de Pathologie Gener-

ale; Eichorst Pathologie u Therapie; Gaylord and Aschoff, Pathological Histology; Nothnagel, Encyclopedia of Practical Medicine; Wood, Chemical and Microscopical Diagnosis.

Surgical Pathology—
Bland Sutton, Tumors, Innocent and Malignant.

DEPARTMENT OF MATERIA MEDICA AND THERAPEUTICS.

WILLIAM EDWIN LEONARD, A. B., M. D., *Professor.*
ADOLPH W. JOHNSON, *Lecturer on Pharmacy.*

The work of this, the essential chair in the College curriculum, is arranged so that the student is gradually led up from the elementary work of the first and second years to the fuller instruction of the third and fourth, when his more complete knowledge of general and special branches enables him to understand the intimate relation of therapeutics to the whole and especially to pathology and the clinical pictures of disease.

First Year: Mr. Johnson will give ten lectures upon the peculiar methods of Homeopathic Pharmacy, personally instructing each student in the technique of the more common preparations, and in writing and filling prescriptions, using for these purposes the material and apparatus in Prof. Leonard's laboratory, which is abundantly supplied with the crude and perfected drugs for illustration and demonstration.

Second Year: Two hours each week in lectures and quizzes, the toxicological and physiological action of a few typical drugs will be studied especial reference being had to the difference in the action of small and large doses, the alkaloids, etc., with the idea of thus laying a broad foundation for the comprehension of the symptomatology of the latter years.

When practicable, actual experiments in the effects of drugs upon individual members of the class will be made, thus giving personal training in observation, the blanks and methods used being those authorized by the American Institute of Homeopathy, and under Professor Leonard's supervision.

Third Year: Routine lectures and quizzes, three hours each week, will be given upon the Vegetable Remedies, some thirty major and seventy-five minor drugs, arranged according to their natural groups and their clinical relationships to disease, and studied in their origin, history, preparation, physiology and symptomatology, full practical comparisons being made with other allied remedies only such usage being presented as has been fully corroborated.

Fourth Year: The animal, mineral and nosological remedies of the materia medica, some forty major and twenty minor drugs grouped and studied as these of the previous year, will be taken up, special attention being given to the usage of this class in chronic as well as acute disease.

Examinations will be held from time to time, or at the end of the term, in the form of written quizzes, the students final standing being made up of these and his daily quizz records.

Collateral Reading:
First Year—Pharmacopea of the American Institute of Homeopathy.
Second Year—Hughes' Pharmacodynamics.
Third and Fourth Years—Farrington's, Hering's Condensed, or Cowperthwaites's Materia Medicas; Dunham's Lectures upon Materia Medica, Allen's Hand-Book.

DEPARTMENT OF PRACTICE OF MEDICINE, CLINICAL MEDICINE AND PHYSICAL DIAGNOSIS.

ASA STEARNS WILCOX, A. B., M. D., *Professor.*
H. M. LUFKIN, M. D., *Professor.*
O. H. HALL, M. D., *Professor.*
ANNA M. HURD, Phm. D., M. D., *Lecturer.*
NORMAN M. SMITH, M. D. *Assistant.*
H. O. SKINNER, M. D., *Assistant.*
A. E. AHRENS, M. D., *Assistant.*
G. B. HAMLIN, M. D. *Assistant.*
O. K. RICHARDSON, M. D., *Assistant.*

PRACTICE OF MEDICINE.

This course of lectures occupies three hours a week throughout the Junior and Senior years; the object aimed at is to acquaint the Student with the Pathological basis of the various diseases, their symptomatic course and the findings derived from the various methods of physical macro- and microscopical examinations, so that with the complete picture of its diseased process and its possibilities, he may intelligently apply all known methods of relief, hydro-therapy, electrical reaction, dietetics physiological and palliative medication, and above all may scientifically select the homeopathic remedy curative of the diseased process as conditioned by the peculiar susceptibility and idiosyncracy of the individual to be treated.

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.
Ander's Practice of Medicine.

CLINICAL MEDICINE.

Abundant material is furnished by the daily clinics at the University free dispensary and at the Hospitals of St. Paul and Minneapolis where clinics are held each Monday morning.

This course is one of the most important to the student, for it is here that he sees the practical application of not only his didactic course on physical diagnosis, but also the subject of internal medicine and diagnosis or practice is fully illustrated by the ambulatory or clinical patient, as well as by the hospital patient.

Professor Lufkin conducts a clinical lecture each Saturday afternoon from 1-3. One hour is devoted to examination of patients, one or two cases being selected for special instruction the following hour.

The important field of homeopathic prescribing (therapeutics) is fully illustrated. All forms of acute and chronic diseases come up for demonstration during the year.

PHYSICAL DIAGNOSIS.

The course on physical diagnosis is embraced in 24 didactic lectures, and teaches the methods of investigating both the normal and abnormal sounds, feeling and appearance of the human subject. The lectures are divided into an introductory portion dealing with the general technique of physical examinations followed by the special methods of investigating the normal and abnormal heart and lungs, the abdominal organs, the stomach, liver and kidneys.

These lectures are supplemented for the junior student, by especial exer-

cises in the dispensary, where abundant material is at hand for putting such methods as are taught in the didactic course, to practical application upon the living subject.

Physical Diagnosis, Clinical Medicine.
Lilienthal's Therapeutics.
Lippe's Reperatory.
Farrington's Clinical Materia Medica.
Vierodt's Medical Diagnosis.
Abram's Manual of Clinical Diagnosis.
DaCosta's Diagnosis.

DEPARTMENT OF SURGERY.

R. D. MATCHAN, M. D., *Professor.*

W. S. BRIGGS, M. D., *Professor.*

A. E. COMSTOCK, M. Sc., M. D., *Professor.*

W. B. ROBERTS, A. B., M. D., *Professor.*

A. E. BOOTH, M. D., *Professor, Orthopaedia.*

A. E. AHRENS, M. D., *Assistant.*

C. A. DAWSON, M. D., *Assistant.*

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 anæsthetics 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 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 in 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 the 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 if anæsthetics and are required to attend a number of surgical patients at their homes, carrying out post-operative detail under the direction of the professor.

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.
ver, aided by models and charts.

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 cada-

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.

Parke's Surgery.
Homeopathic Text-Book of Surgery.
Hamline's American Text-Book of Surgery.
Bradford & Lovett's Orthopædic Surgery.
Pye's Surgical Handicraft.
Modern Surgery, J. C. DeCosta.

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 sequellae, cleft-palate, hare-lip, etc.

DEPARTMENT OF OBSTETRICS.

B. H. OGDEN, A. M., M. D., *Professor.*

HUGH. J. TUNSTRAD, M. D., *Professor.*

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 physiology 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 the 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 the 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 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 symphisiotomy and Cæsarean section.

TEXT-BOOKS AND COLLATERAL READINGS.

Leavitt.
Lusk's Midwifery.
American Text-Book of Obstetrics.
Hirst's Text-Book of Obstretics.
Grandin & Jarman's Midwifery.
Playfair's Midwifery.
Boisliniere, Obstetric Accidents.
Davis' Obstetrics.

DEPARTMENT OF DISEASES OF WOMEN.

R. R. ROME, M. D., *Professor.*
E. E. AUSTIN M. D., *Professor.*
H. C. ALDRICH, M. D., *Professor.*
S. G. COBB, M. D., *Associate.*

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 procedure 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.

DEPARTMENT OF MENTAL AND NERVOUS DISEASES.

The didactic and clinical work on nervous diseases is obtained from the Department of Practice and Clinical Medicine.

The didactic and practical work in mental diseases is obtained at the Fergus Falls Insane Hospital, each senior student spends two weeks at the asylum in practical work among the insane.

Talcott's Mental Diseases.
Clouston's Mental Diseases.
Edinger's Anatomy of Central Nervous System.
Martin's Nervous Diseases.
Dana Text-Book Nervous Diseases.
Bigelow's System of Electro-Therapeutics.
Oppenheim's Diseases of the Nervous System.

Collaterial Reading—Hack Tuke's Dictionary of Psychological Medicine; Bevan Lewis Mental Diseases; Kirchoff's Handbook of Insanity; Ferrier's Localizations of Cerebral Diseases; Strumpell's Text-Book of Medicine; Hirt's Diseases of the Nervous System; Horseley's Brain and Spinal Cord.

DEPARTMENT OF DISEASES OF CHILDREN.

G. B. HAMLIN, M. D., *Professor.*

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 diseases are treated by the members of the class.

The didactic course embraces a description of the normal development of infancy and childhood natural and artificial infant feeding, signs and symptoms of hereditary syphilis, contagious and infectious diseases, tuberculosis, erysipelas, and the diseases of the respiratory and urinary organs; those of the circulatory, nervous and digestive systems, 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.

DEPARTMENT OF ELECTRO-THERAPEUTICS.

ETHEL S. HURD, M. D., *Lecturer.*

Electro-Therapeutics.

It is intended to make the didactic work in this department commensurate with its growing importance. The physics of electricity will be sufficiently considered to enable the student to understand the mechanical construction, and the currents emanating from the galvanic and faradic batteries, the static machine X-Ray coil, the Oudin Resinator, as well as other apparatus used for the production of high frequency currents.

The technique of the various modalities with their physiological effects and the pathological conditions to which they are applicable are carefully and practically demonstrated.

Light energy will be considered in the same manner and demonstrated with the therapeutic arc light.

Books for reference:

Electro-Therapeutic Practice, C. S. Neiswanger, M. D.
Elements of General Radio-Therapeutics, Dr. Leopold Freund.
The Roentgen Ray in Medicine and Surgery, F. H. Williams, M. D.

DEPARTMENT OF OPHTHALMOLOGY.

H. H. LEAVITT, M. D., *Professor.*

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; lachrymal apparatus; iris and ciliary body; lens choroid; retina and optic nerve; affections of the muscular apparatus of the eye and the general relationship between eye-strain and reflex and nervous disorders.

The didactic course consists of thirty-two lectures during the fourth year and ten during the third year.

Ophthalmology.

Norton, Buffum, Swanzy, Noyes.
Collateral reading—Fuch's Diseases of the Eye.

DEPARTMENT OF OTOLOGY, RHINOLOGY AND LARYNGOLOGY.

EUGENE L. MANN, A. B., M. D., *Professor.*
GEO. M. HAYWOOD, M. D., *Clinical Professor.*

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 ofthe 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 catarrhal 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 noso-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 pharynz are considered in their dependence upon alimentary disorders, acute and chronic inflammatory conditions, morbid growths and neurosis, together with the pharangeal and tonsilar conditions incident to the exanthamata, 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—especial 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, mucoid 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.

DEPARTMENT OF SKIN AND GENITO-URINARY DISEASES.

C. H. NEILL, M. D,, *Professor.*

This course will consist of one didactic lecture and one clinic each week for students of the fourth year. It will include the diseases ofthe 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 diagnosis 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 Durhring, Dearborn.
Genito-Urinary: Carlton, Hoyne, Franklin, American Text-Book, Bumstead and Taylor.

MEDICAL ECONOMICS

O. K. RICHARDSON, M. D., *Professor.*

The lecture course on this subject will embrace all that pertains to the social and business side of the practice of medicine.

Under the social head will be treated: The manner of meeting patients in their homes and at the office; a physician's standing in the social community in which he lives, in fact, the doctor's deportment toward the laity.

Under the business head will be treated: The choosing of a location for practice, the location of a home and office in the community, the bookkeeping and collection of accounts.

Lectures will also be given on the advantages of and necessity for organization of medical men.

The code of medical ethics will be explained fully and the reasons given for its existence.

DEPARTMENT OF HISTORY AND METHODOLOGY OF MEDICINE.

O. H. HALL, M. D., *Professor.*

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 ofthe 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 homeopathy in its high place and gives the student an outlook much needed in the profession. The tendency of medicine has always been to over-estimate the material side of man's nature and to make innumerable hypotheses to explain disease. The conflicts in medicine have been the clashing, not of opposite sects, but of antagonistic systems of thought, and reconciliation is possible only on the grounds of 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.

DEPARTMENT OF MEDICAL JURISPRUDENCE.

ARTHUR W. SELOVER, *Lecturer.*

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.

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.

LIBRARY OF MEDICAL DEPARTMENT

Thomas G. Lee, B. S., M. D., Librarian

The Library consists of (a) The General clinical and reference Collection of some 4,000 books and bound periodicals, and thirty-four current periodicals; (b) The College Collections of the College of Homeopathic Medicine and Surgery, the College of Dentistry and the College of Pharmacy; (c) The Department Libraraies, being special collections of books and current periodicals belonging to the Laboratories of Anatomy, Chemistry, Histology and Embryology, Pathology, Bacteriology and Physiology. In addition, the Libraries of the Hennepin County Medical Society, some 3,800 volumes and 50 Journals, and that of the Ramsey County Medical Society, some 4,500 volumes and 150 Journals, are

accessible to the Medical student for reference work and collateral reading.

Other Libraries of value to the Medical student are the General University and other department libraries of 110,000 volumes, the Minneapolis Public Library, 125,000 volumes; the St. Paul Library, 55,000 volumes.

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 diseases 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 practioners are invited to attend them at all times.

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 HOSPITALS, 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 include 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 medical and surgical cases. It contains an amphitheatre in which clinical lectures are delivered. A numer 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.

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.

DEGREES

The degree of doctor of medicine is conferred by the Board of Regents upon students who are recommended, by vote of the faculty, for graduation.

Candidates for the degree must possess the following essential qualifications:

(1) Twenty-one years of age and upwards.

(2) Good moral character.

(3) A degree of preliminary education equivalent to that demanded by the examination for entrance to this college.

(4) Four full 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.

(5) Satisfactory examination passed in all branches in accordance with the foregoing rules.

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.

The College hereby acknowledges favors extended by Dr. G. O.

Welsh and his assistants at the Fergus Falls Insane Asylum for practical instruction to the Senior Class in Mental Diseases.

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.

THE ALUMNI ASSOCIATION

The Alumni Association of the College of Homeopathic Medicine and Surgery endeavors to keep in touch with the College work and needs and is ever alert to assist the Faculty in all ways possible. It has been a potent effort for good in the past and its work is appreciated by the Faculty.

Officers for the present year: H. J. Tunstead, M. D., President, 829, 16 Ave. N., Minneapolis; G. G. Balcom, M. D., Vice President, Lake Wilson, Minn.; Annah Hurd, M. D., Secretary-Treasurer, Pillsbury Bldg., Minneapolis.

University Committee: Ida Mackeen, M. D., Masonic Temple, Minneapolis; J. F. Beck, M. D., 1551 Franklin Ave., Minneapolis: C. Arthur Dawson, M. D., 2½ West Lake St., Minneapolis.

THE COLLEGE OF DENTISTRY

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, save in the studies of anatomy, physiology, chemistry, histology and embryology. These studies, so far as they are required in the various courses, are pursued by all students of the department in common.

BUILDINGS AND EQUIPMENT.

The department is resident in six buildings, five of which are situated upon the University Campus, viz.: Millard Hall, the Medical Science building, the Laboratory of Chemistry, the Laboratory of Anatomy and the Institute of Public Health and Pathology. In addition, two more buildings, a University Hospital and a building for Operative Surgery, are provided for and will be erected.

Millard Hall contains the offices of the dean and secretary of the college of medicine and surgery, and of the deans of the college of homeopathic medicine and surgery and of the college of dentistry; a large amphitheatre and lecture rooms for 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 Medical Science building is a large three-story and basement building, 75 x 150 ft., especially designed for laboratory uses. The south 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. A large lecture amphitheatre, especially arranged for demonstrative work in physiology, the laboratories of experimental physiology and of physiologic chemistry, the offices, library and recitation rooms of this department are also situated in this wing. Upon the basement floor are laboratory stock rooms, work shop, and the animal rooms devoted to physiolocic purposes.

The north wing and center are occupied by the department of Histology and Embryology. Each of these branches has its large, well-lighted laboratories, preparation rooms and private study rooms for research. In addition there are lecture and recitation rooms, smaller laboratories for micro-technique and neurology; animal rooms and operating rooms for experimental work; rooms for photography and photomicrography, for reconstruction work and the making of models and charts; chemical laboratory, departmental library, a vault for the storage of the very valuable collection of series of embryos and sets of histological slides; store rooms and the offices of the professors and assistants.

The Laboratory of Medical 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 assistants.

The Laboratory of Anatomy is a new two-story and basement building, 35 x 60 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 there is 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 Institute of Public Health and Pathology, which is 213 feet over all and 100 feet deep in the central portion, consists of a central main portion 60 x 100 feet, with north and south wings each 56 x 75 feet.

In the south wing are housed the State Board of Health laboratories, which are connected by an underground passage with the adjacent Laboratory of Animal Research of the Minnesota State Board of Health. This wing also contains a suite of rooms for a Pasteur Institute in which the special treatment of and research in rabies will be carried on. Diagnostic laboratories are provided for the bacteriological, chemical and pathological work of the State Board of Health, workshops for the repair and making of special apparatus, unpacking, storage, shipping, washing and media rooms are also available. Research laboratories and the offices and special laboratories of the professional members of the staff are here provided together with vaults for records and offices for the clerical staff.

The central portion and north wing provide for teaching and research work in the University Departments of Pathology, Bacteriology and Public Health. The central portion of the building is 100 x 60 feet, being three stories in front and four stories in the rear, where three of the stories are devoted to museum and library purposes. Here special books and periodicals are provided and interesting pathological and bacteriological specimens and materials, apparatus, methods of construction and other il-

lustrative features of public health are on exhibition. On the first floor is a preparation room for the museum and lecture room, beneath the museum and adjacent to the lecture and autopsy room. Six special laboratories and offices are provided for the Professor of Surgical Pathology, Assistant Professor of Pathology, Demonstrator of Pathology and Bacteriology and the Assistant Director of the State Board of Health Laboratory. The remainder of the central portion is occupied by the lecture and autopsy amphitheatre, special research laboratories, photographic laboratories and a cold storage plant.

In the north wing the main teaching laboratory occupies the full floor space of 75 x 56 feet. It is lighted on three sides and by a skylight and is divided by low partitions into twelve loges, each intended for the use of a group of students. Each loge is fully equipped with all apparatus and supplies which the students may need in the practical work of pathology, bacteriology or public health, so as to render each group independent. A coat room and a room for the distribution of supplies open off the main laboratory. Beneath this is a similar students' research laboratory containing six loges which are to be used for the teaching of such special courses as Pathology of Tumors, Neuro-Pathology, practical Public Health laboratory work, etc. Opening off this is a special laboratory for the teacher in charge, for the issuing of supplies and also a coat room. Other special laboratories, including rooms for the preparation and storage of media and the storage of stock cultures of bacteria, and living quarters for the janitor are also in this wing.

A University Hospital upon the Campus has been provided for through a bequest by the widow of the late Dr. A. F. Elliott; this money, amounting to over $125,000.00 will be used in the construction of a large, thoroughly equipped hospital designed with special reference to teaching purposes.

The last Legislature provided for a building adjacent to the Medical quadrangle which when completed will give fine accommodation for operative surgery, pharmacology, an animal hospital and for the storage and breeding of animals.

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 40 x 150 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 numerous 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 cities

with a population of 500,000 people. The location of the University between two interurban car lines enhances the value and convenience of these clinical opportunities.

A medical library, containing 4,000 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 dental library contains 1,000 volumes. 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.

College Calendar, 1907-1908.

The University year will open on the second Tuesday in September, and close on the second Thursday in June.

FIRST SEMESTER.

SEPTEMBER	9	Matriculation begins.
"	9 to 16	Registration and assignment of seats, benches and lockers.
"	" "	Entrance and conditioned examinations.
"	16	Opening lecture by Dean Owre at 5 p. m.
"	17	Classes called for regular work. Nineteenth annual session.
NOVEMBER	28	Thanksgiving Day. Recess three days.
DECEMBER	21	Holiday recess begins.
JANUARY	7	Work resumed.

SECOND SEMESTER.

FEBRUARY	4	Second semester begins.
"	12	Lincoln's Birthday.
"	22	Washington's Birthday.
APRIL	17	Good Friday. Recess two days.
MAY	26	Examinations begin.

COMMENCEMENT WEEK, 1908.

SUNDAY	June 7	Baccalaureate Service.
MONDAY	June 8	Senior Class Day Exercises.
TUESDAY	June 9	Senior Promenade.
WEDNESDAY	June 10	Alumni Day.
THURSDAY	June 11	Commencement Day—36th Annual Commencement.
FRIDAY	June 12	Summer Vacation Begins.

The College of Dentistry.

FACULTY

CYRUS NORTHROP, LL.D., *President.*

ALFRED OWRE, D.M.D., M.D., C.M., *Dean, Professor of Operative Dentistry and Metallurgy.*

THOMAS B. HARTZELL, M.D., D.M.D., *Professor of Clinical Pathology, Therapeutics and Oral Surgery.*

OSCAR A. WEISS, D.M.D., *Professor of Prosthetic Dentistry and Orthodontia.*

JAMES O. WELLS, A.M., D.M.D., *Professor of Crown and Bridge-Work and Porcelain Art.*

CHARLES A. ERDMAN, 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.*

FRANK F. WESBROOK, M.A., M.D., C.M., *Dean College of Medicine and Surgery, Professor of Bacteriology and Pathology.*

GEORGE B. FRANKFORTER, M.A., Ph.D., *Dean of the School of Chemistry, Professor of Chemistry.*

CHAS. F. SIDENER, B.S., *Professor of Chemistry.*

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

EVERHART P. HARDING, M.S., Ph.D., *Assistant Professor of Chemistry.*

WINFIELD S. NICKERSON, Sc.D., M.D., *Assistant Professor of Histology and Embryology.*

FRANK R. WRIGHT, D.D.S., M.D., *Lecturer on Anæsthesia and Chief of Anæsthesia Clinic.*

MARY V. HARTZELL, D.M.D., *Instructor in Comparative Dental Anatomy.*

H. M. REID, D.D.S., *Instructor in Prosthetic Dentistry.*

JAMES M. WALLS, D.M.D., *Instructor in Operative Technics, and Demonstrator of Operative Dentistry.*

FRED S. YAEGER, D.D.S., *Instructor in Crown and Bridge-Work.*

J. FRANCIS SCHEFCIK, B.S., Ph.G., M.D., C.M., *Instructor in Materia Medica.*

NORMAN J. COX, B.S., D.M.D., *Instructor in Operative Dentistry.*

ARTHUR B. ALLEN, D.M.D., *Instructor in Operative Technics.*

HERMAN A. MAVES, D.D.S., *Instructor in Operative Dentistry.*

JAY N. PIKE, D.D.S., *Instructor in Prosthetic Dentistry and Dental Anatomy.*

AMOS C. WELLS, B.A., D.D.S., *Instructor in Prosthetic Dentistry and Dental Anatomy.*

ANDREW J. WEISS, *Instructor in Technics.*

E. R. HARE, M.D., *Prosector of Anatomy.*

M. RUSSELL WILCOX, M.D., *Demonstrator in Physiology.*

GEORGE D. HAGGARD, M.D., *Instructor in Physiology.*

IRA HARRIS DERBY, B.S., *Instructor in Chemistry.*

LILLIAN COHEN, M.S., *Instructor in Chemistry.*

ALBERT D. WILHOIT, B.A., *Instructor in Chemistry.*

RODNEY WEST, B.A., *Instructor in Chemistry.*

HAROLD M. NEWTON, *Instructor in Chemistry.*

M. L. NICKERSON, A.M., M.D., *Instructor in Histology.*

R. H. MULLIN, B.A., M.B., *Demonstrator in Pathology and Bacteriology.*

FRANK W. SPRINGER, E.E., *Lecturer on Electricity and Its Uses in Dentistry.*

H. V. MERCER, LL.M., *Lecturer on Jurisprudence.*

A. L. MOORE, *Infirmary Clerk.*

MRS. M. C. CLYDE, *Professional Nurse.*

General Information, Rules and Regulations.

NOTE.—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.

MATRICULATION AND REGISTRATION.

After matriculating with the registrar of the University and payment of fees, students will be assigned seats, benches and lockers *in the order of their registration with the dean of the college.*

No one is recognized as a student of the school or permitted in the classes, until his receipts are presented to and countersigned by the Dean; this applies to both semesters.

Students shall have their registration completed *not later than the day previous to the day set for regular work to begin.*

REQUIREMENTS FOR ADMISSION.

The requirements for admission to the College of Dentistry are 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.

It is expected that the credits shall include at least one year's work in Latin.

Application blanks can be had from the registrar; these must be filled out by the proper authorities showing the completion of the four-year high school course. State High School Board certificates are accepted.

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 arts, of the university.

Examinations are held only in the English language.

ADVANCED STANDING.

Applicants for advanced standing must present satisfactory evidence of possessing the preliminary educational qualifications 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 upder 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.

FEES.

The annual fee is one hundred and fifty dollars ($150.00). It includes all charges for matriculation, lectures, laboratory courses, dissections, technic materials, microscopes and graduation.

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.

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.

If the applicant fails to pass the entrance examinations, his fee will be returned by the accountant.

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.

The fee for condition examinations is one dollar ($1.00).

The fee for advanced standing examinations is one dollar ($1.00).

The fee for special examinations is five dollars ($5.00).

Senior students failing to graduate, will be required to pay a fee of fifteen dollars ($15.00) for each branch examined in or taken subsequent to the close of the session in which the failure occurred. A fee of fifteen dollars ($15.00) will also be charged for the completion of each branch of unfinished laboratory or practical work.

Special and graduate students will pay to the accountant a fee of thirty dollars per year for each study they elect to pursue, and additional fees, varying from ten to thirty dollars, for each laboratory course they may enter.

CONDITIONS.

Examinations of conditioned students and of applicants for advanced standing will be held during the first week of the semester, and no student shall be allowed to take the examination until after the fee is paid, as evidenced by the receipt of the Accountant.

No student, with an entrance condition, will be allowed to register for any junior subject.

Students will not be permitted to take advanced work in any graded study, until they have passed the lower branch.

No one can be classed as a Junior or Senior with more than two conditions.

Students who carry conditions into a succeeding year, may find a resultant conflict of study hours. In that event they will give preference to the unfinished studies of the lower or conflicting course.

No student will be eligible to final examinations in any year, who carries conditions of a previous year unremoved.

Candidates for graduation who carry conditions in studies of previous years, must remove these conditions at the end of the first semester in order to be eligible for final examinations.

STANDING.

The standing of students is determined by the results of recitations, written examinations, laboratory and practical work. It is indicated by the terms (P), "passed"; (I), "incomplete"; (C), "conditioned"; or (F), "failed." The mark "failed" indicates that the work must be taken over in class.

ATTENDANCE AND DISCIPLINE.

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.

Students to be eligible for final examinations, must have a record of not less than eighty per cent. in attendance.

Habitual absence, continued indifference to study, or persistently poor scholarship, may subject the student to temporary or permanent suspension.

All laboratory courses must be taken in full and must invariably be entered upon during the first week in which they begin.

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 any of the established rules.

Students detected in the use of outside help, as notes, etc., in quizzes or examinations, or of rendering assistance to other students during examinations, will be subject to suspension for the remainder of the semester. The possession of any secret aids while under examination, will be deemed presumptive evidence of guilt, and will subject the student to the same penalty as if detected in using them.

Any student detected in stealing, will be permanently expelled from the college, and be handed over to the civil authorities to be dealt with according to the law.

The practice of dentistry by students, except under the direct supervision 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 at 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.

INSTRUMENTS, BOOKS, TOOLS AND MATERIALS.

All students are required to provide themselves with instruments, books, tools and materials as prescribed by the college.

BREAKAGE AND LOSS.

In each laboratory course the student will be assigned a certain amount of apparatus and material, for which he will give a receipt.

For apparatus and material attaching to his laboratory desk he will also be held responsible. At the end of each course, if such apparatus and material are restored in good condition, this receipt will be returned to him.

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.

For schedule of lectures, announcements, changes in college rules, etc., see bulletin board.

Rules and regulations of the infirmary and laboratories are posted in their respective places.

CURRICULUM.

The course in the college of dentistry leads to the degree of doctor of dental surgery. It covers a period of three years of collegiate study, each year representing nine months in actual attendance.

The studies are graded, so far as practicable, throughout the three years, and this grading is arranged with careful reference to the relation which the subjects naturally bear to each other, as follows:

FIRST YEAR.

Anatomy, dental anatomy, comparative dental anatomy, histology and embryology, physiology, chemistry, prosthetic technics.

SECOND YEAR.

Materia medica, bacteriology and pathology, clinical pathology and therapeutics, operative dentistry, prosthetic dentistry, orthodontia, crown and bridge-work.

THIRD YEAR.

Electricity, metallurgy, physical diagnosis, oral surgery, operative dentistry, prosthetic dentistry, orthodontia, crown and bridge-work, dental jurisprudence.

SIX-YEAR COURSE.

The University now offers an optional six-year course of study. The first three years of the course are given in the college of science, literature and the arts. The last three years are given in the college of dentistry. It leads to the bachelor's degree at end of the first four years and to the degree of doctor of dental surgery at the end of the six-year course.

Course of Instruction.

ANATOMY.

Osteology.

Lectures and recitations upon the human skeleton and supplementary work on the osteology of domestic mamals; three hours of 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 four 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.

Splanchnology.

Descriptive and topographical anatomy of the thoracic viscera, the alimentary and uro-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.

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 wll 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 upo caries will also be given.

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 the invertebrates, to the complex tooth-forms of he most highly specialized animals of the present time. The lectures will be illustrated with the stereopticon, casts, models and skulls.

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, arol cavity, glands, etc.

N. B.—Recitations, four hours per week; laboratory, six hours per week.

PHYSIOLOGY.

The subject is taught by recitations and lectures illustrated by practical demonstrations. These embrace the discussion, and as far as possible, the observation of physiological ingredients of the animal body; of the physiology of cell life or the fundamental properties of the cell; the nutritive media, blood, lymph and chyle; of the elementary functions of the nervous system; of the muscular tissues; and the epithelial tissues; of the vascular mechanism; of the alimentary canal; of the organs of secretion, excretion and respiration.

CHEMISTRY.

General Chemistry.

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

Qualitative Analysis.

Lectures, recitations and laboratory work. The course includes the general functions of the metals and acids with their qualitative separaton and identification.

Qualitative Analysis.

For work in other special or technical lines of chemistry, numerous courses are offered (see Bulletin of the School of Chemistry). Facilities for research work are also afforded in a large number of lines.

The analysis of the urine is dealt with under physiological chemistry in the Department of Physiology, in the pathology of the urinary system in the Department of Pathology and in the clinical laboratories in connection with the microscopy of the urine.

MATERIA MEDICA.

This subject is covered as thoroughly as its importance demands. The writing and correct composition of prescriptions is an important feature Particular attention is devoted to all therapeutic measures pertaining to dentistry. Practical work consists of the study of crude drugs and preparations, with demonstrations of all the pharmaceutical processes of importance.

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 microorganisms, such as pyogenic cocci, B. tuberculosis, B. diphtheriae, etc. These studies will be pursued by means af 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.

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 wih 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.

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; epulic 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.

PHYSICAL DIAGNOSIS AND ANÆSTHESIA.

The subject of physical diagnosis will be taught didactically and practically, and will have direct bearing upon the subject of anæsthesia and will be as complete as its importance demands.

A course in urinalysis will be given in connection with this course.

The technics of anæsthetics, both general and local, receive full consideration. All anæsthetics 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.

OPERATIVE DENTISTRY.

Work in this department comprises didactic, technical and clinical instruction.

Didactic. A course of illustrated lectures, covering the entire field of operative dentistry, is given in the junior year; the subject is

again thoroughly gone over with quizzes and conference work in the senior year.

Technical. During the junior year a technic course is given, the object of which is to teach as much as possible of operative procedure prior to actual work on patient.

Clinical. A part of the junior and all of the senior year is devoted to clinical practice; there is an abundance of clinical material, and the student has the opportunity to perfect himself by practical work in all branches.

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 ofmodels, molding in sand, casting dies and counterdies; swaging plate to fit model, soldering rim and grinding and polishing metal. Making lower cast-metal plate, comprising the makng 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 swaged metal plate with teeth attached by soldering. Making lower cast metal plate, casting metal around lingual side of teeth and forming gum upon labial and buccal sides with pink rubber. Making lower swaged aluminum plate with turned rim.

Clinical. The student enters the infirmary upon completion of the technic course, and there puts into practice the principles acquired.

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.

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; Jack-screws 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.

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.

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 viewpoints.

Technical. The technics are arranged so as to include all the fundamental principles of crown and bridge-work. Each student in completing the course will be required to make one of the more important forms of crowns and dummies and assemble them in bridges.

ADVANCED COURSE.

Didactic. Lectures and recitations on the character, indication, and methods of handling porcelain in crowns and bridges.

Technical. The construction of porcelain crowns and bridges.

METALLURGY.

A course of lectures and laboratory instruction is given in the senior year upon the most important metals with special work upon those used in dentistry.

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 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.

DEGREES.

The degree of doctor of dental surgery is conferred by the Board of Regents upon the students who are recommended, by vote af the faculty, for graduation. Candidates for the degree must possess the following essential qualifications:

(1) Twenty-one years of age.

(2) Good moral character.

(3) Three full college years spent in the study of dentistry; the third year, at least, in this University, and the remainder in this or other recognized schools of dentistry.

(4) Satisfactory examinations passed in all branches of the curriculum.

Text-books.

Quain's Anatomy, 10th Edn., Vol. II., parts I. and II.
Morris' Anatomy.
Edinger's Anatomy of the Brain and Cord.
Gray's Anatomy.
Cunningham's Anatomy.
Broomell's Anatomy and Histology of the Mouth and Teeth.
Black's Dental Anatomy.
Tome's Dental Anatomy.
Underwood's Comparative Anatomy.
Thompson's Comparatice Dental Anatomy.
Stöhr-Lewis Histology.
Foster's Physiology.
Remsen's Inorganic Chemistry.
Long's Dental Materia Medica, Therapeutics and Prescription Writing.
Ware's Practical Therapeutics II. Edn.
Burchard's Dental Pathology, Pharmacology and Pathology.
An American Text-book of Pathology—Hektoen-Riesman.
Marshall's Oral Surgery.
Tyson's Physical Diagnosis.
Turnbull's Manual of Anæsthetics.
Evans' Crown and Bridge-work.
American Text Book of Operative Dentistry.
Black's Operative Dentistry.
Johnson's Principles and Practice of Filling Teeth.
American Text Book of Prosthetic Dentistry.
Guildford's Orthodontia.
Hodgen's Practical Dental Metallurgy.

EXPENSES.

	1st yr.	2d yr.	3d yr
Tuition, Instruments, Tools and Books	$200.00	$350.00	$175.00
Room, Board and Incidentals	200.00	200.00	200.00

This is a general average and few use more than $1,500.00 for the entire three years.

ALUMNI ASSOCIATION.

An association of the graduates of the college has its annual meeting during commencement week.

THE COLLEGE OF PHARMACY

College Training for Pharmacists

The recognition of the need of substantial college training for pharmacists finds expression in many ways. In New York, Pennsylvania, Hawaii, Wisconsin and Ohio such training is obligatory either by law or by rule of the Boards of Pharmacy. In a number of other states credit is given for college work. In Minnesota graduates from recognized colleges need to have only two years of practical experience, while all others must have four years of drug store experience before they become eligible for examination by the State Board of Pharmacy for full license to practice in Minnesota. At the Joint Conference of the National Association of Boards of Pharmacy and the American Conference of Pharmaceutical Faculties, held at Indianapolis, Ind., in September, 1906, the following resolution was adopted:

"Special education for the practice of pharmacy is in this age a necessity and should as rapidly as possible be made compulsory and the rules of the Boards of Pharmacy are such as to promote and encourage it in all practicable ways. The special pharmaceutical education should include substantial laboratory courses."

The training advocated by these two most representative bodies and by the American Pharmaceutical Association can be obtained only at colleges or schools of pharmacy of recognized standing. It is admitted that the State of Minnesota through its University College of Pharmacy is affording instruction of the most approved kind.

In the organization of this college the Board of Regents and the faculty have 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, recitations and laboratory exercises. Students find their time fully ocupied. Those who feel unable to complete the work in two years may divide it in a manner to complete it in three years. Practising pharmacists who desire to take certain branches of study may avail themselves of any of the college facilities.

College of Pharmacy Calendar

1907-1908

September	10	Registration begins.
September	17	Entrance examinations. Registration completed. Classification of students.
September	18.	Classes called for regular work.
November	28.	Thanksgiving Day. Holiday. (Recess three days.)
December	21.	Holiday recess begins. (No classes.)
December	25.	Christmas Day.
January	7.	Work resumed.
January	27.	First semester examinations begin.
February	1.	First semester examinations end.
February	4.	Second semester begins.
February	12.	Lincoln's Birthday. Holiday.
February	22.	Washington's Birthday. Holiday.
April	17	Legal Holiday. (Recess two days.)
May	31.	Second semester ends.
June	2.	Second semester and final examinations begin.

COMMENCEMENT WEEK.

SUNDAY,	June 7.	Baccalaureate service.
MONDAY,	June 8.	Senior class exercises.
TUESDAY,	June 9.	Senior promenade.
WEDNESDAY,	June 10.	Alumni day. Meeting at 3 p. m. at college.
THURSDAY,	June 11.	Commencement day—the thirty-sixth annual commencement.
FRIDAY,	June 12.	Summer vacation begins.

The College of Pharmacy

CYRUS NORTHROP, LL.D., *President.*

FREDERICK JOHN WULLING, Ph.G., 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., *Assistant Professor of Chemistry.*

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 General and Organic Chemistry.*

CHAS. F. SIDENER, B.S., *Professor of General Chemistry.*

GEORGE DOUGLAS HEAD, B.S., M.D., *Instructor in Clinical Microscopy.*

RICHABD OLDING BEARD, M.D., *Professor of Physiology.*

M. RUSSELL WILCOX, M.D., *Demonstrator in Physiology.*

J. P. SEDGWICK, M.D., *Assistant in Physiology.*

.....*Instructor in Medical and Pharmaceutical Latin.*

FRANK F. GROUT, B.S., *Instructor in Mineralogy.*

GUSTAV BACHMAN, Phm.D., *Instructor in Pharmacy and Laboratory Assistant.*

I. DERBY, B.S., *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.*

JOHN A. HANDY, Ph.C., *Assistant in Laboratory Chemistry.*

OSCAR BLOSMO, Ph.C., *Assistant in Dispensing.*

BERNT O. GRONVOLD, *Laboratory Assistant.*

Courses of Instruction

First Year. History of pharmacy; metrology; physics of pharmacy, pharmaceutical processes; pharmacopœial preparations; mathematics of pharmacy; pharmacy quiz; identification; chemical philosophy; pharmaceutical chemistry of the non-metals and their preparations; the chemistry of the elements. Pharmacopœial inorganic salts and their official preparations; qualitative analysis; identification of salts; comparative morphology of the cryptogams; morphology and anatomy of the higher seed plants; micro-botany; materia medica, organic and inorganic; physiology and anatomy.

Second Year. Carbon compounds; toxicological chemistry; uranalysis; chemistry of hygiene; classification of organic compounds; U. S. P. organic compounds and their preparation; U. S. P. testing; quantitative analysis; manufacture of official salts; National Formulary; incompatibility; dispensing; pharmaceutical assay; synthetic remedies; homeopathic pharmacy; identification of salts; pharmacognosy; powdered drugs; therapeutics; mineralogy and crystallography; bacteriology (optional); clinical microscopy; pharmaceutical jurisprudence; Minnesota pharmacy law; first aids to the injured.

Third Year. Students taking three years to do the work of the regular two-year course, will divide the work in an equitable way subject to the approval of the Dean. Students are urged to devote three years to the completion of the course.

PHARMACY.

I. *History of Pharmacy,* including Pharmacopœias, Dispensatories, textbooks, works of reference. History of the U. S. Pharmacopœia through all its revisions.

Lectures, recitations and laboratory work, first semester, first year.

PROFESSOR WULLING.

II. *Metrology.* Weights and measures, including metric system; balances—construction, varieties, methods of weighing; specific gravity in detail; specific volume, alligation, etc.

Lectures, recitations and laboratory work, first semester, first year.

PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT.

III. *The Physics of Pharmacy.* Students are required to have had elementary physics before entering. This course covers a review and more extended elucidation of such divisions of physics as apply to pharmaceutical processes. Special attention is paid to heat.

Specific 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, dessicators, blow-pipes, crucibles; baths for controlling and equalizing heat; water-salt-oil-glycerine-paraffin-hot air baths-; evaporaton—spontaneous, rapid, slow, in vacuo; ebullition—boiling points, fusion; sublimation, calcination, dehydration, torrefaction, roasting, reduction, oxidation; carbonization, deflagration, ignition, etc.

Solution—pharmaceutical, simple, chemical, saturated; circulatory displacement.

Dialysis—construction of dialyser, osmosis, endosmosis, exosmosis; crystalloids and colloids, etc.

Lectures, recitations and laboratory work, first semester, first year.

PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT.

IV. *Pharmaceutical Processes.* The processes not taken up in III, constitute the subjects of this course. In part they are: drug grinding and powdering; comminution; contusion; trituration; sifting; elutriation; levigation; lixiviation; filtration—filtering medii, filtration of solutions, oils, syrups, rapid filtration, filtration in vacuo, hot filtration, colation; washing—displacement, continuous; decantation—the syphon and its uses; precipitation—methods, vessels, separating, drying, weighing; granulation—granular effervescent salts; desiccation; exsiccation; crystallization—water of crystallization deliquescence, effloresence, methods of obtaining crystals, collecting, draining, washing, drying crystals, fractional crystallization; distillation—stills, simple, fractional, destructive; extraction; maceraton; expression; percolation—history, theories, percolators, exhaustion, repercolation, continuous percolation, fractional percolation; clarification; decolorization.

Lectures and laboratory work, first semester, first year.

PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT.

The work of I., II., III. and IV. aggregates: Lectures, 72 hours; recitations, 54 hours; laboratory work, 238 hours.

V. *Pharmacopœial Preparations.* This course includes the study and preparation of official bodies for which the U. S. P. gives formulæ and processes, and includes waters, solutions, syrups, mucilages, spirits, infusions, decoctions, tinctures, fluid extracts, vinegars, wines, liniments, oleates, ointments, cerates, resins, oleo-resins, honeys; glycerites, mixtures, emulsions, elixirs, collodions, pills, capsules, powders, suppositories, bougies, plasters, papers, cachets, etc.

Lectures, recitations and laboratory work, first semester, first year.

PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT.

VI. *The Mathematics of Pharmacy.* While students are required to have a preparation in arithmetic and algreba before entering, they receive frequent drills at stated hours and as occasion requires or suggests throughout the entire course. Students are required to take a final examination in the subject at the end of the first year, at which examination they must attain a rating of at least eighty per cent.

VII. *Pharmacy Quiz.* A thorough review of the work covered in II, III and IV. Two hours weekly. Second half of first semester and second semester of first year.

MR. BACHMAN.

VIII. *Identification of Inorganic Official Preparations.* The study of the physical properties of official preparations.

First and second year.

MR. BACHMAN.

IX. *Chemical Philosophy.* This course is preliminary to all other work in chemistry. It treats of the principles underlying the science, and endeavors to elucidate chemical facts and phenomena. The subject is divided into—

Chemical Statics, embracing the study of the theories of atoms and molecules, atomic weights, atomic and molecular volume, quantivalence, molecular structure, ions, electric qualities, etc., and—

Chemical Dynamics, the study of reactions and their equations, thermics, chemical properties in general, etc.

Two hours weekly, first semester, first year.

PROFESSOR WULLING.

X. *The Pharmaceutical Chemistry of the Non-metals and their Preparations:*

Two hours weekly, second half of first semester of first year.

PROFESSOR WULLING.

XI. *Pharmacopœial Inorganic Salts and their Official Preparations,* with especial reference to their description, properties and manufacture.

Three hours weekly, second semester, first year.

PROF. WULLING.

XII. *Classification of Organic Compounds.* A continuation and amplification of the theoretical chemistry of the carbon compounds, serving as a fuller preparation for XIII.

Two hours weekly, second half first semester, second year.

PROFESSOR WULLING.

XIII. Chemistry of the Pharmacopoeial Organic Compounds and their Preparations. This course includes the critical study of cellulin and its derivatives, destructive distillation products, starches, sugars, fermentation products, organic acids, fixed oils and fats, volatile oils, waxes and animal fats, alkaloids, glucosides, animal drugs and products, etc.
Two to three hours weekly during the second semester of the second year.

PROFESSOR WULLING.

XIV. Pharmacopoeial Testing. A critical study of the identity, purity, limit and percentage tests of the Pharmacopoeia and their application either wholly or in part to practically every official organic and inorganic salt and compound.
Lectures, recitations and laboratory work, eight hours weekly, second semester, second year.

PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT.

XV. Quantitative Analysis of U. S. P. Salts and Preparations. This course includes the gravimetric volumetric and gasometric determinations of the U. S. Pharmacopoeia, but not pharmaceutical assay work (XVII). Lectures, recitations and laboratory work. Fifteen hours weekly during the first ten weeks of second semester of second year.

PROFESSOR CAREL AND ASSISTANTS.

XVI. Manufacture of Official Organic and Inorganic Salts. The preparation of from twenty to forty official salts as time permits.
Second semester, second year.

PROFESSOR WULLING AND MR. BACHMAN.

XVII. Pharmaceutical Assay. The quantitative determination of active constituents of a number of the potent organic drugs and preparations.
Second semester, second year.

PROFESSOR WULLING AND MR. BACHMAN.

XVIII. Synthetic Remedies. A study of the chemistry of synthetic remedies in medical use.
Second semester, second year.

PROFESSOR WULLING.

XIX. Identification of Salts. The study of the physical identity of the more important official inorganic and organic salts.
One hour weekly during second semester of first year and entire second year.

MR. BACHMAN.

XX. Micro-Chemistry. A brief course is provided for seniors if time permits.
Second semester, second year.

PROFESSOR WULLING.

XXI. National Formulary. This course includes the study of the National Formulary and the making of one or more members of each class of preparations.
Lectures and laboratory work, second semester, second year.

PROFFESOR WULLING, MR. BACHMAN AND ASSISTANT.

XXII. Homeopathic Pharmacy. A brief exposition of the principles underlying homeopathic medication, with some laboratory work.

PROFESSOR WULLING, MR. BACHMAN AND ASSISTANT.

XXIII. Incompatibility. Therapeutic, pharmaceutical and chemical incompatibility is taken up in lecture and recitation work preliminary to XXIV.
Second semester, second year.

PROFESSOR WULLING.

XXIV. Dispensing. The study of the prescription and practical work in dispensing upwards of one hundred typical prescriptions.
Lecture and laboratory work, second semester, second year.

PROFESSOR WULLING, MR. BACHMAN.

CHEMISTRY.

I. General Chemistry. This course includes a study of the chemical properties of the metallic and non-metallic elements.
Lectures, recitations and laboratory work, second semester, first year.

MR. DERBY.

II. Qualitative Analysis. This course covers the common reactions of the metals and acids and their qualitative separation. The ionic theory and the law of mass action are discussed with especial reference to qualitative reactions.
Lectures, recitations and laboratory work, second semester, first year.
MR. DERBY.

III. Quantitative Analysis. A study of the principles of quantitative determination. Preparatory to Pharmacy Course XV.
Lectures, recitations and laboratory work, first semester, second year.
PROFESSOR SIDENER.

IV. Organic Chemistry. This course includes work in both the aliphatic and aromatic series and the preparation of the more important compounds.
Lectures, recitations and laboratory work, first semester, second year.
PROFESSOR FRANKFORTER.

V. Chemistry of Hygiene. The chemistry of the atmosphere, water, soil, etc.; the sanitary examination of air and water.
Lectures, recitations and laboratory work, first semester, second year.
PROFESSOR FRANKFORTER.

PHARMACEUTICAL BOTANY AND MICROSCOPY.

I. The Comparative Morphology of the Cryptogams. The course embraces the comparative morphology of the cryptogams. Especial attention is paid to the green algæ, the foundation of the vegetable kingdom. The other groups of algæ and the fungi are briefly treated, particular stress being laid on their economic relations to other plants, to animals and to man. About one-half of the semester is devoted to the study of the archegoniate series of plants. Numerous examples of liverworts, mosses, ferns, and their allies are studied in the laboratory, and the line of development which leads from the algæ through the archegoniate series to the seed plants is emphasized.
First semester, first year.
MR. BUTTERS.

II. The Morphology and Anatomy of the Higher Seed Plants. In this course especial attention is paid to vegetable histology. The characteristic plant tissues are examined, and their arrangement is noted in roots, stems, leaves, fruits and seeds. The formation and occurrence of carbohydrates, glucosides, alkaloids, organic acids, resins, gums, gum-resins and oleo-resins are carefully studied.
Second semester, first year.
MR. BUTTERS.

III. Micro-Botany. Designed to furnish practical training in the use of the microscope, in the preparaton of material for microscopic examination, including the use of micro-chemical reagents, and in the representation by drawings of all structures observed.
The work of this course is co-incident with that of II and III.
MR. BUTTERS.

These courses occupy the equivalent of six and one-half hours a week throughout the junior year. They aim to give a comprehensive and scientific view of the vegetable kingdom, to lay a broad foundation for the study of pharmacognosy, and throughout the course attention is frequently directed in the lectures to the wider relations of plants to one another and to animals, and to the discussion of the plant as a living unit, thus bringing before the class the fundamental problems of plant physiology and ecology.
The successful completion of the course in botany is prerequisite to the study of pharmacognosy.
The work of the three courses covers sixty-six hours lectures, and one hundred forty-four hours laboratory work.

PHARMACOGNOSY.

I. Crude Vegetable Drugs.
The vegetable drugs of the United States Pharmacopœia are taken up in the following order: Roots, rhizomes, tubers and bulbs, woods, barks, leaves, herbs and flowers, fruits, seeds, plant exudations, resins, gum-resins, waxes and starches. Each drug is carefully examined, both

macroscopically and microscopially. 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 attenton 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-book—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, gentian, taraxacum, pyrethrum, inula, lappa, apocynum, stillingia, sumbul, asclepias, phytolacca, althæa, belladonna, bryonia, calumba, rheum, glycyyrrhiza, (Spanish and Russian), ipecacuanha, pareira, krameria, rumex.

Rhizomes—Aspidium, zingiber (Jamaican, East Indian and African), calamus, yeratum 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, hæmatoxylon, 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, cusso, arnica ,matricaria, anthemis, rosa gallica, rosa centifolia, crocus, zea, chondrus, cetraria, cannabis indica, pulsatilla, scoparius, eupatorium, grindelia, tanacetum, artemisia, absinthium, lobelia, mentha piperita, mentha viridis, melissa, hedeoma, marrubium, scutellaria, chirata, sabina, chelidonium.

Fruits—Humulus, piper (longum, nigrum et album), cubeba, pimenta, rhus glabra, capsicum, colocynthis, cassia, fistula, chenopodium, illicium, cardamomum, vanilla, coriandrum, conium, anisum, carum, fœniculum (Roman and German), macis, aurantii amari cortex, aurantii dulcis cortex, limonis cortex, prunum, tamarindus (East and West Indian), phytolacca, ficus, rubus.

Seeds—Physostigma, amygdala (dulcis et amara), pepo, myristica, sinapis (alba et nigra), nux vomica, staphisagria, ricinus, tiglium, stramonium.

Miscellaneous—Guarana, lactucarium, alœ (Socotrina, Barbadensis, et Capensis), catechu, kino (Malabar et Pallas), opium, elastica, manna, saccharum, saccharum lactis, mel, acacia, tragacantha, mastiche, guaiacum, benzoinum, cambogia, asafœtida, ammoniacum, scammonium, myrrha, copaiba, terebinthina, terebinthina canadensis, resina, pix (Burgundica et liquida), styrax, balsamum peruvianum, balsamum tolutanum, camphora, thymol, menthol, ergota (Spanish and German), sassafras medulla, galla (Aleppo et Chinensis), gossypium purificatum, kamala, lupulinum, lycopodium, amylum, cetaceum, cera, cantharis, coccus, ichthyocolla, moschus, carbo animalis.

Besides the foregoing, a number of the more important unofficial drugs will also be discussed.

Eight hours weekly. Lectures, recitations and laboratory work. First and second semester, second year.

MR. BUTTERS.

II. 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.

Text-book—Schneider's Powdered Vegetable Drugs.

Reference Books—Koch's Drogenpulver, Mœller's Pharmacognostischer Atlas.

Three hours weekly, second semester, second year.

MR. BUTTERS.

MATERIA MEDICA.

I. Inorganic Materia Medica.

II. Organic Materia Medica.

The work in inorganic and organic materia medica is based principally on the U. S. P., but unofficial and synthetic drugs are also studied. The course includes the study of the general characteristics of drugs and of their physiological action. Pharmaco-dynamics, including the study of the identity and quality of drugs, shares attention in the course of pharmacognosy.

Five hours weekly, second semester, first year.

DR. BRACKEN AND DR. CONDIT.

PHYSIOLOGY.

I. The work covers the study of the physiological properties of the cell, the nutritive media, the nervous mechanisms in general, muscular tissues, connective tissues and epithelial tissues. The subjects of anatomy and histology are touched upon sufficiently to lay the foundation for the proper understanding of physiological functions.

Special demonstrations are given upon animals and the living subject, illustrating the physiological functions in the muscular, nervous, vascular, respiratory and glandular systems, special attention being directed to the action of drugs and their effects upon the various systems.

Twenty-two lectures, first semester, first year.

PROFESSOR M. RUSSELL WILCOX.

II. Qualitative and Quantitative Uranalysis. Lectures, recitations and laboratory work. The laboratory work includes the qualitative analysis of representative specimens of urine as regards their physical properties, inorganic and organic constituents, as well as the quantitative determination of chlorides, urea, ammonia, total nitrogen, sugar and albumin, together with the preparation of reagents.

Eight sessions, three hours each. Second semester, first year.

PROFESSOR BEARD AND DR. SEDGWICK.

III. Experimental Physiology. (Post Graduate.) Laboratory work and demonstrations. A study of physiologic apparatus, electric 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 sphymograph, the stethoscope, phonendoscope, etc.

Six hours a week, second semester.

PROFESSORS BEARD AND WILCOX AND DR. G. D. HAGGARD.

IV. Physiologic Chemistry and Microscopy. (Post Graduate.) 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 enumerations of the blood cells, in the estimation of hæmoglobin 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.

PROFESSORS BEARD AND WILCOX AND DR. J. P. SEDGEWICK.

THERAPEUTICS.

In this course drugs are studied in groups, as governed by their physiologic action, and the therapeutic features of such groups are described. Remedial measures other than those depending upon drugs, are fully considered.

Lectures and recitations, four hours a week, first semester, second year.

PROFESSOR BRACKEN AND DR. CONDIT.

PHARMACEUTICAL MINERALOGY AND CRYSTALLOGRAPHY.

I. Mineralogy. A study of the occurrence and properties of minerals of pharmaceutical importance: ores of metals used in pharmacy; non-metallic minerals and mineral waters in their mineralogic and geologic relations.

First semester, second year.

MR. FRANK F. GROUT.

II. Crystallography. A survey of form and more evident physical characters as a basis for practice in sight recognition of economic minerals and their distinction from common rocks.

Second semester, second year.

MR. FRANK F. GROUT.

The work of I and II. requires one hour weekly throughout the year.

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 semseter, second year.

PROFESSOR WESBROOK, DR. CHOWNING.

This course is optional with students of pharmacy at present, but may be made obligatory.

CLINICAL MICROSCOPY.

Instruction includes (a) the macroscopical study of urine, its colors, sediments, and finer chemical tests; (b) the microscopical study of urinary sediments, including blood, pus, epithelial cells, casts, etc.; (c) the macroscopical and microscopical study of sputum, including the study of sputa from cases of pneumonia, pulmonary tuberculosis, asthma, chronic bronchitis, etc.

Lectures and laboratory work. Eight hours weekly; last third, second semester, second year.

(Post-Graduate.)

DR. GEORGE DOUGLAS HEAD.

TOXICOLOGY.

Organic and Inorganic. The chemistry of poisons and their antidotes and a study of symptoms, treatment and post-mortem appearances, including the simulation of symptoms of certain diseases, animal parasites, animal and vegetable products, etc; the physiological action of important poisons and their antidotes; toxicological examination of blood, urine and various organs.

Lectures, recitations and laboratory work, first semester, second year.

PROFESSOR FRANKFORTER.

PHARMACEUTICAL JURISPRUDENCE.

A course of lectures in this subject is provided and seniors are required to attend. The lectures introduce the subjects of contracts, agency, commercial paper, insurance, and discuss the liability of retail and manufacturing pharmacists, etc.

PROFESSOR WULLING.

Twelve lectures, second semester, second year.

MINNESOTA PHARMACY LAW.

Several lectures fully elucidating the rights, duties, privileges and liabilties of pharmacists under the state law regulating the practice of pharmacy, are given by special lecturers near the close of the second year.

FIRST AIDS TO THE INJURED.

A series of lectures designed to qualify the pharmacist to administer upon emergency cases before the arrival of the physician.

Eight lectures, second semester, second year.

SPECIAL LECTURES.

From eight to twelve special lectures on subjects related to the practice of pharmacy are delivered by well-known pharmacists of the state at intervals during the college year.

TEXT AND REFERENCE BOOKS.

Pharmacy: U. S. Pharmacopœia, Remington's, Caspari's and Coblentz's Practice of Pharmacy, U. S. Dispensatory, National Dispensatory, Lyon's Pharmaceutical Assaying, Storer's Dictionary of Solubilites, 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 Pharmacopœia, German Pharmacopœia, British Pharmacopœia, Volatile Oils, Kremer's Gildemeister & Hoffman, Dieterich's Manual, Ruddiman's "Whys in Pharmacy," Dorland's Am. Illus. Medical Dictionary, Dorland's Pocket Medical Dictionary.

Pharmaceutical Chemistry: Wulling, Sadtler and Trimble, Attfield, Simon, Hoffman and Power's Examination of Medical Chemicals, Schmidt, Elsner.

General Chemstry: Remsen's Inorganic, Prescott and Johnson's, Watts' Fownes, Gmelin's Handbook, Roscoe and Schorlemmer, Watt's Dictionary, Fresenius, Sadtler's Industrial Organic Chemistry, Schimf's Quantitative Analysis, Schimf's Qualitative Analysis, Beilstein.

Prescriptions: Ruddiman on Incompatability, Gerrish's Prescription Writing, Rice's Posological Tables, Scoville on Compounding, MacEwen on Dispensing.

Mathematics: Sturmer, Oldberg's Pharm. Problems, Weights and Measures, Helm and Morgan's Mathematical Chemistry, Metrc System by Hamblin Smith; Stevens' Arithmetic of Pharmacy.

Materia Medica: U. S. Pharmacopœia, Sayre, Bracken, Maisch, U. S. Dispensatory, National Dispensatory, Culbreth, Bently and Trimen's Medicinal Plants, Sollman.

Pharmacognosy: Sayre, Maisch, Rusby and Jeliffe, Fluckiger, Huseman and Hilger's Pflanzenstoffe, Base on Vegetable Microscopy, Hanbury's Pharmacographic and Science Papers, Moeller's Atlas, Tschirch and Oesterle's Anatomischer Atlas der Pharmacognosie, Herlant's Micrographies des Poudres Officinales, Schneider's Powd. Drugs; Greenisch and Collier, Vegetable Powders.

Botany: Coulter, 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, Koch's Drogenpulver.

Uranalysis: Tyson, Flint, Von Jaksch an Clinical Diagnosis, Simon's Clinical Diagnosis, Beale's Chart, Rieder's Atlas of Urinary Sediments, Hoffman and Ultzmann, Peyer's Atlas, Boston's Clinical Diagnosis.

Mineralogy: Dana.

Physiology: Kirk, American Text-book of Physiology, Simon's Physiological Chemistry, Martin's Human Body, Foster, Howell's American Text-book of Physiology.

Bacteriology: Schenck, Sternberg, Fraenkel, Abbott.

Toxicology: Reese, Taylor on Poisons, Brundage.

Latin: Robinson's 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, Hare's Therapeutics.

THE WORK OF THE JUNIOR YEAR COVERS 1,131 HOURS, AS FOLLOWS:

Pharmaceutical Chemistry	Lectures and Recitations	64
Pharmaceutical Laboratory Work	Lectures	66
	Recitations	54
	Laboratory	238
Physiology and Anatomy	Lectures	22
Botany and Microscopy	Lectures	72
	Laboratory	144
The several junior courses constituting Chemistry	Lectures	60
	Recitations	15
	Laboratory	158
Qualitative Analysis	Lectures	12
	Recitations	6
	Laboratory	140
Materia Medica	Lectures and Recitations	64
Identification	Laboratory	16
	Total	1,131

If students do not bring credits for Latin and physics they will be required to take in addition:

Latin	72
Physics	72

THE WORK OF THE SENIOR YEAR COVERS 1,276 HOURS AS FOLLOWS:

Mineralogy and Crystallography	Lectures	36
Pharmacognosy	Lectures	54
	Laboratory	162
Identification	Laboratory	72
Organic Pharmacy	Lectures	48
Organic Chemistry	Lectures	36
	Recitations	15
	Laboratory	70
Uranalysis, Chemical	Lectures	20
	Recitations	10
	Laboratory	70

Toxicology	Lectures	32
	Recitations	15
	Laboratory	60
Chemistry of Hygiene	Lectures	20
	Recitations	10
	Laboratory	20
U. S. P. Quantitative Analysis	Laboratory	120
	Lectures	14
	Recitations	10
*Pharmaceutical Laboratory Work	Lectures	54
Ditto	Laboratory	126
Dispensing	Lectures and Laboratory	96
Clinical Microscopy	Lectures and Laboratory	48
Jurisprudence	Lectures	12
Therapeutics	Lectures and Laboratory	40
First Aids	Lectures	8
	Total	1,276

Special lectures from 6 to 12 during the year.

Bacteriology, optional.

* Includes U. S. P. Testing, Making of U. S. P. Salts, Assay, National Formulary Preparations and Homeopathic Pharmacy.

JUNIOR LECTURE AND LABORATORY SCHEDULE.

First Semester, 1907-1908.

MONDAY:	8:30 to 10:30	Pharmaceutical Chemistry.
	10:30 to 11:30	Botany: Lecture.
	11:30 to 12:30	Physiology: Lecture.
	1:30 to 5:00	Botany: Laboratory.
TUESDAY:	9:30 to 10:30	Pharmaceutical Chemistry.
	10:30 to 11:30	Pharmacy: Quiz.
	11:30 to 12:30	Physiology: Lecture.
	1:30 to 5:00	Pharmacy: Laboratory.
WEDNESDAY:	8:30 to 12:30	Pharmacy: Laboratory.
	1:30 to 4:30	Botany: Laboratory.
THURSDAY:	8:30 to 9:30	Pharmacy: Quiz.
	9:30 to 10:30	Pharmaceutical Chemistry.
	10:30 to 12:30	Botany: Lecture.
	1:30 to 5:00	Pharmacy: Laboratory.
FRIDAY:	8:30 to 12:30	Pharmacy: Laboratory.
	1:30 to 4:30	Botany: Laboratory.

Second Semester, 1907-1908.

MONDAY:	8:30 to 9:30	Materia Medica.
	9:30 to 10:30	Pharmaceutical Chemistry.
	10:30 to 12:30	Pharmacy: Recitation.
	1:30 to 5:00	Chemistry: Laboratory.
TUESDAY:	9:30 to 10:30	Chemistry: Recitation.
	10:30 to 11:30	First Aids.
	11:30 to 12:30	Special Lecture.
	1:30 to 4:30	Chemistry: Laboratory.
	4:30 to 5:30	Latin.
WEDNESDAY:	8:30 to 9:30	Materia Medica.
	9:30 to 12:30	Botany: Laboratory.
	1:30 to 4:30	Chemistry: Laboratory.
THURSDAY:	8:30 to 9:30	Materia Medica.
	9:30 to 10:30	Pharmaceutical Chemistry.
	10:30 to 11:30	Botany: Lecture.
	11:30 to 12:30	Chemistry: Lecture.
	1.30 to 5:00	Chemistry: Laboratory.
FRIDAY:	8:30 to 10:30	Materia Medica.
	10:30 to 11:30	Chemistry: Lecture.
	11:30 to 12:30	Botany: Lecture.
	1:30 to 4:30	Chemistry: Laboratory.
	4:30 to 5:30	Latin.

SENIOR LECTURE AND LABORATORY SCHEDULE.

First Semester, 1907-1908.

MONDAY:	8:30 to 9:30	Therapeutics.
	9:30 to 10:30	Pharmacognosy: Lecture.
	10:30 to 11:30	Identification.
	11:30 to 12:30	Organic Chemistry: Lecture.
	1:30 to 5:00	Organic Chemistry: Laboratory.
TUESDAY:	8:30 to 10:30	Pharmacognosy: Laboratory.
	10:30 to 11:30	Crystallography and Mineralogy.
	11:30 to 12:30	Organic Chemistry: Lecture.
	1:30 to 5:00	Organic Chemistry: Laboratory.
WEDNESDAY:	8.30 to 9:30	Organic Pharmacy: Lecture.
	9:30 to 10:30	Therapeutics.
	10:30 to 12:30	Pharmacognosy: Laboratory.
	1:30 to 5:00	Organic Chemistry: Laboratory.
THURSDAY:	8:30 to 10:30	Organic Pharmacy: Lecture.
	10:30 to 11:30	Crystallography and Mineralogy.
	1:30 to 5:00	Organic Chemistry: Laboratory.
FRIDAY:	8:30 to 9:30	Therapeutics.
	9:30 to 12:30	Pharmacognosy: Laboratory.
	1:30 to 5:00	Organic Chemistry: Laboratory.

Second Semester, 1907-1908.

MONDAY:	8:30 to 12:30	Pharmaceutical Laboratory.
	1:30 to 5:00	Quantitative Analysis.
TUESDAY:	8:30 to 12:30	Pharmaceutical Laboratory.
	1:30 to 5:00	Quantitative Analysis.
WEDNESDAY:	8:30 to 12:30	Dispensing.
	1:30 to 4:30	Pharmacognosy Laboratory.
THURSDAY:	8:30 to 12:30	Dispensing.
	1:30 to 5:00	Quantitative Analysis.
FRIDAY:	9:30 to 10:30	Pharmacognosy Lecture.
	10:30 to 12:30	Organic Pharmacy.
	1:30 to 5:00	Quantitative Analysis.
SATURDAY:	9:00 to 12:00	Pharmaceutical Laboratory is open for the benefit of students who may be behind in any of their work.

Pharmaceutical laboratory work includes U. S. P. Testing, National Formulary Preparations, Manufacture of U. S. P. Salts, Assay, Homeopathic Pharmacy, etc.

Quantitative Analysis includes gravimetric, volumetric and gasometric estimation.

ENTRANCE REQUIREMENTS.

A.—To the Two-Year Course.

While nearly all students enrolled in this college are graduates of full four-year high school courses, such a training prior to entrance is not obligatory at the present time. The requirements, however, are being raised gradually in such a way that soon they shall be a full high school preparation or an equivalent.

I. *Minimum requirements applying to all candidates seeking admission to the 1907-'08 course.* Applicants may be admitted without examination if they bring certificates of graduation from, or standing in, institutions of the collegiate grade or present other credentials showing that they have successfully completed the branches of study embraced in a full four-year high school course, or an equivalent, provided that among the branches completed are:

English, two years, including the principles of composition and practice in written expression.

Algebra, one year, elementary, up to beginning of higher algebra.

Geometry, one year, elementary.

Physics, one year, elementary.

Latin, two years: grammar, one year; Caesar (four books), one year.

II. Other applicants must pass examinations in the branches above specified, i. e., in English, algebra, geometry, physics and Latin, or present satisfactory evidence of having completed these branches, for which substitutes cannot be accepted.

Students will be allowed to carry not more than one condition which, however, must be removed before the final examinations in the first year subjects.

B.—To the Three-Year Course.

The minimum requirements for admission to the three-year course are the same as those for admission to the two-year course II., with the exception that students may carry as conditions not more than three of the entrance subjects among which English cannot be. Students must pursue the branches in which they are conditioned during their first year and pass examinations in them or present evidence of having satisfactorily completed the branches. The subjects are not taught at the college, but may be taken at the Academy near by, or at the city high schools or with private tutors. The University Y. M. C. A. usually establishes courses for the benefit of students conditioned in entrance branches.

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 rooms, beginning at 9:00 a. m., on Tuesday, September 17, 1907. Lecture work begins as soon as possible after the examinations, usually the following day.

All applicants are required to furnish a certificate of good moral character.

LENGTH OF COURSE.

The complete course extends over two years of nine 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 three years' attendance will be required of students in this college in the near future.

The fifteenth annual course begins Tuesday, September 10, 1907, at 9:00 a. m., at which time registration commences in the Dean's office. Registration closes on Tuesday, September 17. Regular work begins the following day.

The college year is divided into two semesters; the second beginning February 4, 1908.

REGISTRATION.

All applicants for admission to the regular courses must present to the Dean not later than September 17, 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 at the end of the regular school year 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.

In order to become eligible for final examinations, 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.

STANDING.

The standing of students is determined by the results of recitations, written examinations, laboratory work and attendance. It is indicated by the terms "passed," "conditioned," "incomplete," or "failed." Conditions may be removed as indicated below. Incomplete work must be made up before the final examinations of the following year.

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 next spring examination. Candidates for graduation must have removed all conditions before entering upon the second semester of the graduating year.

Condition examinations are held during the first week 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.

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 Bachelor of Pharmacy, (Ph.B.), upon the graduates of the regular course.

REQUIREMENTS FOR GRADUATION.

Regular attendance at lectures, recitations 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 regular course 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 theses 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 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 student to read and understand the scientific literature of 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, upon graduation, an additional fee of ten dollars for diploma. The rules relating to damage, waste and 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 ten 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 to or in the college buildings and of breakage and loss of laboratory apparatus and material. It will be returned to the student at the close of each year, minus the cost of articles assigned to him, that 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.

FEES.

TWO YEAR COURSE.

First year	$75.00	
Second year	90.00	
		$165.00

THREE YEAR COURSE.

First year	$45.00	
Second year	55.00	
Third year	65.00	
		$165.00

There are no other fees in the regular course. Fees are payable at the time of registration. 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 the 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 designated set of metric weights, a set of apothecary's weights and steel spatulas. The expense of these is within three dollars. Students using platinum crucibles are charged for same. Upon the return of the crucible in the original condition the charge is cancelled; 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 collected for 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.

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.

GENERAL STATEMENT.

Those who do not pass the entrance examinations, may enter 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 temporary 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. Any of 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 and 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.

POSITIONS FOR GRADUATES.

The demand for graduates of this College has always been greater than the supply and is continually growing. The rule is that practically all of the senior class are engaged before graduation. This College is recognized in every state, including those in which standards of efficiency have been established, and its graduates are everywhere admitted to Board examinations.

STATE BOARD OF PHARMACY.

The Board meets at the college four times each year. For information concerning the Board address the Secretary, Mr. Chas. J. Moos, 502 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 communications to the Dean, Professor Frederick J. Wulling, University of Minnesota, Minneapolis, Minn.

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., *Assistant Professor of Assaying*

EDWARD P. MCCARTY, E.M., *Assistant Professor of Mining*

LEVI B. PEASE, M.S., *Assistant Professor of Metallurgy*

OFFICERS OF THE DEPARTMENT OF MECHANICS AND MATHEMATICS

BENJAMIN F. GROAT, B.S., *Professor of Mechanics and Mathematics*

ELTING H. COMSTOCK, B. S., *Instructor in Mathematics*

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CHRISTOPHER W. HALL, M.A., *Professor of Mineralogy and Geology*

FRANK F. GROUT, B.S., *Instructor in Mineralogy*

OFFICERS OF THE DEPARTMENT OF CHEMISTRY

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

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

OFFICERS OF THE DEPARTMENT OF ELECTRICAL ENGINEERING

GEORGE D. SHEPARDSON, M.A., M.E., *Professor of Electrical Engineering*

FRANK W. SPRINGER, E.E., *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., *Professor of Experimental Engineering*

CHARLES F. SHOOP, B.S., *Instructor in Experimental Engineering*

OFFICERS OF OTHER DEPARTMENTS GIVING INSTRUCTION

FREDERICK S. JONES, M.A., *Professor of Physics*

WILLIAM H. KIRCHNER, B.S., *Professor of Drawing*

JOHN ZELENY, B.S., B.A., Res.-Ph.D., *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 28th, 1907, or for second semester's work after February 15th, 1908,

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

Women will not be admitted to any course offered in the School of Mines.

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. No conditions, however, in entrance mathematics shall be allowed except upon special recommendation of the Department of Mathematics.

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 upon;* 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-years' 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.

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.

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 September 9th, in School of Mines Building, room 25, at 9 o'clock, a. m.

PROGRAMME—SUPPLEMENTARY EXAMINATIONS

TUESDAY,	Sept. 10,	9:00-12:00	Mathematics and Mechanics
		2:00-5:00	Mining Engineering Subjects
WEDNESDAY,	Sept. 11,	9:00-12:00	Chemistry
		2:00-5:00	Drawing and Descriptive Geometry Mechanical Engineering subjects
THURSDAY,	Sept. 12,	9:00-12:00	Metallurgical subjects
		2:00-5:00	Physics
FRIDAY	Sept 13,	9:00-12-00	Electrical Engineering subjects
		2:00-5:00	Geology and Mineralogy

REQUIREMENTS FOR ADMISSION TO THE FRESHMAN CLASS

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 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

Bookkeeping

Botany

Chemistry

Civics

Commercial Geography

Drawing

French

Grammar

Literature

Geology

German

Grammar

Literature

Greek

Grammar

Anabasis

History

Ancient, to Charlemagne, one year

Modern, from Charlemagne, one year

England, one-half year

Senior American, one-half year

Latin

Grammar

Cæsar

Cicero

Virgil

Physics

Physiography

Political Economy

Shopwork

Zoölogy

Syllabi

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: Shakespeare'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 discussion in class, is desirable. The following works are noted as indicative of the minimum amount of work expected: at least two of Shakespeare's plays, beside the one read in class, one of Irving's works, one of Hawthorne's novels, one of Stevenson's novels, and one of Webster's orations.

(b) The work in the Principles of Composition should include the principals and technical terms of ordinary texts upon the subjects, whether acquired by 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.

ADVANCED STANDING

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

1. The subjects studied and ground covered
2. The time spent upon each subject
3. In case of laboratory subjects a concise statement of work done
4. The result—it is sufficient to state that the subjects were creditably completed.

Students who desire to obtain advanced standing must present their applications and certificates to the enrollment committee who will consult the departments concerned in determining the credit to be given.

DAILY ROUTINE

The daily session is divided into eight recitation periods of fifty minutes each, four in the morning and four in the afternoon. The morning session begins at 8:30 and closes at 12:35 o'clock. A general assembly of the faculty and students is held at 10.25 o'clock, at which there are brief and simple religious exercises. The noon hour extends from 12:35 to 2 o'clock. The afternoon session begins at 2:00 o'clock, and continues until 5:40. Work extends through six days of the week.

EXAMINATIONS

Students failing to receive a yearly average of 75 per cent in 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 other subjects appearing in courses of instruction, pages 39 to 44, with the exception of Mining and Metallurgical courses, based upon requirements of the various courses and daily program. They may also take certain electives in other colleges, provided suitable arrangements can be made.

Each student must obtain from the Registrar his yearly average in all subjects and present himself for supplementary examinations, according to the program given on page 4.

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 the 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 unclassed 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.

THESES

Every member of the Senior class is required to prepare a typewritten thesis which must be submitted for approval not later than April 10th. Theses must be handed in properly bound, together with original drawings, tracings, negatives and one set of clear blue prints therefrom, not later than May 1st.

The subject for the thesis will be the development, exploitation and equipment of a mining property or metallurgical plant. Considerable latitude is allowed in selecting conditions and location, subject, however, to the final approval of the professor in charge of the department.

The selection must be made and work must begin prior to the Christmas vacation. Students are expected to devote at least twelve hours a week to the preparation of their theses during the second semester.

Special Information

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 who received the degree of E. M. in four years, and vice versa, provided such a candidate completes an additional year's work at the school and presents a suitable thesis.

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 propose to enter.

FEES

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 (Qualitative)	Per semester	$5.00
Chemical laboratory (Quantitative	"	7.00
Mineralogical laboratory	"	3.00
Assaying laboratory	"	15.00
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 seventy-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 fifteen dollars.

A number of valuable catalogs and pamphlets are loaned members of the senior class in the study of power. A deposit of $3.00 shall be made with the Accountant by each member, to be refunded upon the return in good condition of all such matter.

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
	$95.00

SOPHOMORE YEAR

Incidental fee	$30.00
Chemical laboratory fee	14.00
Books	8.00
Note books and supplies	2.00
	$54.00

JUNIOR YEAR

Incidental fee	$30.00
Trip to the mines	$100.00 to 175.00
Books	20.00
Note books and supplies	2.00
	$152 to $227.00

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	30.00
Note book and supplies	2.00
	$93.00

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, and in 1905 an additional sum was provided for equipment.

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, 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 the 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. Board and lodging

2nd. 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 $80.00 to $100.00, 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 sum of $5,000 was placed in the hands of the Board of Regents as a scholarship fund. The income from this fund is loaned students in the School of Mines on the following conditions:

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

LIBRARY

The library consists of about two thousand 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. (*e*) **Ore dressing**—furnishing products for metallurgical treatment. (*e*) **Metallurgy**—smelting and refining 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 treated in the accompanying outline of the course.

Until the second semester 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 25th.

All field work must be taken at the time 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 at the mine.

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. Work begins August 13, 1907.

The students are divided into squads of two or four, and each is required to complete the following exercises and surveys:

1. Chaining
2. Compass reading
3. Adjustment of hand levels and practice in leveling
4. Adjustment and use of wye levels
5. Adjustment of mining transit
6. Reading angles
7. Traverse with steel tape
8. Azimuth traverse with stadia
9. Determination of meridian, latitude and time by solar and stellar observations
10. Survey of mining claim according to the regulations of the U. S. Government
11. Measurement of earthwork
12. Laying out railroad tangents, curves and crossings

Each squad must provide itself with a 6-foot steel tape, graduated to hundredths.

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 the junior year, and comprise the detailed study of ore dressing and concentrating machinery, together with the study of typical combinations of dressing macines 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 1)—4_2 hours, Assistant Professor Nicholson
Drawing (Drawing I)—4_2 hours, Professor Kirchner
Mathematics (Mathematics I)—5 hours, Mr. Comstock
Mineralogy (Geology and Mineralogy, Mineralogy I) 4_2 hours, Professor Hall and Mr. Grout

SECOND SEMESTER

Assaying (Metallurgy I)—4 hours, Professor Appleby
Assaying Laboratory (Metallurgy I)—4_2 hours, Professor Appleby, Assistant Professor Christianson and Assistant Professor Pease
Chemistry (Chemistry I)—4_2 hours, Assistant Professor Nicholson
Drawing (Drawing I)—2_2 and 2 hours, Professor Kirchner
Mathematics (Mathematics II)—5 hours, Mr. Comstock
Mineralogy (Geology and Mineralogy, Mineralogy II)—4_2 hours, Professor Hall and Mr. Grout

SOPHOMORE YEAR

FIRST SEMESTER

Chemistry (Chemistry III)—4_2 hours, Professor Sidener
Drawing (Drawing II)—4_2 hours, Professor Kirchner
Mathematics (Mathematics III)—5 hours, Professor Groat and Mr. Comstock
Metallurgy (Metallurgy III)—3 hours, Professor Appleby
Physics (Physics I)—4 hours, Professor Jones

SECOND SEMESTER.

Chemistry (Chemistry V)—4_2 hours, Professor Sidener
Drawing (Drawing III)—2_2 hours, Professor Kirchner
Mathematics (Mathematics IV)—5 hours, Professor Groat and Mr. Comstock
Metallurgy (Metallurgy IV)—3 hours, Professor Appleby
Mining (Mining I)—4 hours, Assistant Professor McCarty
Plane Surveying (Mining VII)—3 hours, Assistant Professor McCarty
Physics (Physics I)—4 hours, Professor Jones
Mine Surveying (Mining VIII)—4 weeks, Professor van Barneveld and Assistant Professor McCarty

JUNIOR YEAR

FIRST SEMESTER

Geology (Geology and Mineralogy, Geology I)—2 hours, Professor Hall
Mechanics (Mechanics I)—5 hours, Professor Groat
Mechanical Laboratory (Mechanical Engineering XXV)—2_2 hours, Mr. Shoop
Metallurgy (Metallurgy V)—4 hours, Professor Appleby
Mine Mapping (Mining X)—2_2 hours, Assistant Professor McCarty
Mining (Mining II)—5 hours, Professor van Barneveld
Rock Study (Geology and Mineralogy, Geology IX)—2_2 hours, Mr. Grout
Ore Dressing (Mining V)—4 hours, Assistant Professor McCarty

SECOND SEMESTER

Mechanics (Mechanics II)—5 hours, Professor Groat
Steam Laboratory (Mechanical Engineering XXVI)—2_2 hours, Mr. Shoop
Metallurgy (Metallurgy VI)—4 hours, Professor Appleby
Mine Surveying (Mining IX)—3 hours, Professor van Barneveld
Mining (Mining II)—5 hours, Professor van Barneveld
Petrography (Geology and Mineralogy, Geology X)—2_2 hours, Mr. Grout
Steam Engines (Mechanical Engineering XVIII)—2 hours, Professor Flather

FIELD WORK—MONTH OF MAY

Mining (Mining III) *Metallurgy* (Metallurgy VIII)	4 weeks	Professor van Barneveld Professor Appleby Assistant Professor Christianson Assistant Professor McCarty Assistant Professor Pease

SENIOR YEAR

FIRST SEMESTER

Chemistry (Chemistry XVI)—4_2 hours, Professor Frankforter

Electric Power (Electric Engineering V)—3_2 hours, Professor Springer

Geology (Ore Deposits—Geology and Mineralogy, Geology XII)—4 hours Professor Hall

Power (Power I)—5 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)—4_2 hours, Professor Appleby, Assistant Professor Christianson and Assistant Professor Pease

Thesis— 4 hours

SECOND SEMESTER

Chemistry (Chemistry XX)—4_2 hours, Dr. Frankforter

Designs and Specifications (Mining VI)—4_2 hours, Professor van Barneveld

Geology (Special Problems—Geology and Mineralogy, Geology XIV)—2 hours, Professor Hall

Mechanical Laboratory (Mechanical Engineering XXXI)—2_2 hours, Professor Kavanaugh

Mining and Mining Engineering (Mining IV)—5 hours, Professor van Barneveld

Prime Movers (Power II)—3 hours, Professor Groat

Thesis—4 hours

DEPARTMENT OF METALLURGY

This department is well supplied 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, assay furnaces, fuels, etc., in connection with this subject. The principles of assaying and sampling are fully explained. A collection of representative ores of various metals with a collection of corresponding slags are shown, and instruction is given as to nature and quantity of fluxes. Special and rapid methods of testing slags and metallurgical products as employed in western smelting works are emphasized.

The laboratory 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 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 the 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 12½ x12 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 trommels, 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) 4_2 hours, Assistant Professor Nicholson
Drawing (Drawing I) 4_2 hours, Professor Kirchner
Mathematics (Mathematics I) —5 hours, Mr. Comstock
Mineralogy (Geology and Mineralogy, Mineralogy I)—4_2 hours, Professor Hall and Mr. Grout

SECOND SEMESTER

Assaying (Metallurgy I)—4 hours, Professor Appleby
Assaying laboratory (Metallurgy I)—4_2 hours, Professor Appleby, Assistant Professor Christianson and Assistant Professor Pease
Chemistry (Chemistry II)—4_2 hours, Assistant Professor Nicholson
Drawing (Drawing I)—2_2 and 2 hours, Professor Kirchner
Mathematics (Mathematics II)—5 hours, Mr. Comstock
Mineralogy (Geology and Mineralogy, Mineralogy II)—2 hours, Professor Hall and Mr. Grout

SOPHOMORE YEAR

FIRST SEMESTER

Chemistry (Chemistry III)—4_2 hours, Professor Sidener
Drawing (Drawing II)—4_2 hours, Professor Kirchner
Mathematics (Mathematics III)—5 hours, Professor Groat and Mr. Comstock
Metallurgy (Metallurgy III)—3 hours, Professor Appleby
Physics (Physics I)—4 hours, Professor Jones

SECOND SEMESTER

Chemistry Chemistry V)—4_2 hours, Professor Sidener
Drawing (Drawing III)—2_2 hours, Professor Kirchner
Mathematics (Mathematics IV)—5 hours, Professor Groat and Mr. Comstock
Metallurgy (Metallurgy IV)—3 hours, Professor Appleby
Mining (Mining I)—4 hours, Assistant Professor McCarty
Plane Surveying (Mining VII)—3 hours, Assistant Professor McCarty
Physics (Physics I)—4 hours, Assistant Professor Jones
Mine Surveying (Mining VIII)—4 weeks, Professor van Barneveld and Assistant Professor McCarty

JUNIOR YEAR

FIRST SEMESTER

Geology (Geology and Mineralogy, Geology I)—2 hours, Professor Hall
Mechanics (Mechanics I)—5 hours, Professor Groat
Mechanical Laboratory (Mechanical Engineering XXV)—2_2 hours, Mr. Shoop
Metallurgy (Metallurgy V)—4 hours, Professor Appleby
Mine Mapping (Mining X)—2_2 hours, Assistant Professor McCarty
Mining (Mining II)—5 hours, Professor van Barneveld
Rock Study (Geology and Mineralogy, Geology IX)—2_2 hours, Mr. Grout
Ore Dressing (Mining VI)—4 hours, Assistant Professor McCarty

SECOND SEMESTER

Mechanics (Mechanics II)—5 hours, Professor Groat
Steam Laboratory (Mechanical Engineering XXVI)—2_2 hours, Mr. Shoop
Metallurgy (Metallurgy VI)—4 hours, Professor Appleby
Mine Surveying (Mining IX)—5 hours, Professor van Barneveld
Mining (Mining II)—5 hours, Professor van Barneveld
Petrography (Geology and Mineralogy, Geology X)—2 hours, Mr. Grout
Steam Engines (Mechanical Engineering XVIII)—2 hours, Professor Flather

FIELD WORK—MONTH OF MAY

Metallurgy (Metallurgy VIII) *Mining* (Mining III)	4 weeks	Professor van Barneveld Professor Appleby Assistant Professor Christianson Assistant Professor McCarty and Assistant Professor Pease

SENIOR YEAR

FIRST SEMESTER

Chemistry (Chemistry XVI)—4_2 hours, Professor Frankforter
Electrical Power (Electrical Engineering V)—3_2 hours, Professor Springer
Geology (Ore Deposits—Geology and Mineralogy, Geology XII)—4 hours Professor Hall
Power (Power I)—5 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)—4_2 hours, Professor Appleby, Assistant Professor Christianson and Assistant Professor Pease
Thesis—4 hours

SECOND SEMESTER

Chemistry (Chemistry XX)—4_2 hours, Assistant Professor Nicholson
Designs and Specifications (Mining VI)—4_2 hours, Professor van Barneveld
Electro-Chemistry (Chemistry XVII)—3_2 hours, Professor Frankforter
Electro-Metallurgy (Metallurgy VII)—3 hours Assistant Professor Christianson
Mechanical Laboratory (Mechanical Engineering XXXI)—2_2 hours, Professor Kavanaugh
Mining and Mining Engineering (Mining IV)—5 hours, Professor van Barneveld
Prime Movers (Power II)—3 hours, Professor Groat
Thesis—4 hours

Courses of Instruction

COURSES IN CHEMISTRY

Course I. General and qualitative analysis Freshman, first semester

Lectures and laboratory work. The course includes special general chemistry and the reactions of the metals as applied to their separation and identification.
Course I. Four times a week. 136 hours.

Course II. Qualitative analysis Freshman, second semester

Lectures and laboratory work. The work in this course will include examination of alloys, minerals, slags and other compounds. Open to those who have completed course I. Four times a week. 136 hours.

Course III. Quantitative analysis Sophomore, first semester

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. Four times a week. 136 hours.

Course V. Volumetric analysis Sophomore, second semester

Lectures and laboratory work. The course includes an introduction to volumetric determinations with a discussion of standard solutions and the necessary stoicheiometric calculations. Open to those who have completed course III. Four times a week. 136 hours.

Course XVI. Special problems Senior, first semester

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. Four time a week. 136 hours.

Course XVII. Electro-chemical analysis Senior, second semester

Lectures and laboratory work. The course includes the qualitative and quantitative separation of metals by electrolysis. Open to those who have completed course XVI. Three times a week. 102 hours.

Course XX. Iron and steel analysis Senior, second semester

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. Four times a week. 136 hours.

COURSES IN DRAWING

Course I. (a) *Freehand* Freshman, first semester

Lettering, geometric forms and engineering details in outline, including working sketches, translations and the elements of perspective. Twice a week. 68 hours.

(b) *Mechanical* Freshman, first and second semester

Conventional methods, lettering, machine and structural details and standard sizes and shapes. Four times a week. 136 hours.

(c) *Descriptive geometry—Applications* Freshman, second semester
Problems relating to points, lines, planes, solids, interpenetrations, surfacts of revolution, tangents and developments, including the constructive geometry involved. Recitations and lectures. Twice a week. 34 hours.

Course II. Descriptive geometry Sophomore, first semester
Orthographic, isometric, horizontal, topographic, oblique and perspective projections, shades and shadows, line shading and brush tinting. Sketches pertaining to mining and metallurgical plants. Open to students who have completed course I. Twice a week. 34 hours.

Course III. Working drawings Sophomore, first and second semester
Engineering details, assembly drawings, 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. Mining machinery. Four times a week. 68 hours.

COURSE IN ELECTRICAL ENGINEERING

Course V. Electric power Senior, 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. Three and six hours per week.

COURSES IN GEOLOGY AND MINERALOGY

MINERALOGY

Course I. General mineralogy Freshman, first semester
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; and introduction to the methods of quantitative blowpipe analysis; special topics; reference reading and discussions. Eight hours a week.

Course II. Physical mineralogy Freshman, second semester
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.

GEOLOGY

Course I. Physical geology Junior, first semester
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 IX. Elements of Rock Study. Junior, first semester
Structures, textures, mineral and chemical composition of rocks. A practical study of rock types, with laboratory and field practice. A study of their origin, occurrence, variation and alteration, with view to accurate discription. Introduction to the use of the microscope. Kemp's handbook of Rocks, and reference reading. Four hours a week.

Course X. Petrography Junior, second semester

The application of optical study of minerals to the description of crystaline rocks. Rock structures as seen with a microscope. Alternation of rocks. The stratigraphic relation of rocks, and an examination of some Minnesota groups of crystalline rocks. Preparation of material for microscopic study, Lu Quer, Minerals in Rock Sections, and reference readings; lectures and laboratory. Four hours a week.

Course XII. Ore Deposits Senior, first semester

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 XIV. Special Problems Senior, second semester

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 hours a week.

COURSES IN MATHEMATICS

Course I. Algebra and plane trigonometry Freshman, first semester

Rational integral functions, factors and roots of general quadratic, factor and remainder theorems, factors and values of $f(x)$, graphs, cube roots of unity progressions and notation development of $f(x)$ and undetermined co-efficients, 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 a week.

Course II. Algebra, analytic geometry and spherical trigonometry Freshman, second semester

Spherical formulae and solution of spherical triangles, permutations and combinations, determinants, systems of co-ordinates, loci, straight line, transformation, equations of the conics, limits, areas and limits of sums, differentiation and integration of elementary forms, probabilities. Five hours a week. Preparation, course I.

Course III. Analytic geometry and infinitesimal analysis Sophomore, first semester

Properties of the conics, equation of 2d degree, higher plane curves, co-ordinates 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 a week. Preparation, course II.

Course IV. Differential and integral calculus Sophomore, second semester

Applications continued, rational fractions, rationalization, formulae of reduction, multiple integration, various systems of co-ordinates, approximate integration, some differential equations of mechanics, least squares. Five hours a week. Preparation, course III.

COURSES IN MECHANICS

Course I. Statics and mechanics of materials Junior, first semester

Mathematical conditions of equilibrium, frames, theory of elasticity, design for beams, shafts, boiler plates, etc. Five hours a week. Preparation, mathematics IV, and physics.

Course II. Kinetics and hydraulics Junior, second semester
Motion of rigid bodies; numerous problems in work, power, energy, friction and hydraulics. Five hours per week. Preparation, course I.

COURSES IN POWER AND PRIME MOVERS

Course I. Senior, first semester
Estimation of power to be developed at a power site. Dams. Riparian rights. Number and type of units to install. Speed control. Power houses. Appendages. Transmission. Lectures and recitations. Five hours a week. Preparation, course II., Mechanics.

Course II. Senior, second semester
Properties of gases. Steam engine. Gas engine. Steam and gas turbines. Power plants. Pumping. Lectures and recitations. Three hours a week. Preparation, course II., Mechanics.

COURSES IN MECHANICAL ENGINEERING

Course XVIII. Steam engine Junior, second semester. 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 II, Mechanics. Two hours a week.

Course XXV. Strength of materials.. Junior, first semester. 72 hours
Laboratory work investigating the strength and physical qualities of iron, steel, brass, copper, belting, chains, beams, brick and stone. Preparation, course II, Mechanics. Four hours a week.

Course XXVI. Steam laboratory. Junior, second semester. 72 hours
Exercises in valve setting, indicator practice, calibratin of steam gauges, efficiency of screws and hoists. Preparation, course XVIII. Four hours a week.

Course XXXI. Mechanical laboratory Senior, second semester. 72 hours
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 XXVI. Four hours a week.

COURSES IN METALLURGY

Course I. Assaying Freshman, second semester
Determination of values of the ores. Lectures, recitations and laboratory work. Open to those who take course I. chemistry, and have completed course I. mineralogy.
Twelve hours a week.

Course II. Ore testing Senior, first semester
Determination of methods of ore treatment. Lectures and practical work. Open to those who have completed course I. and mining course V.
Ten hours a week

Course III. General metallurgy and metallurgy of iron
Sophomore, first semester
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.
Three hours a week.

Course IV. Metallurgy of wrought iron and steel Sophomore, second semester
Lectures and recitations. Open to those who have completed course III.
Three hours a week

Course V. Metallurgy of the precious metals Junior, first semester
Gold, silver and platinum. Lectures and recitations. Open to those who have completed course IV. Four hours a week.

Course VI. Metallurgy of the base metals Junior, second semester
Associated with precious metals, including lead, copper, etc. Lectures and recitations. Open to those who have completed course V. Four hours a week.

Course VII. Electro-metallurgy Senior, second semester
Lectures and recitations. Open to those who have completed course VI. Three hours a week.

Course VIII. Field work in metallurgy Junior, first semester
Conference and reports. Last four weeks of semester. Open to those who have completed course VI. Last four weeks of semester.

Course IX. Designs and specifications Senior, second semester
Supplementing thesis. Eight hours a week.

COURSES IN MINING

Course I. Explosives, blasting, air compressors and quarrying Sophomore, second semester
Four hours a week.

Course II. Mining Junior, first and second semesters
Mode of occurrence of ore bodies; prospecting, shaft-sinking, tunneling, drifting, stoping, timbering. Methods of metal mining. Methods of coal mining. Hydraulic mining. Open to those who have completed course I. Five hours a week.

Course III. Field Work Junior, second semester
Practice in mine surveying and field geology. Study of mining operations and mine equipment in a representative mining district selected by the department each year. Open to those who have completed courses I, II. Last four weeks of the semester.

Course IV. Mining and mining engineering Senior, first and second semester
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, first semester
Mechanical preparation of ore for the market, for metallurgical treatment, etc. Four hours a week.

Course VI. Designs and specifications Senior, second semester
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, second semester
Computation, platting, with special reference to mine surveying. Three times a week. Open to those who have completed Mathematics, courses I. and II.

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, second semester
Computations, methods, etc. Open to those who have taken courses VII. and VIII. Three times a week.

Course X. Mine mapping Junior, first semester
Four hours a week.

COURSE IN PHYSICS

Course I. General physics Sophomore, first and second semesters
Recitations and experimental lectures. Four hours a week.

THE SCHOOL of CHEMISTRY

School of Chemistry

OFFICERS

CYRUS NORTHROP, LL. D., *President*

OFFICERS OF THE DEPARTMENT OF CHEMISTRY

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CHARLES F. SIDENER, B. S., *Professor of Chemistry*
EDWARD E. NICHOLSON, M. A., *Assistant Professor of Chemistry*
EVERHART P. HARDING, Ph. D., *Assistant Professor of Chemistry*
IRA H. DERBY, B. A., *Assistant Professor of Chemistry*
LILIAN COHEN, M. A., *Instructor in Chemistry*
FRANCIS C. FRARY, M. S., *Instructor in Chemistry*
JOHN A. HANDY, Ph. C., *Instructor in Chemistry*
JAMES ZIMMERMAN, B. A., *Instructor in Chemistry*
WALTER BADGER, B. A., *Assistant in Chemistry*
GEORGE W. WALKER, B. S., *Assistant in Chemistry*
WILLIAM METHLEY, *Lecture Assistant*

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JOHN ZELENY, B. S., Ph. D., *Associate Professor of Physics*

OFFICERS OF THE DEPARTMENT OF DRAWING

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

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 28th, 1907, or for second semester's work after February 15th, 1908.

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. No conditions, however, in entrance mathematics shall be allowed except upon special recommendation of the Department of Mathematics.

III. Graduates of any Minnesota State high school will be admitted *without entrance examinations.*

(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 upon;* 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 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.

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.

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 September 9th, in School of Chemistry Building, room 25, *at* 9 *o'clock a. m.*

REQUIREMENTS FOR ADMISSION TO THE FRESHMAN CLASS

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 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:

Latin (four years).

Grammar, one year.

Cicero, six orations, one year.

Caesar, four books, one year.

Virgil, 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.
American Government, 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.
Commercial Geography, one-half or one year.

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 blank of the institution granting the certificate, and should show:

1. The subjects 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.

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.

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 of 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.

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. 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 School of Chemistry

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. The degree of Bachelor of Science in Chemistry is offered to those who complete the course in Analytical Chemistry and Bachelor of Science in Chemical Engineering to those who complete the course in Applied Chemistry.

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 seat comfortably 350 students. The qualitative laboratory, located on the second floor, is arranged with tables similar to those of the general laboratory and will accommodate 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. The second building which is one of the units in the Medical quadrangle contains three large laboratories with a combined floor space of 3,800 square feet. It is devoted largely to Organic Chemistry, Pharmaceutical Chemistry and Texicology.

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.

FIVE YEAR COURSE IN ARTS AND CHEMISTRY LEADING TO THE DEGREES BACHELOR OF ARTS AND BACHELOR OF SCIENCE IN CHEMISTRY

The degree bachelor of arts will be conferred upon any student who completes the work prescribed in the first four years of the following course, provided that 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 and Sociology.

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

The degree Bachelor of Science in Chemistry will be conferred upon the completion of the fifth year of the course.

Courses of Study

ANALYTICAL CHEMISTRY

FRESHMAN YEAR.

FIRST SEMESTER.

Mathematics [3]
Chemistry (qualitative) [3]
Mineralogy [3]
Drawing [3]
Rhetoric [3]
Military drill [3]
Gymnasium [1]

SECOND SEMESTER.

Mathematics [3]
Chemistry (qualitative) [3]
*Assaying [3]
Laboratory [4]
†Drawing [3]
Rhetoric [3]
Military drill [3]
Gymnasium [1]

SOPHOMORE YEAR.

Chemistry (quantitative) [5]
German, French or Spanish [3 or 5]
Botany [3]
Inorganic preparations [3]
Rhetorical work [1]
Military drill [3]

Chemistry (organic) [6]
Chemistry (quantitative) [2]
German, French or Spanish [3 or 5]
Botany [3]
Military drill [3]
Rhetorical work [1]

JUNIOR YEAR.

FIRST SEMESTER.

Physical chemistry [3]
Special problems [2]
Geology [3]
Physics [6]
*Metallurgy [3]

SECOND SEMESTER.

History of chemistry [2]
Theoretical chemistry [2]
Iron and steel analysis [3]
Physics [6]
*Metallurgy [3]
Mineral analysis [2]

SENIOR YEAR.

Chemistry of carbohydrates [2]
Gas analysis [2]
Colloquium [2]
*Metallurgy [4]
Water analysis [2]
Food analysis [3]
Crystallography [3]
Thesis

Photographic chemistry [2]
Industrial chemistry [2]
Colloquium [2]
Electro chemistry [2]
*Metallurgy [4]
Food adulterations [2]
Micro chemistry [2]
Thesis

APPLIED CHEMISTRY

FRESHMAN YEAR.

FIRST SEMESTER.

Chemistry (qualitative) [3]
Mathematics [3]
German, French or Spanish [3 or 5]
Drawing [4]
Shop work [4½]
Rhetoric [3]
Military drill [3]

Chemistry (qualitative) [3]
Mathematics [3]
German, French or Spanish [3 or 5]
Drawing [4]
Shop work [4½]
Rhetoric [3]
Military drill [3]

SOPHOMORE YEAR.

FIRST SEMESTER.

Chemistry (quantitative) [3]
Mathematics [5]
Physics [6]
Drawing [3]
Military drill [3]

Chemistry (quantitative) [3]
Mathematics [5]
Physics [6]
Drawing [2]
Military drill [3]

† Descriptive geometry optional.
* Optional upon approval of the Dean.

JUNIOR YEAR.

Mechanics [5]
Physics [3]
Mechanical laboratory [4]
Machine design [2]

Industrial electricity [3]
Chemistry (organic) [6]
Mechanics [5]
Dynamos and motors [3]

SENIOR YEAR.

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

Chemistry (industrial) [4]
Chemistry (applied) [4]
Metallurgy [3]
Political science [2]
Electives [4]
Thesis

Five Year Course in Arts and Chemistry

FIRST YEAR.

FIRST SEMESTER.

Mathematics [3]
Chemistry (qualitative) [3]
Mineralogy [3]
Drawing [3]
Rhetoric [3]
Drill [2]
Gymnasium [1]

Mathematics [3]
Chemistry (qualitative) [3]
Assaying [3]
Laboratory [4]
Drawing [3]
Rhetoric [3]
Drill [2]
Gymnasium [1]

SECOND YEAR.

Chemistry (organic) [3]
Chemistry (quantitative) [3]
German, French or Spanish [3 or 5]
Botany [3]
Botany [3]
Rhetorical work [1]

Chemistry (organic) [3]
Chemistry (quantitative) [3]
German, French or Spanish [3 or 5]
Botany [3]
Drill [3]
Rhetorical work [1]

THIRD YEAR.

FIRST SEMESTER.

Theoretical chemistry [3]
Physics [6]
Electives in College of Science, Literature and the Arts [8 or 9]

SECOND SEMESTER.

History of chemistry [3]
Physics [6]
Electives in College of Science, Literature and Arts [8 or 9]

FOURTH YEAR.

Physical chemistry [3]
Special problems [2]
Geology [2]
Metallurgy [3]
Electives in College of Science, Literature and Arts [8 or 9]

Iron and steel analysis [3]
Optical mineralogy [3]
Metallurgy [3]
Mineral analysis [2]
Electives in College of Science, Literature and Arts [8 or 9]

FIFTH YEAR.

Chemistry of carbohydrates [2]
Gas analysis [2]
Colloquium [2]
Metallurgy [4]
Water analysis [2]
Wine and beer analysis [2]
Crystallography [3]
Thesis

Photographic chemistry [2]
Industrial chemistry [2]
Colloquium [2]
Electro chemistry [2]
Metallurgy [4]
Food adulterations [2]
Micro chemistry [2]
Thesis

Courses in Chemistry

FOR UNDERGRADUATES.

I. General Chemistry [1:2_2] Freshman I, II. *Miss Cohen*
Recitations and laboratory work. The course includes a study of the chemical properties of the metallic and non-metallic elements, with a brief introduction to organic chemistry. No prerequisite.

II. Advanced general chemistry. [2:1_2] Freshman I, II.
Professor Frankforter, Miss Cohen and Assistants
The course includes besides descriptive and metallurgical chemistry, an introduction to physical and organic chemistry. Open to those who have had elementary chemistry.

III. Qualitative analysis. Freshman I, II. *Assistant Professor Nicholson*
Lectures and laboratory work. The course includes the general reactions of the metals and acids with their qualitative separation. Besides this mechanical work, the Ionic Theory and the Law of Mass Action are discussed with special reference to common qualitative reactions.

IV. Quantitative analysis. Sophomore I. *Professor Sidener*
Lectures and laboratory work. The course includes an introduction to quantitative and a beginning of gravimetric analysis.

V. Volumetric analysis. Sophomore II. *Professor Sidener*
Lectures and laboratory work. The course includes an introduction to volumetric analysis with a discussion of standard solutions and the necessary stœchiometric calculations.

VI. Organic chemistry. Junior II. *Professors Frankforter and Harding*
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 Preparate.

VII. Organic chemistry. Junior II. *Professors Frankforter and Harding*
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 Preparate.

VIII. Theoretical chemistry [2] Junior II. *Assistant Professor Derby*
Lectures and reading. This course includes a study of Lothar Meyer's Moderne Theorien der Chemie, Oswald's Grundriss der Allgemeinen Chemie and Remsen's Theoretical Chemistry.

IX. History of chemistry [2] Junior II. *Miss Cohen*
Lectures and reading. This course includes a full historical discussion of alchemy and chemistry.

X. Water analysis [2] Senior I. *Professor Frankforter*
Lectures and laboratory work. The course includes an exhaustive discussion of the chemical and sanitary properties of water.

XI. Gas analysis [2] Senior I. *Assistant Professor 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.

XII. The chemistry of carbohydrates [2] Senior I. *Assistant Professor Nicholson*
Lectures and laboratory work. The course includes a discussion of the carbohydrate group with the important methods of analysis.

XIII. Industrial chemistry. [2] Senior II. *Professor Sidener and Mr. Frary*
Laboratory work and reading. The course includes the analysis of various commercial products.

XIV. Food analysis. Senior. *Assistant Profesor Harding*
Lectures and laboratory work. The course includes the chemical analysis of the various food products.

XV. Special problems. Junior I. *Professor Sidener*
Laboratory work. The course includes the working out of various mineralogical, technological and metallurgical problems.

XVI. Photographic chemistry. Senior II. *Mr. Frary*
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.

XVI. Electro-chemistry Senior II. *Mr. Frary*
Lectures and laboratory work. The course includes the qualitative and quantitative separations of the metals by electrolysis.

XVIII. Micro-chemical analysis. Senior II. *Assistant Professor Harding*
Lectures and laboratory work. The course includes the methods for the determination of minute quantities of substance by means of the microscope.

XIX. Food adulterations Senior II. *Assistant Professor Harding*
An examination of the common food products for adulterants.

XX. Iron and steel analysis Junior II. *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.

XXI. Mineral analysis [2] Junior II. *Professor Sidener*
The course includes the analysis of building stones and some of the most important minerals.

XXII. Inorganic preparations [2] Sophomore I. *Assistant Professor Harding*
The preparation of inorganic salts, supplemented by Bender's Anorganische Preparatkunde.

XXIII. Colloquium [2] Senior 1. *Miss Cohen*
A thorough quiz in inorganic chemistry.

XXIV. Colloquium Senior II. *Professor Frankforter*
A thorough quiz in general organic chemistry.

XXV. Special problems [2] Junior I. *Professor Sidener*
This course includes work on ores of base metals, limestones, slags, etc.

XXVI. Physical chemistry Junior I. *Assistant Professor Derby*
Lectures and laboratory work. The laboratory work will include that laid down by Jones and Walker with such references as Nernst and Ostwald.

XXVII. Teachers' course [2] Senior II. *Professor Frankforter*
The course is offered to those who are interested in the teaching of chemistry. No regular laboratory work will be offered, but certain experiments illustrating the difference between good and poor work may be given. Open to those who have taken course I, II and III.

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

I. Elements of Mineralogy [3] I. *Professor Hall and Mr. Grout*

(a) The morphology of minerals; the physical and chemical characters of minerals, with demonstrations; a study of the native elements and of economic minerals; the basis of classifications.

(b) Laboratory work; this 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.

IV. Optical mineralogy [3] Junior or senior II. *Mr. Grout*

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.

V. The Morphology of Minerals [3] Junior or senior *I. Mr. Grout*

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.

VI. Physico-chemical Methods with their Applications [3] Senior II. *Mr. Grout*

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.

GEOLOGY

I. General Geology [3] Junior and 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, wherein stratification, displacement and veining of rock masses are described; (3) Physiographic Geology, pointing out prominent earth features and inquiring into the causes producing them; (4) an outline of Historical Geology. Lectures and conferences illustrated by photographs, maps, profiles, and lantern slides.

X. Elements of Rock Study [3] Junior or senior II. *Mr. Grout*

The structures, textures and mineral and chemical composition of rocks. A practical study of rock types with laboratory and field practice. The origin, occurrence, variation and alteration of rocks are considered with a view to their accurate description. An introduction to the use of the microscope concludes the course.

Kemp's Handbook of Rocks, reference reading and practice. Requisite, course I or equivalent.

XI. Petrography [3] Junior or senior *II. Mr. Grout*

The identification of rocks through the optical study of the component minerals; rock structure as seen under the microscope; alterations of rocks, and stratigraphic relations are studied. Preparation of material for study, its collection in the field and an examination of some group of Minnesota crystalline rocks are features of the course.

Laboratory, lectures, reference reading and field work. Requisite, course IX.

BOTANY

I. General Botany *I, II.* *Professor Clements and Assistant Professor Tilden*

Open to all.

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.

II. General Plant Morphology [3] *I, II.* *Assistant Professor Rosendahl and Mr. Huff*

Open to all students who have completed course I.

A view of mossworts, ferns and flowering plants is given, with lectures, laboratory work and collateral reading throughout the year.

MECHANICAL ENGINEERING

SHOP WORK

COURSE 1. CARPENTRY AND PATTERN WORK.

Freshman I. 162 *hours.* *Mr. Tate*

Wood working, use of tools; lathe and bench work. Patterns for moulding, core boxes. Lectures and practice.

COURSE 2. FOUNDRY PRACTICE AND PATTERN MAKING.

Freshman II. 162 *hours.* *Mr. Peterson*

Patterns and flasks. Moulding, casting, mixing metals, brass work and core making. Shop practice, recitations and lectures.

COURSE 11. MACHINE DESIGN.

Junior I and II. 216 *hours.* *Professor Flather and Mr. Martenis*

Calculation and design of such machine parts as fastenings, bearings, rotating pieces, belt and tooth gearing. Recitations, lectures and drawing-room practice. Open only to students pursuing course E., M. 1.

COURSE 25. STRENGTH OF MATERIALS.

Junior I. 72 *hours.* *Assistant Professor Kavanaugh and Mr. Shoop*

Laboratory work investigating the strength and physical qualities of iron, steel, brass, copper, belting, chains, beams.. Open only to students pursuing course 1 E., M.

COURSE 26. STEAM LABORATORY.

Junior II. 72 hours. *Assistant Professor Kavanaugh and Mr. Shoop*

Exercises in valve setting, indicator practice, calibration of steam gages, calorimetry, efficiency of screws and hoists. Open only to students pursuing course 18 M. E.

COURSE 18. STEAM ENGINE.

Junior II. 54 *hours.* *Professor Flather*

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 1, E., M.

COURSES IN METALLURGY

Course I. Assaying Freshman, second semester
Determination of values of the ores. Lectures, recitations and laboratory work. Open to those who take course I chemistry, and have completed course I mineralogy. Twelve hours a week.

Course III. General metallurgy and metallurgy of iron Sophomore, first semester
Including the subjects of combustion, fuels, refractory material and furnaces. Lectures and recitations on metallurgy or iron. Open to those who have completed course I. Three hours a week.

Course IV. Metallurgy of wrought iron and steel. Sophomore, second semester
Lectures and recitations. Open to those who have completed course III. Three hours a week.

Course V. Metallurgy of the precious metals Junior, first semester
Gold, silver and platinum. Lectures and recitations. Open to those who have completed course IV. Four hours a week.

Course VI. Metallurgy of the base metals Junior, second semester
Associated with precious metals, including lead, copper, etc. Lectures and recitations. Open to those who have completed course V. Four hours a week.

GERMAN LANGUAGE AND LITERATURE

I. Beginning [5] *I, II. Professor Schlenker, Assistant Professors Wilkin and Juergensen, Mr. Schroedel, and Mr. Williams*
Open to all who do not present German for entrance. Pronunciation, grammar, conversation and composition; selected reading in easy prose and verse.
To follow this course students may take course II or course III, and course V as a supplementary course to either.

III. Scientific Intermediate [3] *I, II. Assistant Professor Juergensen*
Open to students who have completed course I. First semester—Hodge's German Science Reader (or equivalent). Second semester—Brandt and Day's German Scientific Reading. This course aims to give the student a reading knowledge of German for use in scientific studies.
This course may be supplemented by course V. To follow this course students may elect course VII or course VI, but must not elect course IV.

IV. Classic Prose and Poetry [3] *I, II. Professor Moore, Assistant Professor Wilkin, Mr. Schroedel and Mr. Williams*
Open to students who have presented German for entrance. Not open to students who have credit for course II or course III. First semester—Meissner's Aus deutschen Landen; Goethe's Gedichte. Second semester—Schrakamp's Berühmte Deutsche, Heine's Buch der Lieder. Review of German grammar throughout the year. This course may be supplemented by course V.

VII. Advanced Scientific Reading. [3] *I, II. Mr. Juergensen*
Open to students who have taken course III or course IV. Reading of monographs and periodicals.

MATHEMATICS

III. Second Part Higher Algebra [3] Freshman and Sophomore I. *Professor Bauer, Dr. Manchester, Mr. Shumway*
Open to those having a credit in course I. Variation, quadratic equations, special higher equations, simultaneous equations of the second degree, maxima and minima of algebraic functions, differentation of algebraic functions, development of functions, logarithms, theory of equations and solution of numerical higher equations.

IV. Trigonometry [3] Freshman and Sophomore I.
Professor Bauer, Dr. Manchester. Mr. Shumway
Open to those having credits in courses I, II, and III. Text, tables, and numerous applications.

V. Analytical Geometry [3] Sophomore I. *Professor Downey, Dr. Manchester*
Open to those who have completed courses I, II, III and IV.
The conic sections, both by rectilinear and polar co-ordinates, producing equations of loci whose law of development is known, constructing and discussing such equations, transformation of co-ordinates, properties of loci by means of their equations.

VI. Differential Calculus [3] Sophomore II. *Professor Downey, Dr. Manchester*
Open to those who have completed courses I to V, inclusive.
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.

PHYSICS

I. Mechanics (Heat, Sound) [6] *I. Professor Jones and Assistants*
Experimental lectures, recitations and laboratory work.
Open to sophomores who have completed Algebra and Trigonometry of courses III and IV.

II. Light, Electricity and Magnetism [6] *Professor Jones and Assistants*
Experimental lectures, recitations and laboratory work.
Open to those who have completed course I.

III. Electric Measurements [3] *I. Assistant Professor Zeleny*
Lectures and laboratory work.
Open to those who have completed course II.

IV. Physical Manipulations [3] *II. Professor J. Zeleny*
Open to those who have completed courses I and II.

DRAWING

COURSE 1. (*a*) FREEHAND.

Freshman I. [2] 72 hours. *Mr. Rose and Assistants*
Lettering, geometric forms and engineering details in outline, including working sketches, translations and the elements of perspective.

(*b*) MECHANICAL.

Freshman I [2] *II* [3] 180 *hours* *Mr. Rose and Assistants*
Conventional methods, lettering, machine and structural details, and standard sizes and shapes.

(*c*) DESCRIPTIVE GEOMETRY.

Freshman II [2] 36 hours. *Professor Kirchner and Assistants*
Problems relating to points, lines, planes, solids, interpenetrations, surfaces of revolution, tangents and developments, including the constructive geometry involved. Recitations and lectures.

COURSE 2. DESCRIPTIVE GEOMETRY.

Sophomore I [2] 72 hours. *Professor Kirchner and Assistants*
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.
(c) Mining.

ELECTRICAL ENGINEERING

COURSE 1. APPLIED ELECTRICITY.

Junior I. 48 hours. *Professor Shepardson and Asst. Professor Springer*
Outline of industrial uses of electricity; units; application of Ohm's law; methods and calculation of wiring; electrical instruments and measurements. Text book: Shepardson, Electrical Catechism. Preparation: course 1 P.

COURSE 2. DYNAMOS AND MOTORS.

Junior II. 72 *hours.* *Assistant Professor Springer*
Theory of electro-magnet and direct current dynamo and motor; methods of regulation, construction and operation of dynamos and motors; methods of testing. Preparation: course 1. E. E. courses 1 and 2 P. and courses 5 and 6 M.

POLITICS

VI. Introduction to Political Science [2] *I. Professor Schaper*
Intended primarily for seniors in the college of engineering.

IX. Transportation [2] *II. Professor Gray*
The evolution of transportation in the United States, and of railroads in particular. Economic aspects, public policy and finance of railroading. Open to seniors in the College of Engineering.

SOCIOLOGY

I. Descriptive Sociology [3] *I. Professor Jenks*
Open to juniors and seniors.
This is a preliminary course designed as the first work of students in the Sociology department. It presents concrete data concerning human association, showing groups of peoples living in the four grades of culture called savagery, barbarism, civilization, and enlightenment; and it discovers the activities and institutions natural and peculiar to these cultures. Text book, lectures, assigned readings, and thesis.

II. Elements of Sociology [3] *II. Professor Jenks*
Open to juniors and seniors.
This course is designed to give a general knowledge of the field of modern sociology, the attempt being to prepare students for such special sociological investigations as they may wish to make. Text book, lectures, assigned readings and thesis.

III. Social Pathology [3] *I. Professor Smith*
Open to juniors and seniors.
Dealing with problems of poverty, crime, insanity, social degeneration, and a discussion of the child problem and methods of social amelioration.

IV. Social Theory. [3] *I. Professor Smith*
Open to juniors and seniors who have had courses I or II.
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.

V. Social Groups [3] *I. Professor Smith*
Open to juniors and seniors who have completed course I.
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 of and reason for the modern city.

VI. The Study of Institutions [3] *I. Professor Smith*

Open to juniors and seniors who have completed course I.

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

VII. Anthropology [3] *I. Professor Jenks*

Open to juniors and seniors.

This is an elementary course studying the essential characteristics of mankind, and the general features of the several races of men. It also investigates the origin and development of the series of activities and various institutions which have had their beginnings in primitive society. Text books, lectures, assigned readings and thesis.

THE COLLEGE of EDUCATION

The College of Education

FACULTY

CYRUS NORTHROP, LL. D., *President.*

GEORGE F. JAMES, Ph. D., *Dean and Professor of Education.*

A. W. RANKIN, B. A., *Professor of Education.*

FLETCHER HARPER SWIFT, Ph. D., *Assistant Professor of Education.*

JOHN F. DOWNEY, M. A., C. E., *Professor of Mathematics.*

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.*

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.*

WILLIS M. WEST, M. A., *Professor of History.*

J. J. FLATHER, Ph. B., M. M. E., *Professor of Mechanical Engineering*

GEORGE P. FRANKFORTER, Ph. D., *Professor of Chemistry.*

FRANCIS P. LEAVENWORTH, M. A., *Professor of Astronomy.*

JOSEPH BROWN PIKE, M. A., *Professor of Latin.*

SAMUEL G. SMITH, Ph. D., LL. D., *Professor of Sociology.*

NORMAN WILDE, Ph. D., *Professor of Philosophy and Psychology.*

JOHN HENRY GRAY, Ph. D., *Professor of Political Science.*

WILLIAM A. SCHAPER, Ph. D., *Professor of Political Science.*

FREDERIC E. CLEMENTS, Ph. D., *Professor of Botany.*

EDWARD VAN DYKE ROBINSON, Ph. D., *Professor of Economics.*

FRANCES S. POTTER, M. A., *Professor of English.*

LOUIS J. COOKE, M. D., *Director of Gymnasium.*

JAMES BURT MINER, Ph. D., *Assistant Professor of Psychology*

CARLYLE M. SCOTT, *Assistant Professor of Music.*

D. D. MAYNE, *Principal of the School of Agriculture.*

INSTRUCTORS

MARGARET BLAIR, *Domestic Art.*

ANNA M. BUTNER, *Physical Culture.*

HENRIETTA CLOPATH, *Drawing.*

CHARLES M. HOLT, *Education.*

....., *Machine Work.*

JUNIATA SHEPPERD, *Domestic Science.*

....., *Sloyd and Woodwork.*

THE COLLEGE OF EDUCATION

The College of Education was authorized by a special enactment of the Legislature of Minnesota in 1905, and was established by the Regents of the University in the following year.

It offers both a practical and a theoretical training for prospective high school teachers and principals, for principals of elementary schools, for supervisors of special studies, and for superintendents of school systems.

The work of the college is not as yet fully organized, and this bulletin contains the announcement of the courses definitely arranged for the coming year, with some indication of the opportunities, which it is hoped will be afforded within a short time.

ADMISSION

Entrance examinations are held only at the beginning of the college year. Students prevented from entering at that time may be admitted later if the circumstances justify this action. Such students are however at a great disadvantage and all students expecting to enter the college 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. Before filling out the blanks obtained from him, applicants are advised to consult with the Dean of the College of Education in regard to their work.

CONDITIONS OF ADMISSION

Students who have completed with credit at least two full years of college work will be admitted to the College of Education. During these two years they should have pursued one or more of the subjects which they expect to teach and in addition at least one course in general psychology. Students in the College of Science, Literature and the Arts of the University of Minnesota, who plan to enter the College of Education are advised to consult with the Dean in regard to their course of study as early as the first semester of the sophomore year.

ADMISSION TO ADVANCED STANDING

I. *From other colleges.*

This college accepts records from all colleges of equal rank for credit to advanced standing. All candidates for graduation must however meet the conditions established by this college as indicated in a succeeding paragraph.

II. *From Minnesota Normal Schools.*

Graduates of the "advanced graduate course" of a Minnesota State

Normal School, who have received one year's credit in the College of Science, Literature and the Arts, and who have completed, in addition, a full year of the work required of these graduates by that college, will be admitted to the College of Education, but will not be permitted to elect either Course V, or Course VII in education. Individual graduates of either of the five-year courses of a Minnesota State Normal School will be admitted under the same regulations.

UNCLASSED STUDENTS

Applicants who present satisfactory reasons for not taking the regular course may be admitted as unclassed students upon proof of fitness to profit by the work. The same general attainments are expected of these students as are required of those who enter the regular course. Unclassed students must take the same number of hours as regular students, except that men and women actually engaged in teaching may be allowed to enter certain classes as hearers.

EXAMINATIONS

At the close of each semester examinations are held and students are reported as "excellent," "good", "conditioned", "passed", "incomplete", 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.

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. Save in the case of the first registration, the

incidental fee is increased by twenty-five cents for each day's delay in registration beginning with the first day set for recitations. The usual fees for shop work are required of students in manual training.

COURSE OF STUDY

The College of Education offers a two-year course of study leading to the degree of Bachelor of Arts *in Education*. The preparation for teaching, which is afforded in these two years, in addition to two years of previous collegiate study, is planned to include first of all a thorough grounding in the correct use of English, both spoken and written. No student should plan to go into this work without adequate training of this kind no matter what subjects he himself plans to teach and no one will be graduated from the College of Education who has not attained a satisfactory standard in this particular.

A second element in the preparation of the future teacher is found in the courses in general and educational psychology, in the history and the organization of schools, in educational theory, and in the practice of teaching. Courses in psychology and in the history of education must be pursued by all students and additional courses are elective in the theory and the practice of elementary and of secondary teaching, in the history of secondary education, in school organization and law, and in school hygiene.

A third year of study leads to the degree of Master of Arts. The work the specific subjects which he proposes to teach. In this particular the standard in Minnesota schools is constantly rising and year by year school trustees are asking of all high school teachers more definite and adequate preparation in the subjects assigned them. This preparation is not possible unless the prospective teacher selects his subjects early in the college course and effects also a desirable and natural combination. When this is done the work required for a bachelor's degree may be arranged to give both a liberal and a special training.

A third year of study leads to the degree of Master of Arts. The work of this year includes advanced studies in education and in philosophy, and in one or more of the subjects of the secondary curriculum at the option of the candidate. The course is planned especially for those holding the degree of Bachelor of Arts who desire to prepare themselves more carefully either for high school teaching or for work as principals and superintendents. Young men and young women who propose to take up this work permanently will find it advisable to do graduate study either immediately upon receiving the bachelor's degree or after a period of practical experience in teaching.

THE DEGREE OF BACHELOR OF ARTS IN EDUCATION

The degree of Bachelor of Arts *in Education* is granted to candidates on the following conditions:

A. The completion of college courses amounting to one hundred and twenty-six (126) credits, in addition to the required exercises in drill, gymnasium and physical culture. The courses selected must be approved by the committee in charge.

A credit is one hour per week through one semester.

B. At least fifteen (15) credits shall be secured in Education, including courses I and II.

C. An amount of work shall be taken in at least three departments concerned with the studies of the secondary curriculum sufficient to secure one major and two minor recommendations. Each minor recommendation will require not less than twelve (12) credits and each major not less than eighteen (18) credits in one department.

D. Each candidate for graduation must show an average of scholarship through four years of college work indicated by at least as many marks of "good" as of "pass."

OBSERVATION AND PRACTICE TEACHING

The critical observation of good teaching and the practice of teaching under skilled supervision is a most important part of the preparation of a teacher. In connection with two courses on the practice of elementary and of secondary teaching, opportunity has been given during the past year to students of this college to observe and to report upon and to discuss the best methods of teaching employed in the public schools of Minneapolis, St. Paul and adjacent towns. For the coming year a plan has been formulated and provisionally approved for the establishment of a practice school in connection with the college, which shall give opportunity not only for more observation work, but also for some amount of practice teaching by the students of the college. A fuller statement of this plan will be issued later in the year.

COMMERCIAL TRAINING

The rapid increase in the number of schools which are offering commercial courses, and the greater recognition now accorded to the graduates of these courses in admission to the State University, serve to emphasize the need of well trained commercial teachers.

No adequate opportunity has been given in Minnesota or indeed in most sections of the United States for preparation of this kind.

The College of Education is not in a position at present to afford the desirable facilities in full, but the attention of prospective teachers is called to the increasing demand in this direction and to the value of

courses, which are now offered in the various faculties of the University in industrial, commercial, and financial history and theory, in physical and industrial geography, and in other cognate courses.

A student, who begins now his preparation for high school teaching, may lay an adequate foundation in these courses for work of this kind, and an opportunity for a more technical preparation will be afforded later.

MANUAL TRAINING

The increasing demand for high school teachers, who are able in addition to the handling of two or three of the ordinary high school studies, to direct the manual training work of the elementary schools, draws attention to the facilities of this kind, which exist at the University. For the present no provision is made for a special certificate in this kind of work, nor is any credit allowed for these courses toward the degree of Bachelor of Arts *in Education*.

Young men and women, however, who desire to prepare themselves for manual training work may register without credit for courses of this kind. In connection with the shopwork of the College of Engineering, opportunities are offered future manual training teachers both in woodwork and in iron-work. With these, students will find it advisable to take courses in descriptive geometry, and in mechanical drawing, and in this way they may secure a fairly satisfactory preparation for the teaching of these branches in connection with some of the regular high school studies.

DOMESTIC ART AND DOMESTIC SCIENCE

These subjects are being added each year to the school course in an increasing number of Minnesota towns. So far superintendents and boards of education have experienced considerable difficulty in securing teachers in these lines. The larger towns and cities can engage trained teachers and supervisors, but in the smaller communities on the first introduction of these subjects, it is necessary to entrust them to teachers able to give instruction in some high school studies.

A good opportunity, therefore, lies before prospective teachers, who in addition to a preparation in the ordinary studies of the high school course will prepare for the direction of these subjects. Students, who are interested in this line of work, will be directed early in their college course in the selection of foundation work in geography, chemistry, physics and other related subjects, and will thus be prepared to elect during the last year or two the more technical instruction in domestic art and domestic science, which may be taken, although not with academic credit, in the College of Agriculture.

NON-RESIDENT WORK

The College of Education desires to open its opportunities, as far as possible, to all the secondary teachers, principals and superintendents of Minnesota.

Outlines of work have been prepared in various lines of professional study as a guide to individual students during the school year and these courses may be continued by resident work at the University during the summer. Upon approval by the committee in charge under the direction of the faculty some of this work will be accepted for undergraduate credit and some of it toward graduate degrees in the case of properly qualified and registered students. Arrangements will be made for a examination in this work at half-yearly intervals. Students of marked ability may be able to complete a considerable part of the requirements, respectively, for the degree of Bachelor of Arts and for the degree of Doctor of Philosophy.

LIBRARY FACILITIES

The professional library of the college contains a large selection of work on the various phases of education and is at the service not only of the students of the college, but of visiting teachers. During the coming year a text-book collection will be added covering the field of secondary schools. As soon as possible this illustrative library will be supplemented by model equipment of other kinds, thus offering concrete suggestions on questions of school furnishing and supplies.

Under certain restrictions the use of part of the professional library will presently be made possible for non-resident students.

THE DEGREE OF MASTER OF ARTS

Graduates of the University of Minnesota and of other institutions of equal rank will be admitted to work leading after one year of study to the degree of Master of Arts, upon the usual conditions attaching to that degree. They will be expected, however, to have given considerable attention in their collegiate work to psychology, and to the history, the theory and to the practice of teaching.

Men and women actually engaged in teaching in Minnesota and possessing the bachelor's degree from a college of good rank will be allowed to pursue graduate studies *in absentia*. For non-resident students a special course is arranged with education as the major subject. Two years are required and three or more are allowed for the completion of this work.

THE UNIVERSITY TEACHERS' CERTIFICATE

The University Teachers' Certificate is granted to all graduates of the College of Education and to those graduates of the College of Science,

Literature and the Arts, who complete one course in general psychology and three courses in education, including courses I and II, and who secure one major recommendation as qualified for teaching from a department of that college, concerned with some branch of the secondary curriculum.

SPECIAL LECTURES

In addition to the courses announced for the College of Education, special lectures will be given from time to time, open to all students, by men closely identified with public education in Minnesota. Educational organization, ideals and methods, will be treated from the point of view of those concerned with the state department of public instruction, the inspection of state graded and high schools, the state normal schools, city schools systems, and with the conduct of schools in smaller communities.

Public lectures will be given also by men familiar with the educational conditions, experiments, and tendencies in other states.

THE EDUCATIONAL CLUB

This organization is made up of those giving instruction in the College of Education and of students registered for advanced work. Meetings are held from time to time during the college year for the discussion of current questions in education and for reports and discussions upon recent educational literature, books, magazines and journals.

COURSES OF INSTRUCTION.

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

Fuller descriptions of some of the courses offered may be found in Bulletins of College of Science, Literature and the Arts, the College of Engineering, the School of Chemistry and the College of Agriculture.

EDUCATION.

I. History of Education to the Reformation [3] *I. Assistant Professor Swift*

Open to juniors and seniors.

An introductory study in the history of education conducted by lectures, assigned readings, discussions and reports. The purpose of the course is to arouse an interest in educational problems, to secure some perspective for use in current investigation, with some command of the facts of educational history, and some ease in the methods of historical study. An attempt is made to bring out education as one phase of civilization and to show the connection of schools with other social institutions. Attention will be given especially to an examination of the schools of Greece and of Rome, the education of the early Christian centuries, the development of the different types of schools in Medieval times, the rise of the university and of the humanistic schools of the Renaissance.

II. History of Modern Education [3] *II. Assistant Professor Swift*

Open to juniors and seniors who have taken course I in Education.

A somewhat intensive study of the periods in the history of modern education, with special reference to the development of the various national systems of public instruction. Different types

of educational theory are considered in connection with a study of the men who first advanced them, and of the schools in which they were first put into effect. This course is a direct preparation for an understanding of the educational systems, theories, and practices of the present.

III. Educational Psychology [3] *I* or *II. Assistant Professor Miner*
Open to sophomores, juniors and seniors who have had course I in Philosophy.
The study of mental development in its relation to heredity and training. Lectures and student reports on the facts and theories of childhood and adolescence with special reference to their bearing on education.
This course is announced also as course II in Philosophy.

IV. Secondary Education [3] *I. Professor James*
Open to juniors and seniors who have had courses I and II in Education.
A study of secondary education in the United States, with such references to the secondary schools of other countries as will lead to a clearer understanding of the place and function of the high school, its curriculum, the problems of present-day importance, and the relation of the high school to other parts of the system of public instruction. The course will be conducted by lectures, reports and discussions.

V. Practice of Elementary Teaching [3] *I. Professor Rankin*
Open to juniors and seniors who have had course I in Philosophy.
This course includes a consideration of the course of study of the elementary school and of the best methods of instruction. It is conducted by means of lectures, assigned readings, discussions and reports, accompanied by either observation or practice in the elementary schools under the direction of the instructor. It is planned for all students who expect to teach in the high schools or to be principals or superintendents. No credit is given in this course to graduates of Normal Schools, who have received one year's credit at the University.

VI. Practice of Secondary Teaching [3] *II. Professor Rankin*
Open to juniors and seniors who have had course IV in Education.
This course includes lectures on the general methods of secondary teaching, assigned readings, reports and discussions, with either observation or practice of secondary teaching under the charge of the instructor. It is planned more particularly for those who expect to teach in high schools.

VII. The Theory of Education [3] *I. Professor James*
Open to juniors and seniors who have course I in Philosophy.
An introductory course in educational theory, including a somewhat detailed study of the principles on which is based the present practice in teaching. No credit is given in this course to graduates of Normal Schools who have received one year's credit at the University.

VIII. School Administration [3] *I. Professor Rankin*
Open to juniors and seniors.
An introductory study of school administration, conducted by lectures, reports and discussions; the organization of school systems—the work of school boards, superintendents, principals and teachers—school buildings and hygiene. This course is planned for students without any teaching experience, who hope later to do work in supervision.

IX. School Supervision [3] *II. Professor Rankin*
Open to seniors.
An advanced course treating of the duties of school principals and superintendents, intended primarily for students with experience in teaching. (Credit will not be given for course VIII and for course IX.)

X. Comparative Study of School Systems [3] *II. Professor James*
Open to seniors who have completed courses I and II in Education.
This course deals with the school systems of Germany, France, England and the United States, with special reference to principles and methods of administration. Elementary, secondary and higher institutions are examined with emphasis varying in successive years. The course is conducted partly by lectures and partly by assigned readings, reports and discussions.

XI. Modern Educational Theories [3] *II. Professor James*
Open to seniors who have had course I in Philosophy and courses I and II in Education.
An advanced course in educational theory, dealing particularly with the contributions of Rousseau, Froebel and Herbart, special emphasis being laid upon one of these writers in each successive year.

XII. Current Problems in Elementary Teaching [2] *I. Professor Rankin*
Open to seniors and graduates who have had course V in Education.
This is a seminar course, involving a general discussion of some current problems in elementary education, one or two of which are worked out practically by the student under the direction of the instructor, through readings, the visiting of schools and through class discussions.

XIII. Educational Classics [2] *I. Professor James*
Open to seniors who have completed courses I and II in Education.
A seminar course for the reading of selected educational classics and for the detailed study of corresponding periods in educational history.

XIV. Current Problems in Secondary Teaching [2] *II. Profesor Rankin*
Open to seniors and to graduate students who have completed course VI in Education.
This is a seminar course for advanced students, preferably with teaching experience, who wish to pursue a theoretical and a practical study of some current problem in connection with secondary teaching. The course will be conducted by lectures, class discussion, readings and by the visiting of schools.

XV. Problems in School Administration [2] *II. Professor James*
Open to seniors and to graduate students who have completed courses I and II in Education.
A research course for advanced students, preferably with teaching experience, who desire to take up the investigation of some question of educational administration. The course will be conducted by lectures, class discussions, assigned readings, and, when possible, by a study of actual school conditions, falling within the proposed field.

XVI. School Hygiene [1] *I. Professor Rankin*
Open to seniors and to graduate students.
This course will be conducted by text and by lectures with the cooperation of men from various other faculties of the University.

AGRICULTURE.

I. Elements of Agriculture. *I. Principal Mayne*
This course is planned to meet the increasing demand for a knowledge of the elements, at least, of agriculture on the part of graded school principals, rural school teachers, county superintendents of schools and others concerned with education in the agricultural sections of the state. The course is given at the School of Agriculture, on Tuesday and Saturday afternoons.

II. Elements of Agriculture (continued).
II. Principal Mayne and Assistants
This is a continuation of course I and is planned to give the

student some familiarity with the underlying principles and the simple processes connected with various forms of agricultural work. Tuesday and Saturday afternoons. Mr. Mayne will have the co-operation of others connected with this branch of the University. Students who are interested are advised to read the Bulletin of the School of Agriculture and to note the various opportunities which are there afforded, for all of these will be made available to some extent in connection with these courses.

ANIMAL BIOLOGY.

Preliminary—I. General Zoology [3]
I, II. Professor Sigerfoos, Assistant Professor Oestlund and Assistants
Textbooks, quizzes, lectures and laboratory work.
This course at least should be taken in the first or second college year by all who expect to teach the subject.

II. Advanced Zoology [3]
I, II, Professor Sigerfoos and Assistant Professor Oestlund
Those who wish a "major" credit in zoology should take this course during the sophomore year.

III. Histology [3] *I, II. Professor Nachtrieb and Mr. Downey*

IV. Comparative Anatomy of Vertebrates [3]
I, II. Mr. Brown
Course III or IV may also be taken during the second college year, to be followed in the College of Education by one or more of the courses hereafter named.

VII. Embryology of Vertebrates. *I, II. Professor Nachtrieb*

VIII. Embryology of Invertebrates [3] *I, II. Profesor Sigerfoos*

IX. Physiology [3] *I. Professor Sigerfoos*

XII. Teachers' Course [1] *I. Professor Nachtrieb*
This course consists of one lecture and discussion each week during the first semester on the ends to be attained through courses in general zoology and the methods and means by which such ends may be gained.
Additional courses in Animal Biology announced in the Bulletin of the College of Science, Literature and the Arts will be accepted also for credit in the College of Education.

ASTRONOMY.

I. General Astronomy [3] *I, II. Professor Leavenworth*
Open to those who have completed Trigonometry.

II. Practical Astronomy [3 or 6] *I, II. Professor Leavenworth*

BOTANY.

Preliminary—I. General Botany [3] *I, II. Professor Clements and Assistant Professor Tilden*

II. General Plant Morphology
I, II. Assistant Professor Rosendahl and Mr. Huff
Course I, or Courses I and II, may be taken during the freshman and sophomore years by those who expect to teach Botany, to be followed in the College of Education by the courses mentioned hereafter.

III. Plant Physiology [3] *II. Professor Clements*

V. Taxonomy [3] *I, II. Assistant Professor Rosendahl*

VI. Cytology [3] *I, II. Assistant Professor Lyon*

XII. Teachers' Course. *II. Professor Clements*

This course consists of one lecture and one discussion a week during the second semester, on the objects to be secured through the high school teaching of Botany and on the methods of presentation.

Additional courses in Botany announced in the Bulletin of the College of Science, Literature and the Arts will be accepted also for credit in the College of Education.

CHEMISTRY.

Preliminary—I (a) *General Chemistry* [3] *I, II. Miss Cohen*
(b) *Advanced General Chemistry.* *I, II. Professor Frankforter*

II. Qualitative Analysis [3] *I. Assistant Professor Nicholson*
III. Identification of Acids [3] *II. Assistant Professor Nicholson*

During the first two college years I (a) or I (b) should be taken by all who expect to teach Chemistry and those who desire a "major" credit should take also courses II and III. The following courses are suggested for students in the College of Education.

IV. Quantitative Analysis (gravimetric) [3] *I. Professor Sidener*

V. Quantitative Analysis (volumetric) [3] *II. Professor Sidener*

VI. Organic Chemistry [3] *I, II. Professor Frankforter*

VII. Teachers' Course [1] *II. Professor Frankforter*

This course is arranged especially for the students in the College of Education. The course will be largely didactic with experimental work necessary to a thorough understanding of the new methods and theories. For technical courses, see catalogue of the School of Chemistry.

DRAWING.

Preliminary—Students who expect to teach Drawing should take in the first two college years, courses I, II, and III, as announced in the Bulletin of the College of Science, Literature and the Arts. In the College of Education selection may be made from the following:

IV. Historical Design [3] *I, II. Miss Clopath*

V. The Teaching of Drawing [1] *I. Miss Clopath*

This course is conducted by lectures and collateral reading on the methods and educational value of drawing, as revealed through a study of the instincts and mental processes of the child.

VI. Drawing as Related to Education [3] *II. Miss Clopath*

Exercises in all the different kinds of art work used in the schools. Advanced work in black and white and in color.

DOMESTIC SCIENCE AND DOMESTIC ART.

These courses cover specifically the science and the art of the home. In the reactionary movement, away from the theoretical, and toward the practical in education, the need of teachers of scientific and artistic home-making has become marked. To meet this demand the following courses have been organized:

DOMESTIC ART.

Domestic art has to do with the very beginning of home-making, the selection of a site, the adaptation of architecture to the needs of the family, the choice of materials, colors, etc., and their relation to the surroundings, the

interior of the home, its furniture and keeping. All of these topics are viewed in both their economic and their social aspect. In addition a full course is offered in needle-work in all its branches.

I. A Study in Textiles. *I. Mrs. Blair*
Animal and vegetable fibres, weaves and dyes, testing fabrics for household use and personal wear, the hygienic values of various fabrics, harmony of color. This course is designed especially to assist the teaching of sewing in graded schools, and includes the preparation, explanation and making of models suited to grade work in the public schools. This course will be given upon Monday and Thursday afternoons, at the School of Agriculture.

II. Design and Garment Drafting. *II. Mrs. Blair*
This course is in the design and drafting of children's and adults' garments and includes also a series of lectures upon the home. This course will be given upon Monday and Thursday afternoons at the School of Agriculture.

DOMESTIC SCIENCE.

Domestic science has to do with the chemistry of the table, the science of cooking, and the housewifely care of the kitchen and dining-room; household accounts, and the administration of the home upon an economical basis, are discussed in their various relations in these courses and the effort is toward system, economy and effectiveness in home management. Students who look forward to teaching are trained to assist in the teaching or supervision of this work in city schools or to have the entire charge of the work, in connection with other teaching, in the smaller high schools.

I. Laundering and Food Economics. *I. Miss Shepperd*
In this course the subject of domestic and commercial laundering and cleaning is first considered, with a study of removing stains, dyeing, setting colors, cleaning delicate fabrics, the use of cleaning agents, starches and bluing. By far the larger part of the semester is given to a study of food economics, with a consideration of all phases of the selection of food materials and the preparation of food. The course is conducted by means of lectures, readings, with the writing of a thesis and by full individual practical experience in all parts of the work.
The course is given on Wednesday and Friday afternoons at the School of Agriculture.

II. Management of Kitchen and Dining Room. *II. Miss Shepperd*
(a) The kitchen, equipment, sanitation, labor saving devices, etc.
(b) The dining room, equipment, furniture, decorations, management, etc.
(c) Household inventories, bills of fare, fancy cookery, etc.
The above course is made, as far as possible, both practical and scientific. It requires three hours of work on each of two afternoons. Students who are interested in this line are advised to read a fuller description, which will be found in the Bulletin of the School of Agriculture.

ECONOMICS.

I. Elements of Economics [3] *I* or *II. Professor McVey*
A thorough course in the elements of economics. The aim is to inculcate accepted doctrine, and show the nature and bearing of economic theory on present day problems. Given in each semester. Open to sophomores.
Text book, problems, lectures and discussions.

II. Economic Geography [2] *I. Professor McVey*
Open to sophomores.
A course in geographical influences on commerce and trade together with a presentation of the growth of industry and a consideration of the development of commercial centers. Text book, lectures and special papers. Alternates with course IV.

III. Money and Banking [3] *II. Professor McVey*
A course open to students who have had course I.
Students desiring but one year's work in economics are advised to take this course following the work in elements of economics. If a longer course is desired, advanced economics should follow course III. This is an elementary course illustrated by constant reference to monetary legislation. Text books, lectures, papers and discussions.

IV. Modern Industrial Legislation [3] *II. Professor McVey*
A general course open to sophomores and upper classmen.
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. Not given 1907-8.

VIII. Advanced Economics [3] *I. Professor McVey*
In this advanced course further consideration is given to selected topics from the course in elementary economics. Carver's Distribution of Wealth and Fisher's Capital and Income are used as texts, supplemented by readings and problems. Lectures, papers and discussions.

XII. Methods of Investigation [1] *II. Professor McVey and Mr. Gerould*
Open to juniors and seniors who have had course I.
A course in methods of using libraries, collecting and organizing material, followed by the actual investigation of important questions.

For other courses in Economics, see the Bulletin of the College of Science, Literature and the Arts.

ENGLISH LANGUAGE AND LITERATURE.

The following courses, in addition to course VI in Rhetoric, are required of all who expect a recommendation for the teaching of English:

III. Early English [3] *I, II. Professor Klaeber*
VI. Chaucer [3] *I. Miss Peck, Mr. Firkins*
VII. Spenser [3] *II. Miss Peck, Mr. Firkins*
XII. Milton [3] *I. Professor Potter*
XIII. Shakspere]3] *II. Professor Potter*
XVI. Teachers' Course in English [1] *I, II. Professor Potter*

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

FRENCH.

Preliminary—I. French, beginning [5]
Mr. Frelin, Madame Bertin, Mr. Melom
II. French, second year's work [3]
I, II. Mr. Frelin and Madame Bertin
IV. Conversation [2] *Mr. Frelin and Madame Bertin*
The three courses above should be taken in the first two college years by students who begin work here. The following two courses are for those who entered with two years of French.
III. Advanced Grammar and Composition [3]
I, II. Mr. Frelin
VI. Advanced Conversation [3]
Professor Benton and Mr. Frelin

V. Classical French Writers [3] *I, II. Professor Benton*
This course is conducted by lectures and conversations, with some reading of modern authors, for the purpose of comparison.

VII. Nineteenth Century Literature [3] *I, II. Professor Benton*
This course is conducted by lectures in French.
Courses V, VI and VII are required for a "major" credit, in addition to the elementary courses, and courses I, II and IV, or III and IV, for a "minor" credit.

GEOLOGY.

I. General Geology [3] *I. Professor Hall*

II. The Essentials of Physical Geography [3] *I. Professor Hall*
A discussion of the principles of earth structure and description of the structural features of continents, with special reference to the earth's movements and the commercial activities of mankind.

III. Industrial Geography [3] *II. Professor Hall*
(a) Influence of the physical structure of North America upon its resources and development.
(b) The industrial development of the countries of North America, and its relation to geographical conditions and environment.
(c) A study of industries, products and the growth of industrial countries. With excursions.
Open to those who have taken course I or II.

IV. Geography and Geology of Minnesota. *II. Professor Hall*
(a) A review of the salient features of the geography of the state, embracing its climate, surface features, rivers, and lakes, with industrial conditions under development.
(b) An historical survey of the facts and principles of pre-Cambrian geology as exemplified in the geological features of the Lake Superior region and of Northern and Eastern Minnesota.
(c) A discussion of the geology and mineral resources of the state, particularly with reference to its deposits of clay, building stones and ores.
Open to all who have taken course I.

Students who desire either a "major" or a "minor" credit in Geology should confer with the head of the department. Other courses in Geology and courses in Mineralogy are announced in the Bulletin of the College of Science, Literature and the Arts.

GERMAN LANGUAGE AND LITERATURE.

The introductory courses in German are announced in the Bulletin of the College of Science, Literature and the Arts.

VIII. Advanced Conversation, Grammar and Composition [2]
I, II. Professor Schlenker and Assistant Professor Wilkin
Essays on assigned subjects; letter writing; oral exercises in German by means of discussions on every day subjects; debates, narration and the like. This course is intended as a preparation for course XVI and is open to students who have taken or are taking course VI. It is recommended that students shall have taken course V.

IX. German Literature of the Classic Period [3] *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 or VII.

X. Modern Authors, German Literature of the Nineteenth Century [3]
I, II. Professor Moore
First semester.—Romantic school and Junge Deutschland.
Second semester.—German literature since 1848.

XVI. Teachers' Course [1] *II. Professor Moore*
This course is especially designed for students who intend to become teachers in the high schools.
A "minor" in German is given to students who complete courses VIII and IX; a "major" to those who complete, in addition, courses X and XVI.

GREEK.

In addition to the preliminary courses, students who expect to teach Greek in the high school should take at least the following:

IV. Oratory [3] *I. Assistant Professor Savage*

V. Philosophy. Plato [3] *II. Assistant Professor Savage*

VII. Poetry, Tragedy, Aeschylus or Sophocles [3] *II. Professor Brooks*

X. Poetry, Epic (advanced course) [3] *II. Professor Hutchinson*

XIV. Greek Composition, (advanced course) [1]
I, II. Professor Hutchinson
All of the above courses are expected of candidates for teaching although in exceptional cases one or two might be omitted. A list of additional courses in Greek will be found in the Bulletin of the College of Science, Literature and the Arts.

HISTORY.

Preliminary—II. English Constitutional History, to the Accession of Geo. I.
I, II. Assistant Professor White and Miss Judson
V. Constitutional History of the United States to 1840.
I, II. Professor West
As to courses in history for the College of Education, students are urged to consult early with the head of the department as to the best choice among the various sequences offered. Students who desire a "major" credit should take at least four year-courses, one of which must be an intensive course, (see list below) and students who desire a "minor" credit should take at least three year-courses, in addition to the "Teachers' Course." The following are intensive courses:

VII. The Making of the Constitution of the United States [3]
I, II. Professor West

VIII. American History since 1789 [3] *Professor West*

IX. Studies in American Biography [3] *I. Professor Anderson*

X. A Critical Study of Historical Masterpieces [3] *II. Professor Anderson*

XI. The History of American Diplomacy [3] *I. Professor Anderson*

XII. The History of European Diplomacy since 1789 [3]
II. Professor Anderson

XIII. Colonial Expansion and Administration [3] *II. Professor West*

XIV. A Critical Study of Authorities of early New England History [2]
I, II. Professor West

XV. Historical Method and Bibliography [2] *II. Assistant Professor White*

XXII. Greek Political Institutions [3] *II. Assistant Professor Westermann*

XVI. A "Teachers' Course" [1] *II. Professor West*
Designed for those who intend to teach history in the high schools. Other courses in History are announced in the Bulletin of the College of Science, Literature and the Arts.

LATIN.

Students who expect to teach Latin are required to take courses I, II, III and IV, during the first two college years.

V. Ovid [1] *I* and *II. Professor Clark*
Open to students who are taking courses III and IV. Translations of Ovid's Fasti, with a study of the religion and religious ceremonials of the Romans.

VI. Teachers' Course in Latin [1] *I. Professor Pike*
Open to students having completed course I-IV. Explanation of indirect discourse; teachers' drill upon portions of Book I, Caesar's Gallic war; discussion of various problems connected with the teaching of Latin in the high schools.

VII. Advanced Course in Caesar [2] *I. Professor Pike*
Open to students having completed course I-IV. Selections from Books V-VII of Gallic war, and from civil war. Latin composition. Students are advised to take courses VI and VII together.

VIII. Advanced Course in Virgil [3] *II. Professor Pike*
Open to those having completed courses I-IV. Interpretation of selections from books VII-XII of Virgil's Aeneid. Students who desire a recommendation in Latin toward a teacher's certificate, must take courses V, VI and VII.

IX. Advanced Latin Composition [2] *II. Professor Pike*

XIII. Correspondence of Cicero [2] *I. Professor Clark*
Additional courses in Latin are announced in the Bulletin of the College of Science, Literature and the Arts.

MANUAL TRAINING.

These courses have been established for the benefit of teachers and others who desire to obtain instruction in the various lines of manual training.

For the work in Sloyd and manual training in woodwork, a carefully graded series of models has been chosen and will be taken up systematically. In the selection of these exercises the utilitarian idea has been prominent, and the construction of the models illustrates primarily fundamental principles and processes rather than mere exercises.

The aim of the course is to teach the proper use of the various tools and appliances. While facility of execution is gained by the use of the tools, the main object is to prepare the teacher for carrying out similar lines of work in his own school.

A course is also offered in ironwork in order to meet the requirements of those who wish to fit themselves to teach this subject, and also to provide instruction for teachers desiring to broaden their knowledge of the subject or to perfect themselves along special lines.

For those who choose to pursue any of the special lines of work indicated in the schedule, the course will be extended beyond the scope of the work given to the class, in so far as the qualifications of the student and the equipment will permit.

MANUAL TRAINING IN WOODWORK.

I. Carpentry. *I.*
Wood working tools; a systematic course in the use of the saw, plane, gauge, paring chisel and kindred tools.

II. Sloyd. *II.*
Training in the use of carving tools in Sloyd, geometrical and chip carving.

III. Wood Turning . *I.*
Exercises in lathe work; use of gouge, chisel and other turning tools. Chuck work, ornamental turning.

IV. Pattern-making. *II.*
Construction of patterns, core prints, core boxes. Lectures and practice. Preparation required courses I, and III.

MANUAL TRAINING IN IRONWORK.

V. Bench and Lathe Work. *I.*
This embraces practice in wrought and cast iron with the hammer, chisel and file at the vise; also training in the use of file and scraper on wearing surfaces. Practice on the engine lathe, in connection with which are taught the elementary features of boring, turning and screw cutting. Lectures and practice.

VI. Machine Construction. *II.*
Construction of machine parts, use of planer, shaper, drill press and milling machines, gear cutting. Lectures and practice. Preparation required, course IV.
Each course in Manual Training calls for four double periods each week.
A description of the equipment and fees for this work will be found in the Bulletin of the College of Engineering.

MATHEMATICS.

Preliminary—III. Second Part Higher Algebra [3]
I. Professor Bauer, Dr. Manchester, Dr. Dunkel and Mr. Shumway

IV. Trigonometry [3] *II. Professor Bauer, Dr. Manchester, Dr. Dunkel and Mr. Shumway*

V. Analytical Geometry [3]
I. Professor Downey, Dr. Manchester

VI. Differential Calculus [3]
II. Professor Downey, Dr. Manchester

The above courses should be taken in the first two college years by those who desire a "major" credit in mathematics. In addition they should take the following:

VII. Integral Calculus [3] *I. Professor Downey*

XII. Mathematical Pedagogy [1] *II. Professor Bauer*
Students who desire a "major" credit will do well to elect also course X in the Theory of Equations. Students who desire a "minor" credit in Mathematics will take courses III, IV, and XII. Other courses in Mathematics will be found announced in the Bulletin of the College of Science, Literature and the Arts.

MUSIC.

I. Theory of Music-Harmony (thorough bass) [2]
I, II. Assistant Professor Scott

II. Advanced Musical Theory-Counterpoint [2]
I, II. Professor Oberhoffer or Assistant Professor Scott

III. Musical Form [2] *II. Assistant Professor Scott*
A full description of the above course, with a statement of fees, will be found in the Bulletin of the College of Science, Literature and the Arts.

V. Teachers' Course. (elementary) [1] *I, II. Assistant Professor Scott*
This is an elementary course open to all students possessing a fair voice and a good ear and is given as a partial preparation for teaching music in the public schools. It includes the fundamentals of music and will aid students in their preparation to teach music in the advanced grammar grades and in the high schools. Especial attention will be given to chorus direction. One hour each week is given to this work and the course is planned to continue through three semesters, two in elementary music and the third a semester of harmony such as is announced in course I. The fee for this work will be four dollars for each semester; three credits for the complete course.

PHILOSOPHY AND PSYCHOLOGY.

All students who expect to teach are advised to take the course in Introductory Psychology during the second college year. The course in Educational Psychology, announced also under the head of Education, is commended to all future teachers. In addition attention is called to the following courses:

V. Outline of Experimental Psychology. *II. Assistant Professor Miner*

III. Experimental Psychology—the Senses [3] *I. Assistant Professor Miner*

IV. Experimental Psychology—Higher Mental Processes [3] *II. Assistant Professor Miner*

VI. Psychological Interpretations [3] *I. Assistant Professor Miner*

All of the above courses have direct bearing upon the problems of education. The attention of future teachers is directed also to the courses in Logic, Ethics and the History of Philosophy, a full description of which will be found in the Bulletin of the College of Science, Literature and the Arts.

PHYSICS.

Preliminary—I. Mechanics. Properties of Matter, Heat, Sound [6] *I. Professor Jones and Assistants*

II. Light, Electricity and Magnetism [6] *II. Professor Jones and Assistants*

The above courses are required of all students who expect a "minor" credit in physics.

III. Electrical Measurements. *I. Assistant Professor A. Zeleny*

VI. Advanced Laboratory Work. *I. Professor J. Zeleny*

XVII. Teachers' Course [1] *II. Professor Jones*
The above courses also are required of students who want a "major" credit in physics. Additional courses in this department will be found in the Bulletin of the College of Science, Literature and the Arts.

PHYSICAL CULTURE.

FOR WOMEN.

Miss Butner and Miss Matson

Preliminary—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. 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 disease. This occasions attitudes and movements that are unseemly in appearance and unhealthful in their general effect.

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

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

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

Teachers' Course. *I, II. Miss Butner*

Students who expect to teach should have additional work in physical culture, even if they are not called upon to give special instruction in this line. "A Teachers' Course" is accordingly offered by Miss Butner to continue through two semesters, three times a week. This course is open to all students who have had two years of gymnasium work, and carries with it three credits, or one and one-half credits, for each of the two semesters. It will be conducted by means of lectures, readings and practice drills, bearing especially upon the calisthenic and gymnasium work of the elementary schools and the gymnasium work and games of the secondary schools.

FOR MEN.

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.

Teachers' Course. *I, II. Dr. Cooke*

This course is designed to meet the demand for teachers trained in accordance with methods pursued at the University.

Elementary Physiology:—Lectures on circulation, respiration, digestion, assimilation, excretion, nerve impulses, etc.

Personal Hygiene:—Lectures on diet, exercise, bathing, sleep, clothing, etc.

Applied Anatomy:—Lectures and demonstrations on the action of muscles and the best methods of developing them.

First aid to the injured:—Lectures and demonstrations.

Physical examinations and prescriptions of exercise:—Demonstrations and practice in taking physical measurements and strength tests, and the application of special exercises for special parts of the body.

Testing for normal vision and hearing.

FLOOR WORK.

Free movements:—Exercises without apparatus for accelerating the circulation, stretching the muscles, and correct carriage of the body.
Calisthenics:—Exercises with dumb-bells, Indian clubs, wands, bar-bells.
Apparatus work:—Class drills, buck, horse, parallel bars, horizontal bars—high and low, flying rings, mat work.
Exercises for the prevention and treatment of common deformities of school children.
Class evolutions and gymnastic games.
Suggestions on conducting a Gymnastic Exhibition.

ATHLETICS.

Track and field events, both indoor and outdoor.
Suggestions on conducting an Athletic meet.

This course is given on Monday, Wednesday, and Friday, through two semesters, open to those who have completed all required gymnasium work, and students who successfully complete it, will receive three credits, one and one-half for each semester. An increasing demand for men competent to direct athletics in state high schools in connection with other teaching, makes this course of interest to young men who expect to teach.

POLITICS.

I. Elements of American Government. *I or II. Professor Schaper*
An elementary course on American Government intended as a preparation for an advanced course in Politics, and for teaching in secondary schools.

II. Comparative Government. *I. Professor Schaper*
Open to all students who have taken course I.

VII. Municipal Administration. *I. Professor Schaper*
A comparative study in modern city charters and the methods of administration.

VIII. Theory of the State. II. *Professor Schaper*
Open to students who have taken course I.
For a "minor" credit students should take courses I and II, for a "major" all of the above named courses. A fuller description of these courses, with an announcement of additional work in Politics, will be found in the Bulletin of the College of Science, Literature and the Arts.

RHETORIC AND ELOCUTION.

RHETORIC.

Preliminary—I. Rhetoric. *I, II*
This course should be taken in the first college year, or for it should be substituted, with the approval of the department, course II.
II. Rhetoric. *I, II. Assistant Professor Comstock*
This course is open to sophomores of whom at entrance Rhetoric was not required.

III. Literary Criticism. *I, II. Professor Sanford*

IV. Lectures upon the History of Art. *II. Professor Sanford*

VI. Advanced Rhetoric. *I, II. Assistant Professor Comstock*

ELOCUTION.

Preliminary—VII. Reading. *I, II. Professor Sanford*

VIII. The Physical Side of Vocal Expression. *I. Assistant Professor McDermott*

IX. The Psychological Side of Vocal Expression. *II. Assistant Professor McDermott*

XII. American Oratory. *I. Assistant Professor McDermott*

Students who desire a credit in Rhetoric should take courses III and IV. The attention of students expecting to teach English is directed, especially in the case of young men, to the courses in debate and oratory. A fuller description of these will be found in the Bulletin of the College of Science, Literature and the Arts.

SOCIOLOGY.

Students who expect to teach will find some of these courses valuable in leading to a comprehension of the sociological phase of educational theory and organization and in supplementing their studies in general and educational psychology.

I. Descriptive Sociology [3] *I. Professor Jenks*

II. Elements of Sociology [3] *II. Professor Jenks*

III. Social Pathology [3] *I. Professor Smith*

IV. Social Theory [3] *I. Professor Smith*

V. Social Groups [3] *I. Professor Smith*

VI. The Study of Institutions [3] *I. Professor Smith*

VII. Anthropology [3] *I. Professor Jenks*

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

THE GRADUATE SCHOOL

The Graduate School

FACULTY

CYRUS NORTHROP, LL.D., *President* — 519 Tenth Avenue S. E.

HENRY T. EDDY, C.E., Ph.D., — 916 Sixth Street, S. E.
Dean of the Graduate School, and Professor of Mathematics and Mechanics, College of Engineering and the Mechanic Arts.

FRANK MALOY ANDERSON, M.A., — 1629 University Avenue, S. E.
Professor of History.

GEORGE N. BAUER, Ph.D., — Minneapolis
Professor of Mathematics.

CHARLES W. BENTON, M.A., Litt.D., — 516 Ninth Avenue S. E.
Professor of the French Language and Literature.

ANDREW BOSS, — St. Anthony Park
Professor of Agriculture and Animal Husbandry.

JABEZ BROOKS, D.D., — 1708 Laurel Avenue
Senior Professor of the Greek Language and Literature.

RICHARD BURTON, Ph.D., — The Plaza
Professor of 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.

F. R. CLEMENTS, Ph.D., — Minneapolis
Professor of Botany.

FRANK H. CONSTANT, C.E., — 1803 University Avenue S. E.
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SAMUEL N. DEINARD, M.A., — Minneapolis
Assistant Professor of the Semitic Languages and Literatures.

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Dean of the College of Science, Literature and the Arts, and Professor of Mathematics.

HENRY A. ERICKSON, B.E.E., — Minneapolis
Assistant Professor of Physics.

OSCAR W. FIRKINS, M. A., — 1528 4th Street S. E.
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JOHN E. GRANRUD, Ph.D., 605 Delaware Street S. E.
Assistant Professor of Latin.

J. H. GRAY, Ph.D., Minneapolis
Professor of Public Finance.

T. L. HAECKER, St. Anthony Park
Professor of Dairy Husbandry.

SAMUEL B. GREEN, B.S., St. Anthony Park
Professor of Horticulture and Forestry, and Horticulturist of the Experiment Station.

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Assistant Professor of Mechanical Engineering.

WILLIAM H. KIRCHNER, B.S., 618 Tenth Avenue S. E.
Assistant Professor of Drawing.

FREDERICK KLAEBER, Ph.D., 616 Ninth Avenue S. E.
Professor of Comparative and English Philology.

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HAROLD LYON, Ph.D., Minneapolis
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WILLIAM A. SCHAPER, Ph.D., 1009 University Avenue S. E.
Professor of Political Science.

CARL SCHLENKER, B.A., 312 Union Street S. E.
Professor of German.

GEORGE D. SHEPARDSON, A.M., M.E., Minneapolis
Professor of Electrical Engineering.

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NORMAN WILDE, Ph.D., 910 Sixth Street S. E.
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JOHN ZELENY, Ph.D., Minneapolis
Associate Professor of Physics.

The Graduate School

The graduate school has been established by the Board of Regents to include in a single organization the graduate work of all colleges and schools of the University, which offer courses of instruction leading to the higher degrees. The administration of the school is entrusted to the Dean, who is charged with its supervision and regulation, under the general direction of the President.

The faculty of the school consists of all those professors in the University who give courses of instruction accepted for such higher degrees as are offered by the school. Each college of the University has its graduate committee.

The Dean is chairman of the faculty and of the graduate committees of the various colleges, *ex officio*.

Regular faculty meetings will be held on the second Friday of each semester and on the last Friday of the year, and they may also be called by the Dean at such other times as business may demand.

The aim of the school is to offer instruction and opportunity for study combined with facilities for investigation and research to graduate students who desire to pursue some one or more branches of knowledge beyond the ordinary undergraduate courses.

FEES

All students taking full work in this school are required to pay a fee of ten dollars a semester, or a proportionate fee for less work. Members of the staff of instruction in the University may register for graduate work without payment of tuition fees. Laboratory fees are charged in addition to those just mentioned.

ADMISSION

Any graduate from a four years' course of study in any reputable college or university will be admitted to the graduate school without examination, but will not be thereby admitted to candidacy for either of the higher degrees until his case has been duly considered and approved, as is explained later, in connection with the several degrees.

Each applicant for admission to the school should present himself in person to the Registrar with his credentials (preferably his diploma of graduation), in order to register and pay his fees.

In case of doubt respecting the sufficiency of credentials, consult the Dean.

Registration at the beginning of each semester is obligatory upon graduate students and undergraduates alike.

Each student will receive at registration for entrance to the school a registration book in which to inscribe the courses he desires to pursue. When the instructors in charge of these courses shall have signed this book certifying that the student is prepared to begin such courses and when the Dean shall have approved this choice, the Registrar will issue cards authorizing the student to attend the courses thus certified to. Upon the successful completion of such work the instructors shall again sign the registration book. The student shall retain his book until ready for final examination, when he shall present it to the chairman of the examining committee. The action of the committee shall be recorded thereon and the book be deposited with the Registrar for record.

DEGREES

The degree of Master of Arts is, in general, conferred for advanced non-technical study; the degree of Master of Science for advanced technical study, such as agriculture, industrial chemistry, engineering, etc.; and Master of Laws for advanced legal studies.

The Master's Degree. Three degrees of this grade are conferred, viz.: Master of Arts (M.A.), Master of Science (M.S.), and Master of Laws (LL.M.).

Candidacy for the Master's Degree. Any bachelor, a graduate of this University or of any other university or college with an equivalent baccalaureate course, will be enrolled by the Dean as a candidate for the corresponding master's degree on the basis of an approved course of study conforming to requirements detailed below, provided the heads of the departments in which the studies selected lie, signify their approval of the student's preparation to enter upon the work selected.

In case of inadequate preparation for the work selected, such preliminary study as the case may require will be stated by the professor in charge and will be insisted on before the applicant is admitted to candidacy.

REGULATIONS

The master's degree will be conferred on any candidate enrolled for that degree, who not sooner than one year after graduation if in residence at the University, and not sooner than two years after registration if not in residence, shall pass satisfactory final examinations on the course which was approved when he was admitted to candidacy, and shall in addition present an acceptable thesis in accordance with the following provisions:

The professor with whom the candidate pursues his major subject shall be chairman of a committee of three, having in charge the work of the candidate from the time of his enrollment as such, the other members of the committee being those professors under whom the candidate's minors fall. This committee shall arrange for and have charge of the final ex-

aminations of the candidate; they shall approve the subject of the thesis, and pass upon the thesis itself. The candidate must secure their approval of his subject at least three months before graduation, and must complete the thesis and all examinations at least two weeks before graduation. All candidates for the master's degree shall pass written examinations upon all work taken by them, time and place to be determined by the committee. If these examinations and the thesis are satisfactory, the candidate shall be admitted to a final oral examination before the committee. It shall be the duty of this committee to canvass the examinations of the candidate's whole course together with the thesis, and in case they regard him entitled to a degree, to report the fact to the Dean, at least one week before commencement. The chairman of the committee shall also make a final report upon the candidate to the Registrar one week before commencement.

Any candidate for master's degree at commencement must, as a preliminary, make application to the Dean in writing, by the first of the preceding May, and state the courses in which he has passed and is to pass examination, the title of his thesis, and the names of the committee in charge of his work.

The amount of work required for the master's degree shall be equivalent to that done by the senior class. Proficiency shall be determined by examination upon the subject matter of the courses taken and of the thesis.

For convenience in selecting among the various departments and subjects of study they are arranged in groups, as follows:

1. Education, Philosophy, Psychology, Sociology.
2. Economics, History, Law, Political Science.
3. Greek, Latin, Sanscrit, and Semitic languages and literatures.
4. Comparative Philology, English, Germanic, Romance, and Scandinavian languages and literatures.
5. Anatomy, Animal Biology, Bacteriology, Botany, Embryology, Histology, Paleontology, Physiology.
6. Agriculture, Chemistry, Geology, Mineralogy.
7. Astronomy, Engineering, Mathematics, Mechanics, Physics.

Candidates desiring a master's degree in some special line of study, for the purpose of teaching or research, or as a basis for studies leading to the doctor's degree, must select three subjects of study, a major to occupy at least one-half of the work required, a first minor to occupy one fourth, which shall be germane to the major subject by being selected from the same group or a closely related group, and a second minor to complete the work required, which last shall be in some reasonable connection with the other subjects selected. In special cases the candidate may be allowed to fill the required time with a major and one minor only. The thesis in this case must embody the results of study and investigation along the line of the major subject. In attaining this specialized master's

degree, the thesis is regarded of much importance, and to it the candidate should devote much time and effort. To render this possible, the professor in charge of the major subject may count work assigned in its preparation as part of the time required in that subject.

Candidates desiring a master's degree with a view to general culture will select subjects from three distinct groups, of which the work in no one group shall be less than four hours a week, for the year. The work in one of these groups shall be designated as the candidate's major and to it the subject of his thesis shall stand in close relation. The courses pursued in the major shall be in advance of any regularly pursued by undergraduates.

All theses must be written in satisfactory English and those accepted for the degree of M. S. and M. A. shall be filed with the librarian of the University for cataloguing before distribution to departmental libraries.

A candidate for the degree of Master of Laws must not only be Bachelor of Laws from a reputable law college having a course equivalent in length to that at the University of Minnesota, but he must in addition have been admitted to the bar in Minnesota. Any person who possesses the requisite legal learning may on registration pursue any or all of the studies offered for this degree, but he thereby acquires no standing as candidate for this degree.

The major selected for this degree will in all cases be Law, and the minors, Political Science and Constitutional History.

The Doctor's Degree. Three degrees of this grade are conferred, viz.: Doctor of Philosophy (Ph. D.), Doctor of Science (Sc. D.), and Doctor of Civil Law (D. C. L.), for still more advanced study than that leading to the corresponding bachelor's and master's degrees, and such special attainments therein as show power of original investigation and independent research, together with a fair degree of literary skill as evinced by the preparation of a thesis which shall be a contribution to knowledge.

Candidacy for the Degree of Doctor. Any student in the Graduate School who applies to be enrolled as candidate for a doctor's degree must, in order to be enrolled as such, possess a reading knowledge of French and German, certified to by the professors respectively in charge of those languages, and in case of an applicant applying to be enrolled as candidate for the degree of Doctor of Civil Law, proficiency in Latin and Roman History is also required. Knowledge of Latin will also be required in certain other cases such as for a major in Medieval History, or Philosophy, as the professor in charge may prescribe.

The applicant must also have made before enrollment such noteworthy advancement in his graduate work as to secure the approval of his candidacy by his instructors. And in particular, he must obtain the written consent of the professor under whom his major subject falls to take charge of his instruction in that subject. His minors must also be acceptable to

this professor, who must recommend him to the dean as a suitable candidate for the degree sought.

In order for the applicant to be successful, this professor should also state that, through the work thus far accomplished by the applicant, he has become convinced of his capacity and of his probable ability to carry an investigation in his special field to a successful conclusion and embody it in a valuable thesis.

The Dean shall, after full consideration and consultation with the professor concerned, pass upon his application and have power to enroll the applicant as candidate or refuse to do so. Such enrollment as candidate must be secured at least one year before the degree will be conferred.

It will frequently not be practicable to enroll an applicant as candidate for the doctor's degree before the completion of one year's study in the Graduate School. Graduates desiring to become candidates for this degree will find it advisable, under ordinary circumstances, to spend the first year of graduate study in attaining to the specialized master's degree, as part of the work leading to the doctor's degree.

That procedure is likely to furnish such a decisive test of capacity for advanced study, as well as experience in preparation of a thesis, as to settle definitely the question of candidacy for the doctor's degree.

Candidates for the degree of Doctor of Civil Law are required to secure the degree of Master of Laws as a preliminary.

REGULATIONS

Candidates for the degree of doctor must devote at least three years of graduate study to the subjects approved for candidacy, of which the last year must be spent in residence at the University of Minnesota. In lieu of the other years the candidate may offer an equivalent term of graduate study at some other university, but study pursued and work done *in absentia* without proper facilities of libraries and laboratories will not be accepted.

The same general regulations govern the candidate for this degree as hold in case of the specialized master's degree, both as regards the amount of study per year, the selection and relative amount of major and minors and as regards the chairman of the committee in charge of the work of the candidate, as well as regards the thesis required, which for this degree must give evidence of original and independent research and must be a contribution to knowledge.

In particular, considerable portions of the work on the major and on the thesis may be carried on under general direction of the professor in charge, in which case the candidate will be held responsible for large attainments in the directions indicated, in the form of written reports, reviews and criticism.

The candidate must pass satisfactory written examinations upon his

major and minor subjects at any time not more than a year prior to the final examination on the major.

In the case of the minors this written examination shall be final. If these examinations are satisfactory and the thesis approved the candidate shall be admitted to a final oral examination upon his major.

The final examination upon the major must show an exhaustive knowledge of the special subject selected, and a large acquaintance with the general field in which the subject lies, but the candidate shall not be admitted to the final examination upon his major until his thesis has been considered by the committee in charge and found satisfactory.

The order of procedure to be followed is this: The candidate for a doctor's degree shall submit the title and outline of his proposed thesis to the professor in charge of his major for final approval at least as early as the first of October preceding the commencement at which the degree is to be conferred. In case the proposed subject and the outline are acceptable, the candidate shall make a statement in writing to the Dean, as early as the first of the following February, of his intention to present himself for a doctor's degree at the next commencement, giving at the same time the names of the committee in charge of his work, the subjects of his major and minors, and the title of his thesis.

The thesis itself shall be completed and delivered to the professor in charge at least one month before commencement. In case the thesis is adjudged satisfactory, the candidate will be admitted by the committee to final examinations upon his major and upon the subject matter of his thesis.

This examination shall be arranged for by the professor in charge of the major, on a date at least two weeks before commencement. It shall be held by a committee of examination of which the professor in charge of the major shall be chairman, consisting of the professors in charge of the minors and, in addition, of such other members of the teaching force as the Dean may appoint as members of this examining committee. In order to do this, the Dean shall be duly informed of the date of the examination by the chairman.

The examining committee shall decide from all the facts within its knowledge, whether the candidate is, in its estimation, entitled to receive the doctor's degree sought, and the chairman shall, without delay, report its findings, in writing, to the Dean and to the Registrar.

Immediately after the final examination, the thesis shall be placed by the chairman in the president's office for general examination, and finally deposited with the librarian.

In case the report of the committee is favorable, the candidate shall be presented to the faculty of the graduate school, at a meeting called for the purpose, by the professor in charge of his major subject, who shall then

make a written statement of the academic life of the candidate, of the character and scope of his examinations, and the scope and value of his thesis.

Any member of the faculty shall then be at liberty to propound any questions he will to the instructors of the candidate, respecting his work, or to the candidate himself, respecting the subject matter of his thesis. Upon evidence before it, the faculty shall then decide by vote whether the candidate shall be recommended for the degree.

Courses of Instruction

The Roman numerals by which the courses are here designated are those under which they appear in the bulletins of the separate colleges.

The courses which are offered to both undergraduates and graduates may not be selected by graduates as major subjects, but as minors only. The courses offered primarily for graduates include the subjects offered to them as majors.

AGRICULTURE

Plant Breeding—Field Crops. *Assistant Professor Bull*

Courses in this subject will include research along such lines as may be advisable, in view of the previous training of the student, the available material and facilities for instruction, and the object sought by the candidate.

The prominent features of the course will be a study of History and Methods; Laws of Evolution, Heredity, etc.; Probabilities, Hybridization, Selection; Nursery and Plant Manipulation; Character Plotting; Plant Economics.

Open to candidates for advanced degrees who have completed long course Botany and Course I, Agriculture, or their equivalent

Farm Management. *Instructor Wilson*

Reading and research work combined with occasional lectures. Those who wish may choose any subject or problem of farm management that is of personal interest, provided they can get the necessary material for study. Any problem related to farming may be chosen, and must be presented from a practical business standpoint with special reference to profit and loss on the farm. Open as major subject to candidates for advanced degree.

ANIMAL HUSBANDRY

Animal Feeding and Nutrition. *Professor Boss*

Original investigations in animal feeding with studies of food requirements for maintenance and growth. Problems will be arranged to suit the training and needs of the individual student.

Meats—Structure—Composition and Preparation for Use.
Professor Boss and Assistant Professor Gaumnitz

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

ANIMAL BIOLOGY

Graduates, whether candidates for a degree or not, will be admitted to any line of research or advanced work that can be carried on profitably.

Less advanced graduates will be admitted to any regular classes of the department for which they are sufficiently prepared.

All advanced students are expected to take an active part in the Journal Club and the Biological Club.

FOR UNDERGRADUATES AND GRADUATES

VII. Embryology of Vertebrates. [3] *I, II. Professor Nachtrieb*
Open to juniors and seniors who have completed courses I and III or their equivalents.
Lectures, reference and laboratory work.
The object of this course is to acquaint the student with the general principles of vertebrate development through the study of various stages of several vertebrates and to give him practice in the preparation of material and the methods of reconstruction.
The general references of the course are: Hertwig-Mark, Text-book of 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 Entwickelungslehre der Wirbelthiere.

VIII. Embryology of Invertebrates. [3] *I, II. Professor Sigerfoos*
Open to juniors and seniors who have completed courses I and III or their equivalents.
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.

X. Mental Evolution in Animals. [3] *II. Professor Nachtrieb*
Open to juniors and seniors.
Lectures on habit, instinct and intelligence of animals.
This course is offered in alternate years. It will be offered during 1908-9.

XI. History. [3] *I. Professor Nachtrieb*
Open to juniors and seniors.
Lectures on the history of zoology, the history of our domestic animals and those that have become extinct within historic times, and the modern theories and problems of heredity and evolution.
This course is offered in alternate years. It will be offered during 1907-8.

XII. Economic Zoology. [3] *II. Professor Nachtrieb*
Open to juniors and seniors.
Lectures on the uses made of animals and their products, fish-culture and the life histories of disease-producing animals.
This course is offered in alternate years. It will be offered during 1907-8.

XIII. Teachers' Course. [1] *Professor Nachtrieb*
Open to juniors and seniors who have completed a long course in the department.
Lectures and discussions on the ends to be attained through courses in general zoology, and the methods and means by which such ends may be gained.
This course is offered in alternate years. It will be offered during 1908-9.

FOR GRADUATES

XVI. Problems of Research. *I, II. Professor Nachtrieb and Associates*
Open to those qualified to carry on special work or research. Those contemplating such work should confer with Professor Nachtrieb.

ASTRONOMY

FOR UNDERGRADUATES AND GRADUATES

I. General Astronomy. *I, II. Professor Leavenworth*
A study of the general principles of astronomy, illustrated by observatory work. Open to those who have completed trigonometry.

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

III. Extended Course in Practical Astronomy. *Professor Leavenworth*
IV. Orbit work. *Professor Leavenworth*
Computation of orbits; the determination of the orbits of planets and comets; perturbations.
V. Astrophotography. *Professor Leavenworth*
The making and measuring of astronomical photographs; the determination of right ascension, declination, parallax, etc.

BOTANY

FOR UNDERGRADUATES AND GRADUATES

III. Plant Physiology. [3] *I, II. Professor Clements*
Open as a major or minor to candidates for an advanced degree.
The course consists of an experimental study of the vital activities of plants. Special attention will be given to the physiology of reproduction. Lectures, laboratory and collateral reading.

IV. Mycology and Plant Pathology. [3]
I, II. Professor Clements and Assistant Professor Rosendahl
Open as a major or minor to candidates for an advanced degree.
The course includes a comparative morphological and taxonomic survey of the fungi and a study of plant diseases of fungous origin. Lectures, laboratory and reference work.

V. Taxonomy. [3] *I, II. Assistant Professor Rosendahl*
Open as a major or minor to candidates for an advanced degree.
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.

VI. Cytology. [3] *I, II. Assistant Professor Lyon*
Open as a major or minor to candidates for an advanced degree.
Laboratory work and collateral reading. The course includes 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, Henneguy, Hertwig, Wilson, Guignard, Beneden and Driesch will be made and methods of cytological research indicated in the laboratory.

VII. Algology. [3] *I, II. Assistant Professor Tilden*
Open as a major or minor to candidates for an advanced degree.
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 Chlorophyceæ (with a systematic examination of the forms found in the Minneapolis water supply), and of the second semester a similar course in seaweeds, Phaeophyceae and Rhodophyceae. Either semester may be taken as a unit.

VIII. Plant Ecology. [3] *I, II. Professor Clements*
Open as a major or minor to candidates for an advanced degree.
Lectures, collateral reading and field observations. The course is designed to cover generally the domain of adaptional adjustments in plant embryology, anatomy, physiology and distri-

bution. Particular attention is devoted to the problems of ecological distribution.

IX. Industrial Botany. [3] *I, II. Assistant Professor Tilden*
Open as a major or minor to candidates for an advanced degree. The course embraces a study of the origin, distribution and cultivation of plants yielding products of economic value, the nature and use of these products and the processes by which they are obtained from the plants. Lectures, demonstrations, topics and laboratory work.

X. Wood Technology. [3] *I. Assistant Professor Lyon*
Open as a minor or a partial major to candidates for an advanced degree.
This course will include a histological study of the most important woods of commerce and the special taxonomy of the trees and shrubs producing these woods. Lectures and laboratory.

FOR GRADUATES

XII. Morphology and Taxonomy. *Assistant Professor Rosendahl*
Open as a major or minor to candidates for an advanced degree. 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.

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

XIV. Problems in Cytology and Embryology. *Professor Clements*
Open as a major or minor to candidates for an advanced degree. 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 reseach from a large number of important problems, material on which has already been carefully selected and preserved for cytological and embryological study.

XV. Paleobotany. *Assistant Professor 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.

ECONOMIC ENTOMOLOGY

FOR GRADUATES

Special Problems in Economic Entomology. *Professor Washburn*

CHEMISTRY

FOR UNDERGRADUATES AND GRADUATES

IV. Quantitative Analysis. *Professor Sidener*
Lectures and laboratory work. The course includes an introduction to quantitative and a beginning of gravimetric analysis.

V. Volumetric Analysis. *Professor Sidener*
Lectures and laboratory work. The course includes an introduction to volumetric analysis with a discussion of standard solutions and the necessary stœchiometric calculations.

VI. Organic Chemistry. *Professor Frankforter*
Lectures and laboratory work. This course includes the aromatic series with a preparation of some of the more important compounds supplemented by Fischer's Organischer Preparate.

VII. Theoretical Chemistry. *Assistant Professor 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.

IX. History of Chemistry. *Professor Frankforter*
Lectures and reading. This course includes a full historical discussion of alchemy and chemistry.

X. Water Analysis. *Professor Frankforter*
Lectures and laboratory work. The course includes an exhaustive discussion of the chemical and sanitary properties of water.

XI. Gas Analysis. *Assistant Professor Harding*
Lectures and laboratory work. The course includes an exhaustive chemical examination of the common gases, with a determination of light and heat efficiency of combustible gases.

XII. The Chemistry of Carbohydrates. *Assistant Professor Nicholson*
Lectures and laboratory work. The course includes a discussion of the carbohydrate group with the important methods of analysis.

XIII. Industrial Chemistry. *Professor Sidener*
Laboratory work and reading. The course includes the analysis of various commercial products.

XIV. Wine and Beer Analysis. *Assistant Professor 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.

XV. Special Problems. *Professor Sidener*
Laboratory work. The course includes the working out of various mineralogical, technological and metallurgical problems.

XVI. Photographic Chemistry. *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.

XVII. Electro-chemistry. *Professor Frankforter*
Lectures and laboratory work. The course includes the qualitative and quantitative separations of the metals by electrolysis.

XVIII. Micro-chemical Analysis. *Assistant Professor Harding*
Lectures and laboratory work. The course includes the methods for the determination of minute quantities of substance by means of the microscope.

XIX. Food Adulterations. *Assistant Professor Harding*
An examination of common food products for adulterants.

XX. Iron and Steel Analysis. *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.

XXI. Mineral Analysis. *Professor Sidener*
The course includes the analysis of building stones and some of the most important minerals.

XXII. Inorganic Preparations. *Assistant Professor Harding*
The preparation of inorganic salts, supplemented by Bender's Anorganische Preparatkunde.

XXIII. Colloquium. *Professor Sidener*
A thorough quiz in general inorganic chemistry.

XXIV. Special Problems. *Professor Sidener*
This course includes work on ores of base metals, limestones, slags, etc.

XXVI. Physical Chemistry. *Professor Frankforter*
Lectures and laboratory work. The laboratory work will include that laid down by Jones and Walker with such references as Nernst and Ostwald.
This work must be taken in regular class. For details, see program of the School of Chemistry.

FOR GRADUATES

Courses offered by Professor Frankforter

For the major work in chemistry leading to the higher degree, no specific courses are offered. On the contrary, the candidate will be given some chemical problem which will require original investigation to solve. The laboratories are specially prepared to offer topics for investigation along the following lines:

1. *General Inorganic Chemistry.*
2. *Analytical Chemistry.*
3. *Technological Chemistry.*
4. *Electro-chemistry.*
5. *Organic Chemistry with the follow special topics:*
   (a) The Alkaloids. (b) The Terpens. (c) The Resins.
6. *Physical Chemistry.*

COMPARATIVE PHILOLOGY

This department, besides (1) offering courses in the general principles of linguistic science, affords an opportunity for (2) elementary studies in comparative Indo-European philology, and more particularly (3) the investigation of old German dialects. Related courses in English philology will be found under "English Language and Literature."

Courses offered by Professor Klaeber.

I. General Introduction to the Science of Language. The life and growth of language.

II. Studies in Semasiology.

III. Introduction to Germanic Philology.

IV. Comparative Phonology of English and German.

FOR GRADUATES

V. Comparative Grammar of the Greek, Latin, and Germanic Languages. With a general survey of the field of Indo-European Philology.

VI. Urgermanische Grammatik.

VII. Gothic: Grammar and Reading of the Gospels. The relation of Gothic to the other Teutonic dialects will be especially emphasized.

VIII. Old Saxon: Grammar and Interpretation of the Heliand.

IX. Old High German: This course is identical with course XVII of the German department. Courses VI, VII and VIII, IX will be given in alternate years.

EDUCATION

FOR GRADUATES

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

IV. Secondary Education. *I. Professor James*
This course is a study of secondary education in the United States, with such references to secondary schools of other countries as will lead to a clearer understanding of the place and function of the high school, its curriculum, the problems of present-day importance, and the relation of the high school to other parts of the system of public instruction. The course will be conducted by lectures, reports and discussion.

V. Practice of Elementary Teaching. *I. Professor Rankin*
This course includes a consideration of the principles of teaching, which underlie the best methods of instruction, and is both theoretical and practical. It is conducted by means of lectures, assigned readings, discussions and reports, accompanied by either observation or practice in the elementary schools under the direction of the instructor. It is planned for all students who expect to teach in the high schools or to be principals or superintendents.

VI. Practice of Secondary Teaching. *II. Professor Rankin*
This course includes lectures on the general methods of secondary teaching, and on the course of study; assigned readings, reports and discussions, with either observation or practice of secondary teaching under the charge of the instructor. It is planned more particularly for those who expect to teach in high schools.
Prerequisite: Course IV in Education.

VIII. School Administration. *I. Professor Rankin*
An introductory study of school administration, conducted by lectures, reports and discussions; the organization of school systems,—the work of school boards, superintendents, principals, and teachers,—school buildings and hygiene. This course is planned especially for students, without any teaching experience, who hope later to do work in supervision.

IX. School Supervision. *II. Professor Rankin*
An advanced course, treating of the duties of school principals and superintendents, intended, primarily, for graduates with experience in teaching. (Credit will not be given both for course VIII and for course IX.)

X. Comparative Study of School Systems. *II. Professor James*
This course deals with the school systems of Germany, France, England and the United States, different phases receiving attention in alternate years. The course is conducted partly by lectures and partly by assigned readings, reports and discussions.

XI. Modern Educational Theories. *II. Professor James*
An advanced course in educational theories, dealing particularly with the contributions of Rousseau, Froebel and Herbart.
Prerequisite: Course III in Education.

XII. Current Problems in Elementary Education. *I. Professor Rankin*
A seminar course for senior and graduate students.

XIV. Current Problems in Secondary Education. *II. Professor James*
A seminar course for senior and graduate students.

ELECTRICAL ENGINEERING

The courses offered by the department of electrical engineering are open to graduate students having the required preliminary training. Thorough courses in physics and mathematics are essential prerequisites. The laboratory, shop and library of the department provide facilities for a moderate amount of research work in addition to the regular courses of study.

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 obtained 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. The laboratory has equipment for obtaining low voltage direct or alternating current up to 2,000 amperes, for continuous EMF to up to 2,000 volts and for alternating EMF up to 40,000 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 electro-plating 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. Telephone transmitters, receivers and accessories provide for practice in assembling and testing the ordinary telephonic apparatus and circuits and for investigation.

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.

FOR UNDERGRADUATES AND GRADUATES

I. Applied Electricity. [2] Junior I. 36 hours. *Professor Shepardson*
Outline of industrial uses of electricity; units; application of Ohm's law; methods and calculation of wiring; electrical instruments and measurements. Text book: Shepardson, Electrical Catechism. Preparation required: Physics, course I.

II. Dynamos and motors. [2] Junior II. 72 hours.
Assistant Professor Springer
Theory of electro-magnet and direct current dynamo and motor; methods 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.

III. Alternating Currents. [3] Senior I, II. 108 hours.
Professors Eddy and Shepardson
Phenomena, measurement and use of alternating currents; theory of line, transformer, generator and motor; types of apparatus. Textbook: Steinmetz, Alternating Current Phenomena. Preparation required: Electrical Engineering, courses I and II.

IV. Electrical Engineering Practice. Electric Railway. [2] Senior I. 18 hours. One-half semester. *Assistant Professor Springer*
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.

V. Electrical Engineering Practice. Batteries. [2] Senior I. 18 hours. One-half semester. *Assistant Professor Springer*
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.

VI. Electrical Engineering Practice. Electric Lighting. [2] Senior I. 18 hours. One-half semester. *Professor Shepardson*
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.

VII. Electrical Engineering Practice. Electrical Transmission. [2] Senior II. 18 hours. One-half semester. *Professor Shepardson*
Preliminary surveys; choice of electrical systems; load diagrams; best units of power; comparison of steam, gas and water power; location, design and erection of station buildings; boilers, engines, dynamos, storage batteries, switch board and lines; operation and regulation; maintenance of plant; emergencies; examination of stations in Minneapolis and St. Paul. Preparation required: Electrical Engineering, courses II and VI.

VIII. Electrical Engineering Practice. Central Stations. [2] Senior II. 18 or 36 hours. One-half or one semester. *Professor Shepardson*
Preliminary surveys; choice of electrical systems; load diagrams; best units of power; comparison of steam, gas and water power; location, design and erection of station buildings; boilers, engines, dynamos, storage batteries, switch board and lines; operation and regulation; maintenance of plant; emergencies; examination of stations in Minneapolis and St. Paul. Preparation required: Electrical Engineering, courses II and VI.

IX. Electrical Engineering Practice, Telegraph and Telephone. [2] Senior II. 18 or 36 hours. One-half semester. *Professor Shepardson*
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. Preparation required: Electrical Engineering, courses I and VI.

X. Electrochemistry. [2_2] Senior II. 36 or 72 hours. *Professor Shepardson*
Theoretical and experimental study of electrolysis, electrodeposition and electric furnaces.

XI. Electrical Design. [2_2] Junior II. 72 hours. *Assistant Professor Springer*
Problems in designing circuits, electro-magnets and dynamos; complete working drawings and specifications to accompany each design. Text-book: Weiner, Dynamo Electric Machines. Preparation required: Physics, courses I and II; Electrical Engineering, courses I and II; Machine Design, course XI.

XII. Electrical Design. [2_2] Senior I. 72 hours. *Professor Shepardson*
Design of a dynamo or other problem as assigned. Preparation required: Electrical Engineering, course II and IV.

XIII. Electrical Design. [3_2] Senior II. 108 hours. *Professor Shepardson*
Designs, specifications and estimates for an electric light or power plant, or other approved problem. Preparation required: Electrical Engineering, courses IV and VI.

XIV. Electrical Laboratory. [3_2] Junior II. 108 hours. *Assistant Professor Springer*
Tracing circuits and locating faults; measurements of conductivity and insulation; calibration and use of instruments; operation and characteristic curves of dynamos and motors. Preparation required: Physics, courses I and II; Electrical Engineering, courses I and II.

XV. Electrical Laboratory. [2_2 or 4_2] First semester [3_2] Second semester. Senior I. 72 or 144 hours; II. 108 hours. *Professor Shepardson*
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.

XVI. Electrical Laboratory. [1_2 or 2_2] Senior I. or II. 36, 72 hours. *Professors Shepardson and Springer*
Efficiency tests and special problems.

XVII. Electrical Measurements of Precision. [2_2] Senior I or II. 72 hours. *Assistant Professor Springer*
Lectures and laboratory work. Measurements of resistance, voltage, current, self-induction and capacity; standardization of measuring instruments. Open to a limited number.

XVIII. Plant Operation. Senior I, II. *Professor Shepardson and Mr. Dixon*
Practice in operation and care of boiler, engines, motors, dynamos and circuits of the University lighting plant. Nine runs of four hours each.

XIX. Journal Reading. [1_2] Senior I. 36 hours; II. 36 hours. *Professor Shepardson*

XX. Electric Power. Senior I. 54 or 72 hours. *Assistant Professor Springer*
For Civil, Mechanical and Mining Engineers.
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.

XXI. Dental Electricity. [2] Senior I. Dentists. 27 hours. *Assistant Professor Springer*
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.

XXII. Electrical Measurement of Precision. *Assistant Professor Springer*
Lectures and laboratory work. Precise measurements of resistance voltage, current, self-induction and capacity; standardization of measuring instruments.

XXIII. Illumination Engineering. *Professors Shepardson and Eddy*
Lectures and laboratory work. Investigation of performance of electric and gas lamps, reflectors and diffusers; luminous efficiency, distribution, color characteristics, physiological phenomena, methods of determining location, kind and quantity of lights for obtaining desired illumination.

XXIV. Telephone Engineering. *Professors Shepardson and Eddy*
Lectures on laboratory work. Theoretical and experimental study of telephonic apparatus; lines and line phenomena, including induction, transpositions, loading coils, etc.

XXV. Alternating Current Phenomena. *Professor Shepardson*
Lectures and laboratory work. Study of wave-forms, transient phenomena; oscillographic investigations; tests of apparatus.

ENGLISH LANGUAGE AND LITERATURE

FOR UNDERGRADUATES AND GRADUATES

III. Early English. [3] *I, II. Professor Klaeber*
A course in the grammar, literature and development of Old English,
This course is required of all those who wish to teach English.

IX. The Short Story. [3] *II. Mr. Firkins*
History and development of the short story.

XI. The Bible as Literature. [3] *II. Professor Potter*
A literary survey of the Old Testament with special attention to forms and critical study of selected readings.

XIV. Construction and Development of Modern Drama. [3]
I. Assistant Professor Peck
A study in the theory of the drama with the history of English drama to the middle of the nineteenth century.

XV. Late Nineteenth Century Drama. [3] *II. Assistant Professor Peck*
A survey of Ibsen followed by critical reading of selected plays of Sudermann, Hauptmann, Maeterlinck, contemporary French drama, D'Annunzio, contemporary English and American playwrights. Open only to those students who have had course XIV.

XVII. The Philosophy of English Grammar. [1] *I, II. Professor Burton*
This course aims to show in a simple way the underlying principles of English speech, distinguishing these principles from the false speech uses, which have come into the language from foreign sources.

XIX. Browning and Tennyson. [3] *II. Professor Burton*
This course involves a reading of the representative work of the two major poets of the Victorian era in order to show their quality and contrasted power.

SENIOR SEMINAR

Hakluyt's Voyages. *Assistant Professor Peck*
An inquiry into the vivid and dramatic sources of language and literature found in this "prose epic" of the Elizabethan seamen. (Graduates will not receive credit for work taken in undergraduate courses, except in minors.)

I. Anglo Saxon. *Professor Klaeber*
Grammar and reading of texts.

II. Critical Study of Beowulf. *Professor Klaeber*

III. Principles of Criticism. *Mr. Firkins*
This course comprises:
(a) A brief treatment of elements or forces in literature, e. g. clearness, vigor, beauty, precision, art, taste, humor, truth, ethics and the like.
(b) An exposition of literary types, e. g., the lyric, epic, drama, short story, novel, biography, etc., in relation to the standards and methods of judging each.

IV. Continental Drama. *Professor Potter*
A study of the rise of continental drama, and its connection with Elizabethan drama.

V. Prose Fiction as a Literary Form. *Professor Burton*

VI. The Drama as a Literary Form. *Professor Burton*
This course will not be given in 1907-8.

FORESTRY

Equipment: The vast lumbering operations in the northern part of Minnesota offer the best of opportunities for a study of that branch of forestry. The establishment of the Chippewa Forest Reserve and its management by the Forest Service gives opportunities which few other sections possess to study the best methods of forest management. The state has twenty-one thouand acres of timber land to be used as a forest and game preserve, on which student help will be largely used. In addition Itasca state park, consisting of 22,000 acres, is used by the Forestry School as a demonstration forest and experiment station. Every student spends about twelve months in the park during his course and does practical work in all branches. The use of this park gives the Minnesota Forestry School a forest equipment which is unsurpassed anywhere.

Graduate work is offered to those who have sufficient preparation to pursue it to advantage. Two courses are offered but others may be given if conditions seem to make it desirable.

I. Forest Management and Economics. *Professor Green*
A general course in economics as applied to the problem of properly handling forest wealth.

II. Working Plans for Forests. *Professor Green*
The study and discussion of the working plans in use in foreign countries. Criticisms of working plans in the United States.

FRENCH

(Italian and Spanish.)

FOR UNDERGRADUATES AND GRADUATES

V. 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.
Professor Benton
Open to those who have completed course I and II or course III.

VI. Advanced French Conversation. *Professor Benton and Assistant Professor Frelin*

VII. Lectures, in French, on the literature of the XIXth century.
I, II. Professor Benton
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.

VIII. Teachers' Course. [1] *I, II. Professor Benton*
Open to those who have completed course VII. Study of modern critics concerning the development of literature and teaching. All discussion in the French.

X. Italian Literature. [3] *I, II. Professor Benton*
Open to juniors and seniors. Dante, Goldoni, Alfieri, Manzoni.

XII. Spanish, advanced. *I, II. Mr. Melom*
Advanced grammar, Cervantes, Calderon, Lope de Vega.

FOR GRADUATES

XIV. Romance Philology. Old French. *Professor Benton*
French and other Romantic languages from popular Latin. Morceaux choisis 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 Cantiiene d'Eulalie; the chronicles of Villehardouin, La Chan-

son 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.

XV. History of the Drama. *Professor Benton*

XVI. Italian. Dante's Divine Comedy. *Professor Benton*

XVII. Old Spanish. *Professor Benton*
Development of Castilian dialect. El Poema del Cid.

GEOLOGY

FOR UNDERGRADUATES AND GRADUATES

III. Industrial Geography. *Professor Hall*
Open to those prepared.
The structural features of North America are outlined as an introduction. Following this is a study of the types of soil and dominating climatic characters of the several agricultural regions of the continent; a discussion of the geography of industries as they have grown up within the past hundred years and their dependence upon physiographic conditions; a study of local industries is effected through excursions and reports. A brief survey of industries in other parts of the world parallels the more detailed study of North America. Throughout the course cause and effect are kept in view.

V. Geography and Geology of Minnesota. *Professor Hall*
Open to those prepared.
(a) The physical geography of the state in its relations to geological history and industrial development.
(b) The principles and facts of pre-Cambrian geology as exemplified within the state and their extension into general application.
(c) The present problems of the state in agriculture, drainage, water power, mining, quarrying, etc., are considered.

VIII. Paleontology. Senior I, II. *Assistant Professor Sardeson*
The chief type 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.

IX. Paleontologic Practice. Senior I, II. *Assistant Professor 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.

XI. Petrography. Junior or senior II. *Mr. Grout*
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 and broader stratigraphical 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.

XIII. 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.

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

XVIII. Petrographical Problems. *Professor Hall and Mr. Grout*
A study of rocks as geological bodies; the benesis of rocks and their chemical and dynamical alterations, illustrated in the gneisses and gabbro schists of the Minnesota River valley or the granites and basic eruptives of central Minnesota.

XIX. The Keweenan Eruptives. [1] *Professor Hall and Mr. Grout*
Of eastern and northeastern Minnesota, their stratigraphic relations, textural and structural characters; or other problem to be selected on consultation.

XX. 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 St. Anthony, the Dalles of the Saint Croix and other problems. The special field to be selected on consultation.

XXI. Paleontologic Geology. *Assistant Professor Sardeson*
A study of the Ordovician fauna with special illustrations from the Ordovician of Minnesota and neighboring states.

XXII. Paleontology. *Assistant Professor 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.

MINERALOGY

FOR UNDERGRADUATES AND GRADUATES

IV. Optical Mineralogy. Junior or senior I. *Mr. Grout*
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.

V. The Morphology of Minerals. Junior or senior II. *Mr. Grout*
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.

VI. Physico-chemical Methods with their Applications. Senior I. *Mr. Grout*
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.

VII. An Outline of Mineralogy. [1] Junior or senior. *Mr. Grout*
A study of methods of identification of minerals, with their applications. Conferences, reading and demonstrations. Throughout the year.

FOR GRADUATES

VIII. Original Problems in Morphological and Physical Mineralogy. *Professor Hall and Mr. Grout*

Investigations in mathematical crystallography and its application to crystal development and structure. Further applications than are made in course IV of the optical characters of minerals in identification of mineral species.

IX. Special Investigations in Physical and Chemical Mineralogy. *Mr. Grout*

Special attention is here given to tenacity and electrical properties and their relation to crystal form, cleavage and fracture. Dimorphous compounds are investigated and the conditions governing their formation studied. The physical properties of artificial mineral compounds are compared with those of natural minerals.

X. Discussion of Mineral Occurrence and Association. *Professor Hall and Mr. Grout*

Genetic relationships. Field work in connection with the different phases of the particular problem in hand.

The equipment of the Department of Geology and Mineralogy is sufficient for many lines of graduate work. The department has collected from many localities, both within and without the state, and the Geological Survey made extensive collections during the years of its active field work. The material thus gathered, the published literature on the state and the field within easy access from the University afford suggestions of unsolved problems in a number of different geological lines.

GERMAN

FOR UNDERGRADUATES AND GRADUATES

X. Modern Authors. German Literature of the Nineteenth Century. I, II. *Professor Moore*

Pre-requisite, course IX.
First semester.—Romantic school and Junge Deutschland.
Second semester.—German literature since 1848.

XI. History of German Literature. *Mr. Juergensen*

Prerequisite, course IX.
Lectures in German. Reviews and topical research on the part of the students.

XII. Seminar in German Drama. [1] I, II. *Professor Schlenker*

Prerequisite, course IX.
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.

XIV. History and Literature of the Reformation. I, II. *Professor Moore*

Prerequisite, course IX or course X.
Readings from Brandt, Luther, Hutten, Sachs, Murner and Fischart. Selections from the histories of Jansen and Egelhaaf.

XIII. Middle High German. I, II. *Professor Schlenker*

Prerequisite, course IX.
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.

FOR GRADUATES

XV. The German Volkslied. *Mr. Williams*

Prerequisite, course IX.
Outline of the history and development of the Volkslied. Study of selected numbers in Uhlands Volkslieder with references to other general and special collections. Influence of the Volkslied upon lyric and ballad writers.

XVI. Lessing and the Age of Enlightenment. *Professor Moore*
Reading of Lessing's critical and controversial writings.

XVII. The Drama of the Classic Period. *Professor Schlenker*
An intensive course in the plays more particularly of Lessing, Goethe and Schiller.

XVIII. The Romantic School. *Professor Moore*
History of the Romantic Movement; causes of its rise and decline; its spirit and influence.

XIX. Old High German. *Professor Klaeber*
This course is identical with course V in the department of Comparative Philology.

GREEK

FOR GRADUATES

XVIII. Advanced Course in Poetry.
Epic and Lyric Poetry — *Professor Hutchinson*
Dramatic Poetry — *Professor Brooks*

XIX. Advanced Course in Oratory. *Assistant Professor Savage*

XX. Later Greek (322 B. C.—200 A. D.) *Professor Hutchinson*

XXI. Advanced Course in Modern Greek. *Professor Brooks*
Inasmuch as the exact nature of the work will differ with the desires and purposes of the applicants who must be dealt with individually, it has not been thought best to attempt a more specific statement than the above. No undergraduate courses in Greek will be accepted as a part of the work leading to an advanced degree.

HISTOLOGY AND EMBRYOLOGY

THOMAS GEORGE LEE, B. S., M. D., *Professor of Histology and Embryology.*

WINFIELD S. NICKERSON, Sc. D., M. D., *Assistant Professor of Histology.*

JOHN BLACK JOHNSTON, Ph. D., *Assistant Professor of Anatomy of the Nervous System.*

This department occupies the entire north wing and half of the Medical Science Building, and is well equipped for both graduate and undergraduate work. The following courses are open to graduates and other properly qualified students.

FOR GRADUATES AND UNDERGRADUATES

III. General Vertebrate Morphology and Histology [3]
I. Professor Lee, Assistant Professor Nickerson
Lectures, recitations, and laboratory, afternoons, three days per week, nine weeks, first quarter, 108 hours.

IV. Elements of Vertebrate Embryology. [3]
I. Professor Lee, Assistant Professor Johnston
Lectures, recitations, and laboratory, forenoons, three days per week, nine weeks, first quarter, 108 hours.

V. Elements of Vertebrate Neurology [3] *I. Assistant Professor Johnston*
Lectures, recitations, and laboratory, second quarter. Prerequisite, courses III and IV or equivalent.

VII. Human and Vertebrate Organology [3]
I. Professor Lee, Assistant Professor Nickerson
Lectures, recitations, and laboratory, afternoons, three days per week, nine weeks, second quarter, 108 hours. Prerequisite, course III or equivalent.

VIII. Advanced Vertebrate Embryology [3]
I. Professor Lee, Assistant Professor Johnston
Lectures, recitations, and laboratory, forenoons, three days per week, nine weeks, second quarter, 108 hours. Prerequisite, course IV or equivalent.

IX. Advanced Vertebrate Neurology [3] *I. Assistant Professor Johnston*
Lectures, recitations, and laboratory, afternoons, three days per week, nine weeks, first quarter, 108 hours. Prerequisite, courses VII, VIII, and XXI or equivalent.

XI. Micro-technique and Morphology of Special Sense Organs [3]
II. Professor Lee, Dr. Lemstrom
Lectures, recitations, and laboratory, afternoons, three days per week, nine weeks, third quarter, 108 hours. Prerequisite, courses VII and VIII or equivalent.

XII. Special Embryology of Man and Vertebrates. [3] *II. Professor Lee*
Lectures, recitations, and laboratory, forenoons, three days per week, nine weeks, third quarter, 108 hours. Prerequisite, courses VII and VIII or equivalent.

XIII. Special and Applied Neurology [3] *II. Assistant Professor Johnston*
Lectures, recitations, and demonstrations, afternoons, fourth quarter. Prerequisite, courses IX and XI or equivalent.

XVII. Special Neurological Technique [3]
II. Assistant Professor Johnston
Elective course for qualified students, forenoons, fourth quarter.

XVIII. Cytology and Histogenesis [3] *I. Professor Lee*
Lectures and laboratory, afternoons, second quarter. Elective course open to students who have had course XI or equivalent.

XIX. Neurological Research. *Assistant Professor Johnston*
Problems and special work in vertebrate neurology. Open only to those qualified to carry on investigation.

XX. Experimental Embryology. *II. Professor Lee*
Special course for advanced students. Lectures and laboratory, forenoons, fourth quarter.

XXI. The Animal Parasites of Man [3]
II. Assistant Professor Nickerson
Lectures and laboratory, afternoons, third quarter. An elective course in medical zoology. The general outlines of the morphology and classification of the different groups which contain members parasitic upon man, with special consideration of each species of medical importance, including its distribution, life history, methods of infection, means for diagnosis, and the chief symptoms produced by it.

XXX. Research Work in Human and Vertebrate Morphology
Professor Lee
Properly qualified students will be provided every facility for original investigation of anatomical problems.

XL. Anatomical Journal Club and Seminar
Weekly meetings during year for reviews of the current literature and discussion of special topics in Anatomy, Histology, Embryology, and Neurology, and of the research work being carried on in the department. The department library, which is large and rapidly growing, receives all the leading anatomical journals

HISTORY

FACILITIES

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

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

COURSES OF INSTRUCTION

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

III. The Renaissance and Reformation. *I. Professor White*
Open to those who have completed either I or II, and a desirable preparation for IV.
The Renaissance and Reformation will be studied as general European movements, with the emphasis upon the work of individual men and upon ideas rather than upon politics and institutions. The purpose of the course will be to show how the medieval world became the modern world.

IV. Europe since 1789. *I, II. Professor Anderson*
Open to those who have completed course I or II. The entire class meets twice each week for lectures or recitations. The third exercise is devoted to the study of important historical documents, drawn principally from Anderson's Constitutions and other Select Documents illustrative of the History of France, 1789-1901. This work is done in small groups which meet in the European history seminar room.

The history of France occupies the most prominent place in the course, that of other countries being grouped about it, as far as possible. Much attention is given to international affairs, the principal territorial changes being illustrated with a series of wall maps prepared for the course under the direction of the instructor. A special effort is made to put the students into a position to understand the present governments and politics of the leading European states.

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 cooperative 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.

VI. American History, 1841-1885. *II. Professor Anderson*
Open to those who have completed, or are pursuing, course V. Special attention is given to the development of the slavery issue in politics, the political history of the Civil War and reconstruction.

XV. Historical Method and Bibliography. [2] *II. Professor White*
Open to those who have completed course I or course II. The course is designed especially for those intending to do advanced work in history. It aims to make clear to the students 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 Van 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 bibliographers, 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.

XX. English History, 1660-1905. *I. Professor Anderson*
Open to those who have completed course II. The period from 1660 to 1815 is covered in a rapid survey. From 1815 the work is more intensive, the topics and readings affording an oportunity to become acquainted with the principal British reviews and with two or three of the leading newspapers.

XXI. Greek History. *I. Assistant Professor Westermann*
Especial attention will be given to the period following Alexander's conquests.

The following courses are "intensive" or "advanced" courses. Each one of them requires the completion of the corresponding "general" course in the list above. They may be taken, in proper combinations, for majors for the master's degree, or, by ones or twos, for minors.

VII. The Making of the Constitution of the United States.
I, II. Pofessor 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.

VIII. American History since 1789 *as shown in the Development of Constitutional Law.*
Professor West
In alternate years, not offered in 1907-8. Open to seniors who have 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.

IX. Studies in American Biography. *I. 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 some acquaintance with the entire body of writings relating to the subject. Not given in 1907-8. When next offered, the subject will be Thomas Jefferson.

X. A Critical Study of Historical Masterpieces. *II. Professor Anderson*
Open to undergraduates who have taken two courses in history, and to graduates.

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. Not given in 1906-7.

XI. The History of American Diplomacy. *I. 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.

XII. The History of European Diplomacy since 1789. *II. 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 IV is the best preparation.

Ability to read easy French is required. The course centers about a critical reading of the principal treaties.

XIII. Colonial Expansion and Administration. *II. Professor West*
Open to those who have completed 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.

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

XVIII. The Beginnings of the English Judiciary. *II. Professor White*

XIX. Expansion of America as studied in its Highways of Immigration.
Not offered in 1907-8.

XXII. Greek Political Institutions. *II. Assistant Professor Westermann*
Open to students who have completed courses I or II and XXI.
A study of the development of Greek political forms and of their operation as seen in typical oligarchic, democratic, federal and monarchic states.

XXIII. Roman Imperial Organizations. *II. Assistant Professor Westerman*
Open to students who have completed two year-courses in history.
This course will survey the development and organization of the imperial system from the beginning of Roman expansion beyond Italy to the time of the Germanic invasion. Especial attention will be given to the administration of the municipalities and provinces under the empire, and to the growth of despotism.

HORTICULTURE

Equipment. The library of the division of horticulture is well equipped with literature and periodicals devoted to this subject, all of which are well indexed. The campus, orchards, nurseries, fruit gardens and greenhouses at the University farm afford good illustrations and opportunities for study and experiment work. The new fruit breeding farm offers the best of facilities for the study of this important line of work.

Graduate work is offered to those who are prepared to pursue it to advantage. Two courses are offered but others will be given if conditions seem to make it desirable.

I. General Pomology. *Professor Green*
A general course in the study of cultivated fruits.

II. Plant Breeding. *Professor Green*
A general course in the study of the origin and development of cultivated varieties.

LATIN

FOR GRADUATES AND UNDERGRADUATES

I. (a) Teachers' Course in Latin [1] *and (b) Advanced Course in Caesar* [2] *Professor Pike*
This course comprises the work of courses VI and VII in the Bulletin of the College of Science, Literature and Arts.

II. Advanced course in Virgil. *Professor Pike*
Interpretation of selections from books VII to XII of Virgil's Æneid.

III. Advanced Latin Composition and Lectures on Latin Style. *Professor Pike*

IV. Suetonius. *Professor Pike*
Selections from Suetonius' Lives of the Caesars.

V. Roman Elegiac Poetry. *Professor Clark*
Selections from Catullus, Tibullus, Propertius, and Ovid, with a study of the rise, development and characteristics of Roman Elegiac poetry.

VI. Correspondence of Cicero. *Professor Clark*
Selections from the letters of Cicero with a study of his life and a history of his times.

VII. Roman Satire. *Professor Clark*
Selections from Juvenal, Persius, Horace and from the fragments of early satire with a study of the rise, development and characteristics of Roman satire.

Of these courses III-VII are open only as minors to graduate students. I and II are open as minors only on permission of the professor in charge.

FOR GRADUATES

VIII. Roman Law. *Professor Clark*
Reading of Robinson's Selections of Roman Law and the first work of the Institutes of Justinian with lectures and topical study of Roman private law.

IX. Tacitus. *Professor Pike*
Reading and interpretation of books XIII to XVI of the Annals with a study of Tacitus' style and the history of the times of Nero.

X. Roman Eloquence. *Assistant Professor Granrud*
The history and theory of Roman eloquence to 43 B. C. Selections from the Rhetorical Works of Cicero will constitute the basis of the work of the first semester; during the second semester a few representative orations of Cicero will be studied with special reference to their structure and style.

LAW

FIRST GRADUATE COURSE

I. Dean Pattee
The first course offered for the degree of Master of Laws is that of the *Philosophic Basis of Jurisprudence.* This course constitutes an inquiry into the nature of law in its most general signification. It considers the truths of reason, the "laws of nature" so-called, and the positive law or Jurisprudence. It considers the nature of International and Municipal law, and illustrates by means of judicial authorities how the primary truths of reason operate in the realm of human law.

II. Science of the State.
This course considers the segregation from the comprehending science of politics, and the co-ordinate sciences of government and jurisprudence. The citizen and subject population; the territory, its existence and content, subdivisions, relation of people to the land, comparison of great and small states; theories of the state; liberty and opportunity as the ends of the state; the state as the organ of power, and guardian of rights; the essentia of constitutions.

III. Constitutional History and Jurisprudence.
This course is devoted to a critical study of the "dual system" of constitutional government of which the American Republic is the conspicuous example. The Federal constitution and the State constitutions are illustrated separately in both their historical and their legal aspects, as distinct parts of one system, but which are designed to work harmoniously in unison, and are both necessary to the successful operation of the system. The Federal courts are shown to have so conducted their administration of their high duties as to have contributed to the proper development of the State side of the system, and to have made the Federal Government the firm bulwark of local self-government in the States.

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.

The two preceeding courses, heretofore given by Dr. Folwell and Judge Pierce, respectively, are to be otherwise arranged for hereafter.

SECOND GRADUATE COURSE

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 candidacy 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 current academic year will depend upon the number of applicants for admission.

MATHEMATICS

FOR UNDERGRADUATES AND GRADUATES

VIII. Curve Tracing. *II. Professor Downey*
By aid of the calculus. Open to those who have completed the first six courses.

IX. Differential Equations. [3 and 2] *I. Dr. Manchester*
Open to those who have completed the first seven courses.

X. Solid Analytical Geometry. [3 and 2] *I, II. Professor Bauer*
The plane, the straight line in space, quadric surfaces, applications. Open to those who have had the first seven courses.

XIII. Method of Least Squares. [2] *Professor Leavenworth*
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 seven courses.

FOR GRADUATES

XVI. Advanced Differential and Integral Calculus. [2] *Professor Downey*
This course goes farther into some of the subjects treated in courses VI and VII and takes up some important subjects not included in those courses.

XVII. Theory of Curves and Surfaces. [2] *Professor Bauer*
This is a course in Differential Geometry. The fundamental equations of the theory of curves and of surfaces will be developed. The work will be based upon Scheffer's *Theorie der Curven* and *Theorie der Flaechen.* Not to be given unless four or more apply for it.

XVIII. Theory of Functions of a Complex Variable. [2] *Dr. Manchester*
Lectures, readings and problems. The course presupposes a knowledge of Differential and Integral Calculus and Differential Equations.

XIX. History of Mathematics. [2] *Professor Haynes*
Lectures and reading, under direction, of works in the mathematical library on the ancient and modern development of mathematics.

XX. Projective Geometry. [3] *Professor Kirchner*
A study of the theories and methods of Projective geometry. Perspective, homology, duality, cross-rates, involution, reciprocals, conics, systems of conics, ruled surfaces, and special problems and exercises.

XXI. Perspective. [3] *Professor Kirchner*
The principles and practice of perspective, including shadows, reflections, distortions, corrections, systems, methods, the practical problem, and inverse constructions.

XXII. Elliptical Integrals. *Assistant Professor Brooke*

MECHANICAL ENGINEERING

FOR UNDERGRADUATES AND GRADUATES

VIII. Shop Economics. Senior II. 36 hours. (Elective.) *Professor Flather*
Shop and factory organization and management; cost systems.

XI. Machine Design. Junior I and II. 216 hours. *Professor Flather*
Calculation and design of such machine parts as fastenings, bearings, rotating pieces, belt and tooth gearing. Recitations, lectures and drawing-room practice. Open only to students pursuing course I in mechanics.

XII. Machine Design. Junior II. 72 hours. (Second half semester.) *Professor Flather*
Application of graphical methods to the design of valve gears and link motions; Zeuner diagrams, indicator cards. Lectures and drawing-room practice. Open only to those pursuing course XVIII.

XIII. Machine Design. Steam Engine. Senior I. 144 hours. *Professor Flather*
Calculations and working drawings for a high speed automatic steam engine. Theoretical diagrams and determination of details. Preparation: Courses XII and XVII.
Gas Engine. An alternative course in gas engine design is offered those who have completed course XIX.

XIV. Machine Design. Senior II. 144 hours. *Professor Flather*
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.

XV. Tool Design. Senior I or II. 72 or 144 hours. *Professor Flather*
Design of special tools for manufacturing interchangeable parts; jigs and milling fixtures. Preparation: courses V and XI.

XVI. Engineering Design. Senior II. 72 or 144 hours. *Professor Flather*
Problems, designs and estimates for power plants, central stations and factory equipment. Selection of motive powers, pumps, shafting, piping and accessory plant. Preparation: courses XVII, XVIII, and XIX.

STEAM ENGINEERING

XVII. Steam Boilers. Junior I. 18 hours. *Professor Flather*
Application of theory and practice in the design and construction of steam boilers, chimneys, boiler settings and accessories, smoke prevention, mechanical stokers; methods of operating boilers with safety and economy. Open only to students pursuing course I in mechanics.

XVIII. Steam Engine. Junior II. 54 hours. *Professor Flather*
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.

XIX. Gas Engines and Producers. Junior II. 36 hours. *Professor Flather*
Principles of operation of two cycle and four cycle engines; cylinder construction and arrangement; valve gears and starting mechanisms; system of speed control, ignition and cooling. Application of the indicator and consideration of indicator diagrams.

A study of the power gas producer including suction and pressure types for various fuels; construction and operation of the generator and accessory apparatus. Application to various industrial purposes. Recitations and lectures. Open only to students pursuing course V in chemistry.

XXIII. Mechanical Engineering. Senior I. 36 hours. *Professor Flather*
Measurement of power. A study of the methods employed in measuring power. Dynamometers, Prony brakes; measurement of water power; water meters; weir measurement, flow of water in pipes; measurement of electric power, efficiency of motors; power required to drive machine tools and shafting. Recitations and lectures. Preparation, course II in applied mechanics.

XXIV. Mechanical Engineering. Senior I. 36 hours. (Elective.)
Professor Flather
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.

MECHANICAL ENGINEERING LABORATORY

XXV. Strength of Materials. Junior I. 72 hours.
Assistant Professor Kavanaugh and Mr. Shoop
Laboratory work investigating the strength and physical qualities of iron, steel, brass, copper, belting, chains, beams. Open only to students pursuing course I in mechanics.

XXVI. Mechanical Laboratory. Junior II. 72 hours.
Assistant Professor Kavanaugh and Mr. Shoop
Continuation of course XXV; also exercises in valve setting, indicator practice, calibration of steam gauges, calorimetry, efficiency of screws and hoists. Preparation: course XVIII.

XXVII. Hydraulic Laboratory. Junior II. 72 hours.
Assistant Professor Kavanaugh and Mr. Shoop
Hydraulic measurements, calibration of weirs, nozzles, orifices and meters, tests of water meters, rams, pulsometers, pumps and other hydraulic apparatus. Preparation: course XXV.

XXVIII. Mechanical Laboratory. Senior I. 108 hours.
Assistant Professor Kavanaugh and Mr. Shoop
Calibration of dynamometers and other apparatus. Testing lubricating value of oils; tests of injectors, steam engines and boilers, and complete power and lighting plants. Preparation: Course XXV.

XXIX. Mechanical Laboratory. Senior I. 108 hours.
Assistant Professor Kavanaugh and Mr. Shoop
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; tests of injectors, steam-engines and boilers. Preparation: course XXVI.

XXX. Mechanical Laboratory. Senior II. 144 hours.
Assistant Professor Kavanaugh and Mr. Shoop
Tests of gas and hot air engines; gas producers; air compressors; automobile and locomotive testing and other special work. Preparation: course V in chemistry, and XXVIII.

XXXI. Mechanical Laboratory. Senior II. 72 or 144 hours. Elective.
Assistant Professor Kavanaugh and Mr. Shoop
Special research work and commercial tests.

XXXII. Mechanical Laboratory. Senior II 72 hours.
Assistant Professor Kavanaugh and Mr. Shoop
Special modification of courses XXIX and XXX, covering work in hydraulic measurements, steam engine and boiler testing for students in mining and metallurgy.

RAILWAY MECHANICAL ENGINEERING

FOR GRADUATES

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

XXXIII. Railway Technology. Senior I. 72 hours.
Assistant Professor Kavanaugh
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, supplemented by lectures and recitations.

XXXIV. Railway Design. Senior II. 144 hours. *Professor Flather*
(a) Of link and valve motions. Continuation of course XII with
(b) Of locomotive and car details.
(c) Of the locomotive boiler.
(d) Of assembled parts. Preparation: course XXXIII.

XXXV. Locomotive Construction. Senior II. 36 hours. *Professor Flather*
Lectures, reading and recitations on design and construction of locomotives, supplementing course XXXIV. 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.

XXXVI. Locomotive road testing. Senior II.
Assistant Professor Kavanaugh

FOR GRADUATES

Courses are offered in:
Engineering Design.
Experimental Investigation.
Railway Engineering.

In each of these courses the student must satisfy the head of the department that he is able to satisfactorily carry on the work proposed.

This work will be largely a continuation of that laid down in the courses for undergraduate students, and will consist in original designing and experimental research along various engineering lies; studies and investigations relating to the economic administration of manufacturing plants; also special lines of investigation will be followed in connection with railway mechanical engineering. This will be accompanied by a similar line of work in the drawing room in which original problems will be taken up by the student.

MECHANICS AND MATHEMATICAL PHYSICS

I. Applied Mechanics. [90] Junior I. *Professor Eddy*
Statics and dynamics including 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 the equilibrium polygon. Open to students who have completed the work of the first two years in mathematics and physics.

II. Hydraulic and Pumping Machinery. [90] Junior II. *Professor Eddy*
The laws of the equilibrium pressure and flow of liquids and gases; the theory of the action of pumps and air compressors. Open to those who have completed course I in applied mechanics.

III. Thermodynamics of Steam and other Engines. [54] Senior I. *Professor Eddy*
The mechanical theory of heat as applied to steam, gas and oil engines, by analytical and graphical methods. Open to those who have completed courses I and II, in applied mechanics and hydraulics.

IV. Water Turbines. [36] Senior I. *Professor Eddy*
The general mathematical theory of hydraulic turbines, especially with reference to the design of the various types of reaction turbines as affecting their efficiency; turbine governors. Open to those who have completed course II in hydraulics.

V. Steam Turbines. [36] Senior II. *Professor Eddy*
The thermodynamics of the various types of steam, turbines, and theory of their design and construction. Open only to those who have completed courses II and IV on the steam engine, etc., and water turbines.

VI. Refrigerating Machinery. [18] Senior II. *Professor Eddy*
The thermodynamics of ammonia machines of the compression and absorption types, etc. Open to those who have completed course III in the steam engine.

FOR GRADUATES.

Professor Eddy

Selections from the following list of courses in theoretical mechanics and mathematical physics will be offered each year to graduates (or possibly to undergraduates) of sufficient preparation in mathematics and physics according to the needs of the students applying and the amount of time at the disposal of the professor, with whom arrangements should be made at as early a date as possible.

VIII. Theory of Elasticity.
IX. Hydrodynamics and Fluid Motion.
X. Kinetic Theory of Gases.
XI. Potential Function and Electrical Theory.
XII. Flourier's Series, Spherical Harmonics, etc.
XIII. Electro-magnetic Theory of Light.
XIV. Theory of Function of the Complex Variable.
XV. Directional Calculus and Vector Analysis.

PATHOLOGY AND BACTERIOLOGY

The present courses in general pathology and bacteriology for medical and engineering students are offered as minors for Ph. D. and as majors for the master's degree.

A major for the Ph. D. shall consist of research in pathology for medical or experimental medicine prerequisite to which certain of the regular courses offered in this department must be satisfactorily completed.

Before entrance into any course offered in this department, a working knowledge of certain groups of subjects such as histology and embryology, animal biology, anatomy, physiology, botany, chemistry, physics, etc., must be had.

I. General Bacteriology.
Professor Westbrook, Assistant Professor Hill and Dr. Mullin
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. Bacterial activities concerned in sewage purification, etc., will receive attention. Twenty hours per week during the last eight weeks of the second semester, second year.

II. General Pathology.
Professor Wesbrook, Dr. Mullin, Assistant Professor White, and Assistant Professor Hill
Lectures, demonstrations and laboratory work on the general processes involved in disease to include the study of inflammation, the degenerations and tumors. Twenty hours per week during the last eight weeks of the second semester, second year.

PHARMACY

THE GRADUATE COURSE IN THE COLLEGE OF PHARMACY

In addition to its regular undergraduate course 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 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 undergraduate course are equal to those of the undergraduate work of this college; an acquaintance with either German or French sufficient to enable the student to read and understand the scientific literature of 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, upon graduation, an additional fee of ten dollars for diploma. The rules relating to damage, waste and 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.

PHILOSOPHY AND PSYCHOLOGY

FOR UNDERGRADUATES AND GRADUATES

II. Educational Psychology. [3] *II. Assistant Professor Miner, Mr. Haynes*
Open only to sophomores, juniors and seniors who have completed course I.
The study of mental development in its relation to heredity and training. Lectures and student reports on the facts and theories of childhood and adolescence with special reference to their bearing on education.

V. Outline of Experimental Psychology. [3] *II. Assistant Professor Miner*
Open only to those who have completed course I.
Four hours of laboratory work and one hour of discussion. With course IV, this involves a broad survey of experimental methods and results as well as a training for laboratory research in psychology. Typical experiments on sensation and movement.

IV. Experimental Psychology—Higher Mental Processes. [3]
II. Assistant Professor Miner
Open only to those who have completed course I.
If possible, this course should follow course V. It continues the same plan, with experiments on affection, memory, attention, and such other processes as can be studied by laboratory methods. The quantitative phase of Experimental Psychology is taken up for special discussion.

VI. Psychological Interpretation. [3] *I. Assistant Professor Miner*
Open only to those who have completed course I.
Unusual and pathological mental states are studied for the light they throw upon normal mental life. The student is given drill in the detecting of mental defects and in the psychological explanation of characters in history and literature. The subconscious, dreams, suggestibility, telepathy, nervous disorders, insanity, secondary personalities, and the crowd are among the topics treated.

VII. Psychological Principles. [3] *II. Assistant Professor Swenson*
Open to those who have completed courses I and IX.
An advanced course treating in detail some of the more important theoretical problems connected with Psychology. The discussions will center about the methods and aim of the science, its fundamental principles, and its relations to other sciences, regard being had to the general outlines of historical development in these respects.

VIII. Psychological Problems. [3] *I or II. Assistant Professor Miner*
Open only to those who have completed courses III and IV, or their equivalent.
Original work on special topics. Credit hours to be determined by conference with the instructor.

X. Ancient and Medieval Philosophy. [3] *I. Professor Wilde*
Open only to those who have had course I or IX.
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.

XI. Modern Philosophy. [3] *II. Professor Wilde*
Open only to those who have had course I or IX.
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.

XII. The Principles of Ethics. [3] *I. Professor Wilde*
Open to those who have completed course I or IX.
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.

XIII. Philosophy of Religion. [3] *II. Professor Wilde*
Open only to those who have completed course I or IX.
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.

XIV. Logic of Science. [3] *I. Assistant Professor Swenson*
Open to those who have completed course I and IX.
This course serves as an introduction to philosophy through the medium of the special sciences, its aim being to suggest a system of the sciences through a discussion of the nature and relations of their fundamental principles.

XV. Philosophy of Herbert Spencer. [3] *II. Assistant Professor Swenson*
Open to those who have completed courses I and IX.
A critical reading of the First Principles, with references to other important features of the Synthetic Philosophy, and to the philosophical character of the modern scientific movement. The course is intensive, the aim being to develop the power of philosophical criticism in regard to such questions as the logical foundations of the theory of evolution, the relations of science and religion, and the place of the scientific interest 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 course and hours may be arranged to suit the greatest number.

XVI. The Philosophy of Aristotle. *Assistant Professor Swenson*
A critical reading of his logical treatises, the Metaphysics, and the Psychology in the original Greek.

XVII. The Philosophy of Kant. *Assistant Professor Swenson*
A critical reading of the three critiques; the relation of Kant to the development of modern philosophy.

XVIII. The Philosophy of Hume. *Assistant Professor Swenson*
A critical reading of Hume's philosophical works, the position of Hume in the development of English philosophy.

XIX. The Philosophy of Descartes, Spinoza, and Leibnitz.
Assistant Professor Swenson

XX. The History of Ethics. *Professor Wilde*
A critical reading of the chief works in the History of Ethics.

XXI. Systematic Ethics. *Professor Wilde*
A detailed study of the principles of conduct and the basis of moral obligation.

XXII. German Idealism. *Professor Wilde*
A critical discussion of the philosophies of Fichte and Hegel.

XXIII. Metaphysics. *Assistant Professor Swenson*
A critical and constructive discussion of theories of knowledge and reality.

XXIV. 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.

XXV. Research in Psychology. *Assistant Professor Miner*
Minor or major research in experimental educational, analytic, genetic or comparative psychology.

PHYSICS

FOR UNDERGRADUATES AND GRADUATES

I. Mechanics, Properties of Matter, Heat, Sound. [6] *I. Professor Jones*
Experimental lectures, recitations and laboratory work.
Open to those who have completed algebra and trigonometry of courses III and IV.

II. Light, Electricity and Magnetism. [6] *II. Professor Jones*
Experimental lectures, recitations and laboratory work.
Open to those who have completed course I.

III. Electric Measurements. [3] *I. Assistant Professor A. Zeleny*
Lectures and laboratory work.
Open to those who have completed course II.

IV. Physical Manipulation and Laboratory Technique. [3]
II. Assistant Professor A. Zeleny
Open to those who have completed courses I and II.

V. Theoretical Mechanics. [3] *II. Professor Jones*
Open to those who have completed course II.

VII. Advanced Laboratory Work. [6] *I. Professor J. Zeleny*
Open to those who have completed course II.

VIII. Advanced Laboratory Work. [3] *II. Professor J. Zeleny*
Open to those who have completed course VI.

IX. Advanced Laboratory Work. [6] *II. Professor J. Zeleny*
Open to those who have completed course VI.

FOR GRADUATES

X. Kinetic Theory of Gases. [3] *Assistant Professor Erikson*
Open to those who have completed course II.

XI. Radio-activity. [3] *Mr. Kovarik*
Advanced laboratory work. Open to those who have completed course VI.

XII. Discharge of Electricity through Gases. [3] *Professor J. Zeleny*
Open to those who have completed course II.

XIII. The Theory of Light. [3] *Professor Jones*
Open to those who have completed course II.

XIV. The Mathematical Theory of Electricity and Magnetism. [3]
Assistant Professor A. Zeleny
Open to those who have completed course III.

XV. Laboratory Practice. *Professor J. Zeleny*
Original investigation in some special field being the principal feature of this work.

These courses may not be given simultaneously. Students wishing to pursue one or more of these courses should consult the head of the department.

POLITICS

FOR UNDERGRADUATES AND GRADUATES

III. The Elements of Jurisprudence. *I. 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 and 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.

II. *Comparative Government.* *I. Professor Schaper*
An account of the government as the agent of the state; a comparative study of the organization and workings of the governments of the great European powers of today, including the French, German, British and others. Text with lectures and assigned reading.

IV. *American Constitutional Law.* [2] Seniors and graduates.
I and II. Professor Schaper
This is an advanced course in the study of the principles of our constitutional law based on important supreme court decisions and standard works.

IX. *Politics and Administration.* [2] *I and II. Professor Schaper*
A course 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.

VIII. *Theory of the State.* *II. Professor Schaper*
A study in the theory of the state, its origin, nature, purpose and its justification; the state on its physical side, that is, the elements of population and territory. Important theories, like the divine, contract, instinct, the modern socialist, 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 I. A text book with lectures and topical readings.

VII. *Municipal Administration.* *II. 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 corruption and merits of proposed reforms.

FOR GRADUATES

XI. *Seminar in Political Science.* *I and II. Professor Schaper*
For research and the discussion of current problems in administration, politics and public law.

SCANDINAVIAN

FOR UNDERGRADUATES AND GRADUATES

VI. *Scandinavian Literature.* *Professor Carlson*
History of the literature and a study of special authors.

FOR GRADUATES

Courses offered by *Professor Carlson.*

VII. *Icelandic or Old Norse.*
The history, language and literature of Iceland and Norway from earliest times to 1500 A. D.

VIII. *Old Swedish.*
The history, language and literature of Sweden from earliest times to 1500 A. D.

IX. *Old Danish.*
The history, language and literature of Denmark from earliest times to 1500 A. D.

X. *Modern Danish Language and Literature.*

XI. Modern Swedish Language and Literature.

XII. Modern Norwegian Language and Literature.

SEMITIC LANGUAGES

FOR UNDERGRADUATES AND GRADUATES

I. Elementary Hebrew. *I, II. Assistant Professor Deinard*
Harper's Elements of Hebrew and reading of easy prose passages of the Old Testament.

II. Advanced Hebrew. *I, II. Assistant Professor Deinard*
Critical reading of some Old Testament book, with a review of Hebrew grammar.

III. Elementary Arabic. *I, II. Assistant Professor Deinard*
Socin's Arabic Grammar and reading of the prose selections contained in it.

IV. Advanced Arabic. *I, II. Assistant Professor Deinard*
Selected Suras of the Koran and a review of Arabic grammar.

V. Elementary Aramaic or Syriac. *I, II. Assistant Professor Deinard*
Stack's Grammatik des Biblischen Aramaisch, and Brockelman's Syrische Grammatik.

VI. History of the Hebrews to the close of the Persian period. *I, II. Assistant Professor 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.

FOR GRADUATES

Courses offered by *Assistant Professor Deinard.*

I. Critical Study of one of the following Old Testament Books:
Isaiah, The Minor Prophets, The Psalms, or Job.

II. Early Arabic Poetry.
And the relation of the Arabic, grammatically considered, to the Hebrew.

III. Reading of the Aramaic Portions of the Old Testament.
And a review of Aramaic grammar.

IV. History, Prophecy and the Monuments.
Studies in the early history of the Semites.

SOCIOLOGY

FOR UNDERGRADUATES AND GRADUATES

V. Social groups. [3] *I. Professor Smith*
Open to those who have completed course I.
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 of and reasons for the modern city.

VI. The Study of Institutions. [3] *I. Professor Smith*
Open to those who have completed course I.
The genesis of custom and the beginning of law with the geographical and race influence in the growth of states will be studied, as well as the various forms of the family and their relation to forms of civilization.

VIII. Ethnology. [3] *I. Professor Jenks*

Open to those who have had course I, II, IV, or VII.

This is a study of the different races of men in America, Europe, Asia, Africa, and Oceania. The various historical classifications of men into races are presented. The causes of the origin and distribution of the several races and subraces are sought, and from historical perspective and present indications an attempt is made to judge of the future development of races. Ethnological problems are also presented. Text books, lectures, assigned readings, and thesis.

IX. The Philippine People. [3] *I. Profesor Jenks*

This course will present the geography, natural resources, and ethnology of the Philippine Islands. A careful comparative study of the four large ethnic and culture groups of people will be made; tropical influences will be noted; the present policy of the Insular Civil Government will be outlined, so far as it tends to modify the natural characteristics and modern culture of the inhabitants, and to affect American home interests in the Orient. This course aims to present a practical model for the investigator of human culture, and to introduce students to Oriental race problems; it will also better fit students for government, business, or missionary service in the Orient. Lectures, illustrated lectures, assigned readings, and thesis.

X. Physical Anthropology. [3] *II. Professor Jenks*

Open to those who have had courses VII or VIII.

This course studies the physical variations in the human body. It pays especial attention to those variations which distinguish one race or group of men from another; and it seeks the cause and significance of such variations. It also attempts to trace the physical evolution of the human body and to forecast its future, studying both its development and decline. Six lectures on the development and anatomy of the human brain will be given by Professor Charles A. Erdman, M. D. This course is of prime importance to all advanced students in the department of Sociology, and of interest to students preparing for the Medical course. Lectures, laboratory work, assigned readings, and thesis.

XI. The American Negro Race. [3] *Professor Jenks*

Open to those properly qualified. Not given in 1907-8.

This course will begin with a study of the Negro's African tribal kinsmen, and trace the rise and development of the American Negro race from the birth of American slavery. The present characteristics, traits and conditions of the Negro will be especially considered. The developing tendencies of the Negro will be studied for the purpose of considering the probable future of the American Negro race. Lectures, assigned readings, and thesis.

XII. The American People. [3] *Professor Jenks*

Open to those properly qualified. Not given in 1907-8.

This course presents the distribution of the different peoples of the world found in the United States. It seeks the natural genius of the peculiar home development of these peoples, and notes the modifications of this development in America, thus portraying the ethnic contribution of each to American civilization. It will aim to discover the dominant physical, mental, and moral characteristics of each people, and attempt to determine the relative ethnic and cultural importance of each to the Nation.

STRUCTURAL ENGINEERING

Courses offered by *Professor Constant*

FOR UNDERGRADUATES AND GRADUATES

I. Structural Designs. Prerequisite, courses in stresses and structural details. Senior I. 170 hours; II. 170 hours
Theory and design of steel structures, including railway and highway bridges, standpipes and towers, and other problems of structural interest. Theory of higher structures. Reference: Johnson's Stresses, Merriman's Part III and IV Bridge Series. Ten hours per week.

II. Masonry Construction. Prerequisites, I. Senior I. 136 hours
Properties of stones, bricks, cement and concrete, and their use in engineering structures. Foundations, retaining walls, piers and abutments, dams and chimneys. Theory of reinforced concrete. Theory and design of masonry arches. Design of stone and concrete structures. Lectures and textbook work, two hours per week; drawing room work, six hours per week. Reference books: Baker's Masonry, Church's Mechanics, and current periodical engineering literature.

FOR GRADUATES

III. Swing and Lift Bridges.
Detailed study of mechanism and power for operating moving bridges, and complete design, with working drawings for a swing or bascule bridge.

IV. Higher Structures.
Theory and design of cantilever, suspension and arch bridges. Analysis of indeterminate structures and complex portal bracing. General theory of flexure and application to special problems.

Degrees Granted In 1906

TOTAL—544.

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

FOR BACHELOR OF ARTS. 225.

Jessie Fremont Abbott, Minneapolis.
Alma Clara Aldrich, Minneapolis.
Adolph A. Anderson, Langford, S. D.
Marie Atterbury, Anoka.
Hattie Austin, Minneapolis.
Magnus H. Aygarn, Clarkfield.
Carrie Agnes Bachtle, Mapleton.
Florence Jeannette Baier, Minneapolis.
Frank Morris Ball, Minneapolis.
Arthur R. Barnes, Campbell.
Elsie Mariam Barquist, Minneapolis.
Vera F. Barrows, Minneapolis.
Charles Walter Bergstrom, Minneapolis.
Wilhelmina S. C. Beyer, St. Paul.
Eva Maud Blasdell, Minneapolis.
Julia Marie Blekre, Minneapolis.
Maude Stewart Bliss, Minneapolis.
Belle V. Bonsteel, Minneapolis.
Gertrude Bowne, Duluth.
Martha T. Broberg, New London.
Theodore Arthur Buenger, St. Paul.
Marjorie Louise Bullard, St. Paul.
Polly Caroline Bullard, St. Paul.
Bernice Vieva Bullock, Minneapolis.
Florence Emma Burgess, Minneapolis.
Louise Burwell, St. Paul.
Georgianna Elmira Campbell, Princeton.
Evelyn May Card, Minneapolis.
Phillip Emanuel Carlson, Cannon Falls.
Florence Rose Castor, Waseca.
Van Rennselaer Chase, St. Paul.
Theodore Christianson, Dawson.
Stephens Gilman Clark, Stillwater.
Guy Earl Clutter, Anoka.
Ethel Clark Cockburn, Minneapolis.
Earle Gladstone Constantine, St. Paul.
Ida Christine Crogan, Minneapolis.
Harriet Marie Crooks, St. Paul.
Alice Isabelle Currer, LeSueur.
Paul D. Dansingberg, Minneapolis.
Raymond Grant Davidson, Sauk Centre.
Jennie E. Dawson, Minneapolis.
William Dawson, Jr., St. Paul.
Florence Augusta Dickinson, St. Paul.
Mary Louise Diether, St. Paul.
Francis Marion Dolan, St. Paul.
Isabel Sturtevant Dunn, Minneapolis.
George Arthur Earl, Minneapolis.
Luther J. Eastberg, Franklin.
Nellie May Elliott, Fergus Falls.
Frank Taggart Everhard, Minneapolis.
Elizabeth S. Feller, St. Paul.
Sadie Monica Fitzgerald, Litchfield.
Fanny Xeriffa Fligelman, Minneapolis.
Orlow Bailey Flinders, Sutherland, Ia.
Willis Hazeltine Frisbee, Sheldon, Ia.
Anna Funk, Minneapolis.
Edith May Garbett, Minneapolis.
Mary Lucile Geary, St. Paul.
Mary Colburn Goff, Minneapolis.
Sara Goldman, St. Paul.
Mabel Goodrich, Anoka.
Mildred Clare Gordon, Minneapolis.
Helen R. Gove, Minneapolis.
Maud Graves, Minneapolis.
Edna Lillian Greaves, Glencoe.
Glenn Henry Greaves, Glencoe.
Elizabeth Browne Greene, Sheldon, N. D.
Frederick F. Griebenow, Alexandria.
Grace Gretchen Grygla, Minneapolis.
Harriet L. Hagen, Minneapolis.
John Oliver Halverson, Madelia.
Mathilde K. Hansen, Minneapolis.
Verna MaBelle Hanson, Rochester.
Elizabeth Hatch, LaMoille.
Ruth Haynes, Minneapolis.
Martha P. Hazzard, Minneapolis.
Ernest A. Heilman, Redwood Falls.
Patrick Robert Heily, Graceville.
Charles Frederick Hellberg, Owatonna.
Bertha Edith Herum, Hudson, Wis.
Nellie Crags Heyd, St. Paul.
Jessie Bennett Hill, Minneapolis.
Ruth Holway, Minneapolis.
Jessie Helen Horn, St. Paul.
Helen Rosina Hubbard, St. Paul.
Irving M. L. Hudson, Benson.
Luella Huelster, St. Paul.
Eva Hank Hunter, Anoka.
Mildred Marion Hunter, Tracy.
Fred R. Huxley, Minneapolis.
Ethel Indie Huyck, Minneapolis.
Louise Irmen, Minneapolis.
Mary Ives, Minneapolis.
Genevieve Jackson, Minneapolis.
Charles Eugene Johnson, Minneapolis.
Edward Carl Johnson, New Richland.
Ida Amanda Johnson, Minneapolis.
David M. Jones, Wabasha.
Lois Mary Jordan, Minneapolis.
Minnie Barbara Kaercher, Minneapolis.
Hazel May Kaull, Redfield, S. D.
Blanche Elizabeth Kinnard, Minneapolis.
Anna Isabel Knowlton, St. James .
Albert Carl Koch, Peking, Ill.
Arnol Otto Kramer, Preston.
Hettie Kummerer, Minneapolis.

Myron Hall LaGrange, Minneapolis.
Adelaide Lamphere, St. Paul.
Lewis Larson, Atwater.
Hazel Lauderdale, Minneapolis.
Elsie Preston Leonard, Minneapolis.
Horace Hardy Lester, Minneapolis.
Lucretia Lucile Lewis, Cannon Falls.
Edith Alda Linkfield, Minneapolis.
Anna Sylvia Litowitz, Minneapolis.
Avis LeGro Lockerby, Minneapolis.
Eliza Serene Loe, Minneapolis.
Ethel Marie McIntyre, Minneapolis.
Henry Clinton Mackall, Minneapolis.
Corinne Frances McMillan, Minneapolis.
Leola Louise Markus, Duluth.
Ida Emelia Martinson, Maynard.
Adeline Rhoda Marvin, Pine Island.
Hattie Evelyn Marvin, Zumbrota.
Kittybelle Mason, Minneapolis.
Catherine Millar, Minneapolis.
Roy Spencer Millisack, Minneapolis.
Claude Guile Miner, Blue Earth.
Carl Henry Moe, Minneapolis.
Sarsfield Gerald Moran, Graceville.
Marie Footner Moreland, St. Paul.
Alice Anne Morris, Minneapolis.
Guy Moses Morse, Minneapolis.
James Z. Nebbergall, Sioux Falls, S. D.
Clarence J. Neilson, Minneapolis.
Clara Isabel Nelson, Litchfield.
Wilhelmina H. Neumann, Little Falls.
Iris Bailey Newkirk, Minneapolis.
Fay Margaret Newton, St. Paul.
Anna N. Nyquist, Eagle Lake.
Peter Olaus Okkelberg, Goodhue.
Theresa Anna Olsen, Minneapolis.
Mary Elisabeth Organ, Minneapolis.
Ethel Gillette Palmer, Minneapolis.
Florence Marie Palmstrom, Hastings.
Grace Edith Papst, Minneapolis.
Jarvis Montgomery Partridge, Grand Rapids.
Sidnee Pattee, Minneapolis.
Mabel Irene Patterson, St. Paul.
Frederick Witter Payne, Lakefield.
Arthur Leonard Peterson, Benson.
Earl Pettijohn, St. Paul.
Ruby Gwenllian Phillips, Minneapolis.
Alice Lydia Pomeroy, Minneapolis.
Frederick Warren Putnam, Red Wing.
Irene Radcliffe, Minneapolis.
Florence Marie Raihle, Minneapolis.
Edith Louise Reed, Minneapolis.
Emma D. Ripley, Minneapolis.
William Henry Rowe, Jr., St. James.
Harry Eustace Ruble, Albert Lea.
Albert Running, St. James.
Ella C. Ruscoe, Minneapolis.
Charlotte Hammond Sanborn, Minneapolis.
William C. L. Schaefer, St. Paul.
Eleonora L. Schnell, St. Charles.
Alice B. Schoch, St. Paul.
Harriet Winslow Sewall, St. Paul.
Arthur D. Sinclair, Minneapolis.
John Franklin Sinclair, Minneapolis.
Mary Estella Slaven, Austin.
Carroll Ninde Smith, Peking, Ill.
Helen Maude Smith, Minneapolis.
Pearl Smith, Minneapolis.
Roy Howard Smith, Shakopee.
Effie Spence, Harman.
Paul Lord Spooner, Morris.
Elvin Charles Stakman, Brownton.
Theodore T. Stenberg, Ormsby.
Verene Ottilie Stephan, Elgin.
Alice M. Stewart, Mankato.
Mark Leonard Stewart, Mabel.
Mabelle V. Stocking, Minneapolis.
Paul D. Stratton, Granite Falls.
Arthur D. Stroud, Mabel.
Io Sublette, Minneapolis.
Mathias Sundt, Minneapolis.
Charles Stewart Sutton, Prior Lake.
Elaine Elizabeth Swanson, Minneapolis.
Katharine Malinda Taney, St. Paul.
Kenneth Taylor, St. Paul.
Agnes A. Tennison, Monticello.
Alice Elizabeth Thompson, Minneapolis.
Antoinette Barnard Thompson, Minneapolis.
Chas. Richard Thompson, Minneapolis.
Gladys I. Thompson, Minneapolis.
Nellie Lovinna Thompson, Minneapolis.
Stuart McMillan Thompson, Cincinnati, O.
Charles N. Tierney, Farmington.
Mary Tillotson, Moorhead.
Conrad A. Tressman, Mayer.
Albert Troutfether, Windom.
Eloise N. Truesdell, Minneapolis.
Bessie Mae Tucker, Minneapolis.
Lillian Exceene Utley, Preston.
Lydia Way Vallentyne, Minneapolis.
Harriet VanBergen, Minneapolis.
Nellie Margaret VanRickley, Minneapolis.
Roy Albion Vickery, Minneapolis.
Hazel May Ward, Glenwood.
Agnes Merritt Watson, St. Paul.
Emma Letitia Watson, St. Paul Park.
Clara Lucile Way, Minneapolis.
Rodney Mott West, Minneapolis.
Anna Weum, Minneapolis.
Mabel Amelia Wheeler, Minneapolis.
Esther Elizabeth Whitcomb, Atwater.
Anna May Whitney, Rochester.
Vesta F. Williams, Brooklyn Centre.
John J. Wilson, Minneapolis.
Lucy Pearl Wiseman, Pine City.
Floyd Francis Yeager, Minneapolis.
Hattie M. Young, St. Paul.

FOR CERTIFICATE OF PROFICIENCY IN MUSIC. 1.

Verna MaBelle Hanson, Rochester.

FOR BACHELOR OF SCIENCE. 2.

August Edward Bostrom, Minneapolis. Melvin S. Nelson, Bagley.

FOR MASTER OF SCIENCE. 2.

Francis C. Frary, Minneapolis.
B.S., '05.
Major, Chemistry, Minors, Electricity and Mathematics.

W. H. Truesdell, Minneapolis.
E.M., '03.
Major, Geology, Minors, Mineralogy and Chemistry.

FOR MASTER OF ARTS. 16.

Mary Elizabeth Bell, St. Paul.
B.A., '05.
Major, English, Minors, Pedagogy and Geology.

Helen L. Brooke, Minneapolis.
B.S., Nebraska University, '98.
Major, French, Minors, Spanish and Anglo Saxon.

Robert E. Griggs, Minneapolis.
B.S., Ohio State College, '03.
Major, Botany, Minors, Geology and Zoology.

Charles Elliott Huff, Minneapolis.
B.S., '99.
Major, Botany, Minors, Geology and Sociology.

Ned L. Huff, Minneapolis.
B.A., '03.
Major, Botany, Minors, Geology and German.

Marie Harholdt, St. Paul.
B.A., '04.
Major, English, Minors, German, History.

Harry D. Love, Minneapolis.
B.A., '05.
Major, Latin, Minors, Greek and German.

Gustav Melby, Minneapolis.
B.A., S. D. University.
Major, English, Minors, Norwegian and Hebrew.

Edith R. Moore, St. Paul.
B.A., Vassar, '04.
Major, History, Minors, English and Pedagogy.

Elizabeth Middleton, Minneapolis.
B.A., Earlham, '04.
Major, Spanish, Minors, English and French.

Lillian Nixon, Minneapolis.
B.A., '03.
Major, English, Minors, Philosophy and French.

Ruth Josephine Sandvall, Minneapolis.
B.A., '05.
Major, Latin, Minors, German and Greek.

S. Albert Skinner, Minneapolis.
B.S., Upper Iowa, '97; M.S., '99.
Major, Botany, Minors, Zoology and Chemistry.

Helena Warrington, Minneapolis.
B.A., '05.
Major, History, Minors, English and Latin.

Albert Davis Wilhoit, Minneapolis.
Major, Chemistry, Minors, Mineralogy.
B.A., Macalester, '05.

Mary Martin Yardley, Minneapolis.
B.S., Wellesley, '90.
Major, Latin, Minors, German and Italian.

FOR DOCTOR OF PHILOSOPHY. 2.

Peter A. Mattson, B.A., Gustavus Adolphus, '92.
Thesis: "The Development of the Constitutional Idea in Sweden."

John Zeleny, B. S., '92, B.A., Cambridge, 1900.
Thesis: "The Velocity of the Ions produced by Röntgen Rays."

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS.

FOR CIVIL ENGINEER. 13.

Elmer Ellsworth Adams, Willmar.
Bannona Gerhardt Alrick, Zumbrota.
Ernest Benbow Alsop, Minneapolis.
Fred Pabst Bowen, St. Paul.
Hervey Butler Childs, Ortonville.
John Chauncey Childs, Minneapolis.
Tresham Dames Gregg, Minneapolis.
Monroe Hanauer, St. Paul.
George Irwin Hayward, Pine Island.
Charles James Malloy, Red Wing.
John Murphy, Litchfield.
Arthur Lathrop Reed, Minneapolis.
Frederick Edward Wiesner, Tracy.

FOR MECHANICAL ENGINEER. 7.

Thomas Stanley Armstrong, Minneapolis.
Wallace T. Crawford, Faribault.
Gabriel Everett Garber, Minneapolis.
Benjamin W. Loye, Red Wing.
Frank Elmer Matteson, Eyota.
Arthur Christian Ringsred, Duluth.
Norman W. Rose, Duluth.

FOR ELECTRICAL ENGINEER. 28.

George M. Albrecht, St. Paul.
Paul Fay Bunce, Minneapolis.
John Peter Calmeyer, Glenwood.
Nathan Cohen, Minneapolis.
Leo Henry Cooper, Minneapolis.
Martin Cornelius, Roberts, Wis.
Andrew Paul Dunn, Winnebago City.
Charles F. Englin, Stillwater.
Jacob Oscar Finchy, Wabasha.
Henry Hopson Glascock, Minneapolis.
Albert Nelson Gunther, St. Paul.
Elmer Harvey Haeberle, New Ulm.
Christopher Hoff, St. Paul.
Clarence E. Hokanson, Hector.
Robert Thorold Hubbard, St. Paul.
Charles Arthur Lang, Minneapolis.
Harry Wheelock Mowry, Minneapolis.
Harold Gould Payne, Minneapolis.
Otto Bismarck Roenke, Minneapolis.
Harry Albert Schow, Minneapolis.
Walter Frederick Schwedes, Wabasha.
Gordon Russell Shuck, Rushmore.
Laurence A. Stegner, Minneapolis.
Harris Garfield Stone, Minneapolis.
Carl Mugg Ungerman, Waseca.
Erwin L. F. Weber, Helena, Mont.
Gerald Graham Wiggins, Minneapolis.
William Arthur Zimmer, Big Stone City, S. D.

THE SCHOOL OF MINES.

FOR ENGINEER OF MINES. 13.

John Brandt, St. Paul.
Lester L. Clement, Winona.
Guy P. Harrington, Hutchinson.
Frank Twombly Howes, Minneapolis.
Paul Starr Kurtzman, Minneapolis.
William F. Moenke, Belle Plaine.
Charles Morgan, Zumbrota.
Bertholdt Robert Neustadt, Minneapolis.
Edward Silvester O'Connor, Highwood.
Horace Cole Rawson, Fergus Falls.
William A. Rose, Duluth.
George Watson Wallace, Jr., Duluth.
Walter Hall Wheeler, Minneapolis.

THE SCHOOL OF CHEMISTRY

FOR ANALYTICAL CHEMIST. 1.

Otto Lewis Bernhagen, Minneapolis.

THE COLLEGE OF AGRICULTURE

FOR BACHELOR OF SCIENCE IN AGRICULTURE. 7.

Amos John Gaumnitz, St. Cloud.
Marc Carl Leager, Minneapolis.
Harry Scott Muir, Winnebago.
William Argalus Peck, St. Anthony Park.
William Arnold Peterson, St. Anthony Park.
Pierre Duane Southworth, St. Anthony Park.
James Benjamin Torrance, Minneapolis.

FOR BACHELOR OF SCIENCE IN FORESTRY. 4.

William T. Cox, St. Anthony Park.
Frank Irvin Rockwell, Osseo.
Samuel Bertolet Detwiler, St. Anthony Park.
Dillon Parnell Tierney, Farmington.

FOR BACHELOR OF SCIENCE IN HOME ECONOMICS. 1.

A. Adel Thompson, College Grove.

THE COLLEGE OF LAW.

FOR DOCTOR OF CIVIL LAW. 1.

Albert R. Moore.

FOR MASTER OF LAWS. 10.

La Roy Baird, River Falls, Wis.
I. Frank Cotton, Minneapolis.
Henry J. Fletcher, Minneapolis .
Hiram David Frankel, St. Paul.
James Edward Mehan, Minneapolis.
C. Knute Semling, Halstad.
Tomesabura Shimizu, Mayabashi, Japan.
Homer W. Stevens, Loman.
Robert Kincade Stuart, Minneapolis.
William Edward Thompson, Minneapolis.

FOR BACHELOR OF LAWS. 103.

Gustavus Wilhelm Allen, Minneapolis.
Albert S. Anderson, Stewartville.
Victor Emanuel Anderson, Wheaton.
Arthur E. Arntson, Red Wing.
Adolph William Aylmer, Minneapolis.
Willus Norman Beal, Guilford, Me.
John Bliss Bell, Minneapolis .
A. Melvin Breding, Minneapolis.
Joseph Brorby, Minneapolis.
Garfield W. Brown, Pipestone.
Fred Russel Burrell, Princeton.
William M. Carey, Jr., Mapleton.
Fred J. Carpenter, Parker, S. D.
Herbert John Charles, St. Paul.
Irwin Allen Churchill, Rochester.
Percival M. Clark, Ortonville.
Arthur H. Clarke, Minneapolis.
Charles A. Coakley, Flandreau, S. D.
Louis Loren Collins, Minneapolis.
William D. Crouley, Minneapolis.
Horace Fulton Curtis, Minneapolis.
Edward Harvey Davin, Minneapolis.
Burr A. Dickinson, St. Paul.
Chester B. Dille, Minneapolis.
Frederick Samuel Domes, Blue Earth.
Don Carlos Dow, Worthington.
Clarence E. Drake, Minneapolis.
Howard V. Dyer, Pipestone.
Axel Albert Eberhart, Mankato.
Harry J. Edison, Minneapolis.
Marvin Jay Eggleston, Minneapolis.
David Charles Freimuth, Minneapolis.
Daniel Ramsey Frost, St. Paul.
Richard Maurice Funck, Minneapolis.
Richard F. Gallagher, Minneapolis.
Richard Nelson Gardner, Minneapolis.
Frank Ross Garvin, Mapleton.
J. Henry Gruber, St. Paul.
Hans A. Hanson, Fergus Falls.
Jesse Gideon Henderson, Minneapolis.
Clyde Ackley Hewitt, Nassau.
Walter Clifford Hinman, Brainerd.
George Paul Homnes, Castle Rock, Wis.
Martin John Hurley, Pine City.
Andrew Johnson, Valley City, N. D.
Carl Arvid Johnson, Mankato.
Henry A. Johnson, Minneapolis.
Louis Harvey Joss, Minneapolis.
John Henry Kay, St. Paul.
Edward Lincoln Kimball, Duluth.
Henry G. Kleinschnitz, Eau Claire, Wis.
Sigvard M. R. Koefod, Ashby.
Victor S. Langlois, Minneapolis.
John C. Larson, Irving.
Peter R. Lavik, Minneapolis.
Hugh E. Leach, Spring Valley.
John Chester Lewis, Hutchinson.
Roy V. Lewis, Worthington.
Henry J. Linde, Ridgeway, Ia.
J. Raymond Lindgren, Adrian.
Gustavus Loevinger, Mitchell, S. D.
Seth Lundquist, Minneapolis.
Dennis Francis Lyons, Merriam Park.
Charles David McCanna, McCanna, N. D.
William Allison McManigal, St. Paul.
William Oscar McNelly, Minneapolis.
Peter Magnus Magnusson, Minneapolis.
Thomas Mani, Sisseton, S. D.
Clifford John Menz, St. Paul.
Herbert A. Merrifield, Elk River.
Ray O. Miller, St. Paul.
George Nordin, St. Paul.
Willis Irving Norton, Minneapolis.
Charles E. Phillips, Larabee, Ia.
J. A. O. Preus, Decorah, Ia.
William Hammond Pryor, Winona.
Charles Richard Pye, Northfield.
John G. Redding, Minneapolis.
Albert Preston Reed, Minneapolis.
Albert C. Remele, Minneapolis.
Bernard Robinson, Minneapolis.
Christian Rosenmeier, Thorpe.
Warren E. Shuck, Rushmore.
Harold Schull, Minneapolis.
William T. Schultz, Pine Island.
Charles E. Smith, Wadena.
George David Smith, Redwood Falls.
David Lowe Stine, Slayton.
John Woodcock Stradley, Cresco, Ia.
John Swendiman, Jr., Dodge Center.
John Swinland, Minneapolis.
David Richard Thomas, Minneapolis.
Carl Otto Thorsen, Minneapolis.
June Jaye Truax, Mantorville.
George Harvey Tyler, Willmar.
George C. Van Dusen, Minneapolis.
Henry Van Fredenberg, Alexandria.
Alfred W. Uhl, Faribault.
S. M. Waters, Minneapolis.
Wayne Richard Werring, Minneapolis.
Carl John Wold, Minneapolis.
Charles Rolla Wright, Fergus Falls.
Margaret A. Young, Minneapolis.

THE DEPARTMENT OF MEDICINE

FOR DOCTOR OF MEDICINE. 49.

William Pitt Abbott, St. Paul.
Edward Mayo Ashley, Pembina, N. D.
Paul Leonard Ashley, St. Cloud.
Seiler Joseph Aspelund, Mondovi, Wis.
Harry Jacobs Bartron, Lake City.
Luthard M. Bergh, Audubon.
Elwyn R. Bray, Biwabik.
William George Brede, Minneapolis.
Nathan Cowperthwaite Bulkley, Danbury, Conn.
Arthur J. Button.
Gottfried William Callerstrom, Gowrie, Ia.
Harry E. Canfield, St. Charles.
Edwin L. Carlsen, Albert Lea.
Sigfried J. Cheleen, Rock Island, Ill.
J. H. Cosgrove, St. Paul.
Orriman S. Ely, West Superior, Wis.
George Heigert Green, St. Peter.
Olaf Jenson Hagen, Abercrombie, N. D.
Ernest Martin Hammes, Hampton.
Claude Leonard Haney, Minneapolis.
Ray Roberts Knight, Minneapolis.
Alfred H. Ludeman, Minneapolis.
Axel B. Lund, Dawson.
Jerome E. McLaughlin, Lewiston, Idaho
Charles McMahon, Adrian.
James N. Metcalf, Minneapolis
Harry William Miller, Wahpeton, N. D.
William Wilmerding Moir, Minneapolis.
Edward Moren, Minneapolis.
Niels Nielson, Denmark.
Henry B. O'Brien, St. Paul.
Reuben Martin Pederson, Hanley Falls
Victor Nathan Peterson, Cokato.
Chelsea Carroll Pratt.
Clarence P. Rice, Appleton.
Gustav Leander Rudell, Winthrop.
John P. Schneider, Minneapolis.
John P. Schutt, Minneapolis.
Simon Peter Seaberg, Minneapolis.
Frederick LeRoy Smith, Sioux Falls, S. D.
Margaret Isabel Smith, Minneapolis.
Carl Benjamin Teisberg, Ashby.
Frank Aloysius A. Tyler, Brainerd.
Clinton C. Tyrrell, Hamline.
Victor E. Verne, Minneapolis.
Peder S. Vistaunet, Fargo, N. D.
Guy F. Walter, Minneapolis.
Carl Albion Witham, Rock Elm, Wis.
Arthur Rufus Trego Wylie, Faribault.

FOR HOMEOPATHIC MEDICINE AND SURGERY. 1.

Bertha Gray Newkirk.

THE COLLEGE OF DENTISTRY

FOR DOCTOR OF DENTAL SURGERY. 41.

Frederick Arthur Amundson, St. Peter.
Carl Ernfried Anderson, Kennedy.
Harry J. Baker, Rose Creek.
Harvey Dwight Barnett, Minneapolis.
Oscar Bjorge, Lake Park.
Adolph Leonard Blix, Granite Falls.
Louis Dale Blondel, Spencer, Ia.
Ernest Wm. F. Boerner, Buffalo.
Wayne Bliss Corser, St. Paul.
Stephen R. Fortier, Little Falls.
Marcus Frederickson, Lakefield.
Ula Emil Heddy, Minneapolis.
Walter Sandberg Huntington, Marion, Ia.
William Richard Jung, Fergus Falls.
Edward Henry Junclaus, Glencoe.
Kaare Kaasen, Minneapolis.
Ernest Clayton Kendall, Minneapolis.
Louis William Korfhage, St. Paul.
James Thomas Layne, Rushford.
Alexander Cameron Lestico, Glencoe.
Emil Hjalmar Lier, Ashby.
Robert Victor Malmgren, Young America.
Merton R. Melvin, Wheaton.
William Basil Morstain, Minneapolis.
George Andrew Nelson, Minneapolis.
Verner Hjalmar Nilsson, Minneapolis.
Carlton Percy Olsen, Minneapolis.
Claus Alvin Rollin, Sweden.
Arthur Taylor Rowe, Casselton, N. D.
Carlus Selvig, Rushford.
Walter Herbert Smith, Fairfax.
Stephen Howard Spurr, Minneapolis.
Howard W. Thomas, Ellendale, N. D.
Joseph Leo Tomasek, Wauconia, Ia.
George Chester Turner, Lanesboro.
Isador John Wahlstrom, Fergus Falls.
Charles Edgar Waiste, Minneapolis.
R. Mortimer Weaver, Spencer, Ia.
Amos Schumpert Wells, Newberry, S. C.
Conrad Peter Winther, New Paynesville.
Leslie Maley Woodbury, Zumbrota.

THE COLLEG OF PHARMACY

FOR PHARMACEUTICAL CHEMIST. 17.

Henry Joseph Barnett, Wheatland.
William H. Bockoven, Clark, S. D.
Edwin G. Carlson, Willmar.
Joseph Patrick Cutting, Sleepy Eye.
Robert E. Desmond, Rushford.
D. Curtis Frise, Minneapolis.
Leonard Granberg, Minneapolis.
John Abner Handy, Good Thunder.
Edward Philip Kennedy, Marshall.
Koyla M. Ketcham, Herman.
Leo Daniel Madden, Eyota.
Robert North, Hudson, Wis.
Henry Ellis Peterson, Litchfield.
Sumner Amos Peterson, Atwater.
Carolyn H. Smith, Minneapolis.
George Thrall Stewart, Elk River.
LeRoy Sweet, River Falls, Wis.

The College of Science, Literature, and the Arts

SENIORS—221

Anderson, Ella M., Hibbing.
Applebee, Inez A., Anoka.
Atwater, Florence Fay, St. Paul.
Babcock, Donald C.,
Grand Forks, N. D.
Bacon, Lora D., Minneapolis.
Barrett, Edith M., Stillwater.
Bearnes, Clara H., Minneapolis.
Berg, Ingeborg M., Minneapolis.
Berger, Edla G., St. Anthony Park.
Bicknell, Blanche L., Minneapolis.
Blackburn, Nathan B., Salem, Mass.
Blegen, Carl W., Minneapolis.
Bliss, Margaret S., Minneapolis.
Bowler, Edna B., Minneapolis.
Bragdon, G. B., Minneapolis.
Brooberg, Ethel S., Minneapolis.
Brooks, Pearl M., Minneapolis.
Brown, Montreville J., Minneapolis.
Burgan, Essie M., Minneapolis.
Burton, Beulah I., Minneapolis.
Butler, Anna, Minneapolis.
Butler, Marietta, Minneapolis.
Calhoun, Frederic D., Minneapolis.
Campbell, Alma B., Minneapolis.
Campbell, Anna J., Hopkins.
Campbell, Carl G., Burkeville, Va.
Casey, Martin J., Jordan.
Chadwick, Eugene E., LeSueur Center.
Chamberlain, Frances, Minneapolis.
Chapman, Emily K., Sioux Falls, S. D.
Clark, F. Mildred, Minneapolis.
Coapman, Wall G., Columbus, Wis.
Cockburn, Edna G., Minneapolis.
Cograve, Pansy B., Minneapolis.
Cole, Vera V., Minneapolis.
Cooper, Florence, Minneapolis.
Copley, Mary E., St. Paul.
Cox, Ella G., Cloquet.
Craven, Jennie, Faribault.
Cressy, Earl H., Minneapolis.
Crossman, Rose A., Minneapolis.
Crounse, Agnes R., Minneapolis.
Dahl, Anna D., Minneapolis.
Dahlberg, Effie H., Minneapolis.
Dart, Izella M., Litchfield.
Dart, Raymond, Litchfield.
Davis, Reba, Winchester, N. D.
DeVeau, Katherine L., Minneapolis.
Dewart, Richard H., St. Thomas, N. D.
Dickinson, Grace, Buffalo.
Diether, Althea, St. Paul.
Donovan, Kathryne, Clontarf.
Dunn, M. Irene, St. Cloud.
Dyar, Ralph E., Winona.
Easton, Dana M., Warren.
Ebert, Michael H., Glencoe.
Eichholzer, Rupert, Owatonna.
Ellefson, Elven T., Jackson.
Ellison, Culver, Minneapolis.
Elmer, Edna, Minneapolis.
Engdahl, J. Louis, Minneapolis.
Enright, Mollie C., St. Paul.
Evans, Gertrude S., Miles City, Mont.
Fairfield, Elizabeth P., Minneapolis.
Ferraby, Mary H., Grovelake.
Frey, Bernice V., Minneapolis.
Frye, Lucius A., St. Paul.
Gallup, Helen T., St. Cloud.
Gaus, Mildred B., Minneapolis.
Gee, Gertrude L., Monticello.
Gibbs, Mabel H., Waterville.
Gleason, Mary F., Minneapolis.
Gloor, Arnold, Minneapolis.
Gould, Edna H., Minneapolis.
Green, Elberta, Minneapolis.
Griggs, Richard L., Virginia.
Grime, Florence L., Minneapolis.
Grindeland, Clarice, Warren.
Guthrie, Florence K., Blooming Prairie.
Hall, Orrin I., Zumbrota.
Hammond, Lola, Minneapolis.
Hansen, Mabel J., Alden.
Hare, Howard M., Minneapolis.
Hartgering, Constance,
Rapid City, S. D.
Hathorn, Irma, Minneapolis.
Heffner, Corinne, Minneapolis.
Heffron, Gussie B., Bemidji.
Heinsius, Cecil, Minneapolis.
Helson, Mary C., St. Paul.
Hicks, Frances, St. Paul.
Higbee, Marie A., Minneapolis.
Higbie, Edgar, Minneapolis.
Higgins, Adele L., Minneapolis.
Higgins, Fannie, Minneapolis.
Hill, Helen, St. Cloud.
Hill, Ruth H., Minneapolis.
Hille, Clara E., Fergus Falls.
Hills, Minnie L., St. Paul.
Hodgson, Frank C., Minneapolis.
Hofflin, Florence L., Hopkins.
Honnold, John G., Le Mars, Ia.
Hubbard, Dorothy B., Lake Elmo.
Hull, Mabel B., Litchfield.
Huntley, Earl W., Spring Valley.
Inaoka, Seimin, Minneapolis.
Jaquess, Agnes, Minneapolis.
Jedlicka, Alex I., Vesta.
Jefferson, Charlotte C., Bingham Lake.
Jones, Myrtle M., Minneapolis.
Josephson, Chester A., Red Wing.
Keating, Monica C., St. Paul.
Kelley, Esther B., St. Paul.
Knappen, Elizabeth E., Minneapolis.
Knoblauch, Louise, Minneapolis.
Kutnewsky, Walter K., Redfield, S. D.
La Due, Eva, Minneapolis.
Lagerstedt, Albert, Gibbon.
Latimer, Homer B., Minneapolis.
Lee, Oliver J., Clarkfield.
Little, G. R., Kasson.
Loftus, Mary F., Minneapolis.
Loomis, Floyd S., Owatonna.
Lovell, Helen S., Minneapolis.
Lydiard, Eva A., Long Lake.
Lyon, Frank S., Minneapolis.
McCauley, Ethel N., McCauleyville.
McGregor, May, Minneapolis.
McKay, Natalie R., Brownton.

McKenzie, Jessie C., Wild Rice, N. D.
McLennan, Winnifred G., Crookston.
McPartlin, Ellen E., Glencoe.
Marchant, Lura E., Minneapolis.
Marsh, Elizabeth, Stillwater.
Matcham, Roy W., Minneapolis.
Maynard, Pearl, Long Prairie.
Miller, Harry H., Grove City.
Miller, Margaret C., Sheldon, Ia.
Misz, Alice M., St. Paul.
Michener, Carroll K., Spring Valley.
Moran, Sadie V., Graceville.
Moulton, Dora H., Dawson.
Moulton, Roy J., Dawson.
Muir, Robert W., Hunter, S. D.
Nelson, Hattie R., Minneapolis.
Oliver, Amy S., Eau Claire, Wis.
O'Neill, Edward J., Graceville.
Palmer, Rilla Wood, St. Paul.
Pederson, I. Alice, Rothsay.
Pennington, Georgiana, Minneapolis.
Perkins, Claude C., Pine Island.
Peterson, Anna M., Mineapolis.
Phelps, Edith M., Minneapolis.
Pitts, Clara P., Alton, Ia.
Plummer, Lillian, Minneapolis.
Pohlman, Edward J., Minneapolis.
Poppe, Walter H., Minneapolis.
Powell, Archie O., St. Paul.
Powell, Frederick C., St. Paul.
Powers, Mary N., Granite Falls.
Preston, Sara, Minneapolis.
Quackenbush, Harry C., West Concord.
Randall, Claude D., Minneapolis.
Randall, Harry L., Minneapolis.
Reed, Fred B., Decorah, Ia.
Rich, Elizabeth, Minneapolis.
Robertson, Alvin J., Sleepy Eye.
Rockwood, Ethel, Minneapolis.
Ross, Clara E., Springfield.
Rossman, Arthur G., St. Paul.
Rossman, Claude W., Minneapolis.
Roth, Margaretta E., Robbinsdale.
Rouse, Honore, Minneapolis.
Runey, Madge, Minneapolis.
Ryan, Anna C., St. Paul.
Ryan, Margaret A., Duluth.
Saby, Rasmus, Minneapolis.
Sahlbom, Eureka, Worthington.
Sanborn, Lottie E., Minneapolis.
Schaller, Rose Marie, Hastings.
Schmitt, Lillian, Mankato.
Schuknecht, John R., Minneapolis.
Schummers, Will A., Caledonia.
Shadewald, Elsie, Minneapolis.
Skinner, Frances E., Minneapolis.
Smith, Carrie H., Minneapolis.
Smith, Grace I., Minneapolis.
Smith, Irene, Miles City, Mont.
Solie, Simon, Delavan.
Sparks, Hannah D., Minneapolis.
Spooner, Ethel B., Minneapolis.
Stamm, Frieda L., St. Paul.
Stanley, Charles P., Waupaca, Wis.
Stevens, Charlotte I., Minneapolis.
Stevens, Helen, Minneapolis.
Stinchfield, Minnie, Rochester.
Stinson, Blanch, Sheldon, Ia.
Swenson, Edward F., Luverne.
Swenson, Freda E., St. Paul.
Swenson, Sabra S., New London.
Swenson, Swen W., Minneapolis.
Switzer, Harriet P., Minneapolis.
Switzer, Mabel E., Minneapolis.
Towler, Edna E., Minneapolis.
Trieloff, Alma J., Carver.
Tubbs, Florence M., Minneapolis.
Vance, Marjorie E., Decorah, Ia.
Wagen, Alma D., Mankato.
Walker, Adele F., Minneapolis.
Wallace, Jennie E., Humboldt, Ia.
Watson, Emma L., St. Paul.
Watts, James T., Mankato.
Weitzel, Grace B., Minneapolis.
Wennerlund, Camilla, Willmar.
West, Margaret, Minneapolis.
Whipple, Lucius, Duluth.
White, Grant, Luverne.
Wilk, Jacob, Minneapolis.
Williams, Anna E., St. Paul.
Williams, Geo. E., Randolph, Wis.
Woodward, Clara E., St. Paul Park.
Yager, Mary, Minneapolis.

JUNIORS—252

Albrecht, Lella, Minneapolis.
Amble, Florence L., Minneapolis.
Anderson, Aneta, Estherville, Ia.
Anderson, F. F., St. Paul.
Anderson, Theodora H., Montevideo.
Anderson, Tryphena, Montevideo.
Armstrong, Mary E., Minneapolis.
Aygarn, Edwin, Choice.
Aylmer, Albert R., Baltimore, Md.
Barber, Marion L., Minneapolis.
Beckman, Emma A., Minneapolis.
Bedford, Clayton D., Rushmore.
Benz, Laura, St. Paul.
Blanchard, Naneen M., St. Paul.
Bland, Guy C., Anoka.
Blossom, Nina M., St. Paul.
Brainerd, Rena, Blooming Prairie.
Breen, Elizabeth M., St. Paul.
Brewster, Grace, Mankato.
Brock, Emma L., St. Paul.
Brown, Mildred, Minneapolis.
Bruce, Ellen M., St. Paul.
Bruchholz, Elizabeth C., Minneapolis.
Buchanan, Margaret McD., Minneapolis.
Bush, Maude G., Minneapolis.
Cannon, R. Cassius, Watertown, S. D.
Casey, Catherine, Lanesboro.
Chamberlain, Caro, Minneapolis.
Chapman, Esther J., Minneapolis.
Clark, Miriam S., Minneapolis.
Cliff, Howard J., Ortonville.
Clough, Lee, Minneapolis.
Colgrove, Vivian G., Minneapolis.
Colyer, Robert G., Morris.
Crawford, W. Howard, Hampton, Ia.
Crosby, Emily N., Minneapolis.
Crosby, Walter B., Minneapolis.

Cummings, Helen S., St. Paul.
Cuzner, Fay, Minneapolis.
Davenport, John E., Minneapolis.
Davis, William E. C., Minneapolis.
Day, Juanita H., St. Paul.
Deal, Florence D., Minneapolis.
Deering, Harold C., Minneapolis.
Deering, Robert L., Minneapolis.
Doherty, Michael J., Le Sueur.
Dougherty, Kathryn, Mankato.
Doyle, Anastasia, St. Paul.
Duxbury, Lloyd L., Caledonia.
Ebeltoft, Carl T., Lake Park.
Edwards, Majorie, Minneapolis.
Eklund, Edwin G., Minneapolis.
Elliott, Charles W., Minneapolis.
Elliott, Grace J., Minneapolis.
Elmquist, Elmer W., St. Paul.
Elwell, Margaret A., Minneapolis.
Enegren, Cecile, Minneapolis.
Ervin, Harry C., St. Cloud.
Evans, Albert G., Duluth.
Faegre, Minnie L., Flandreau, S. D.
Fagundus, Aimee J., Minneapolis.
Farwell, Edith L., Zumbrota.
Feeny, Agnes E., St. Paul.
Fellows, Murlen, Minneapolis.
Finch, Alice M., Clinton Falls.
Firmin, Kate M., Minneapolis.
Fleming, Lou B., St. Paul.
Fleming, M. Beryl, St. Paul.
Fletcher, Ruby H., Minneapolis.
Fletcher, Victor W., Farmington.
Fligelman, A. Leah, Minneapolis.
Foland, Grace W., Benson.
Fulkerson, J. E., Zumbrota.
Gaghagen, Grace L., Minneapolis.
Gessell, Walter I., Heron Lake.
Gippe, Louise, Watson.
Gleason, Caroline J., Minneapolis.
Goddard, Jessie C., Hurley, S. D.
Godley, Florence H., Minneapolis.
Gordinier, Fannie E., St. Paul.
Gould, Mary, Winona.
Greeley, Kate E., Stillwater.
Green, Alice F., Minneapolis.
Hall, E. S., Red Wing.
Halvorson, Cora E., Dawson.
Halvorson, Ella, Dawson.
Hansen, Thorwald, Benson.
Harter, Clarence M., Minneapolis.
Haynes, Jack Ellis, St. Paul.
Hille, Julie, Fergus Falls.
Hillesheim, Emma M., Sleepy Eye.
Hitchings, Vinnie, Sutherland, Ia.
Hoffman, Minnie C., St. Paul.
Holen, Julia A., Argyle.
Holmes, Emily Evelyn, Baldwin, Wis.
Howe, Ida E., St. Paul.
Hubbard, Will A., Minneapolis.
Hunt, C. L., Minneapolis.
Hutchinson, Lura C., Minneapolis.
Inglis, Rewey B., Minneapolis.
Jacobs, Orpha M., St. Paul.
Jenks, Florence K., Minneapolis.
Johnson, Anna J., Minneapolis.
Johnson, A. M., Minneapolis.
Johnson, Guy C., Minneapolis.
Johnson, Jay G., Granite Falls.
Johnson, Ruth, Minneapolis.
Jones, Florence, Gaylord.
Jones, Perrie, Wabasha.
Jones, William M., Lisbon, N. D.
Kelly, Margaret, St. Paul.
Kennedy, Anne, St. Paul.
Kingsley, Grace, Minneapolis.
Klimenhagen, Olive E., St. Paul.
Knight, Ralph T., Minneapolis.
Koessler, Rudolf F., Heron Lake.
LaDue, Mabel, Minneapolis.
Lawton, George T., Minneapolis.
Laybourn, Hortense, Minneapolis.
Leavenworth, Louise, Minneapolis.
Leck, Bertha, Owatonna.
Leland, Rosamond E., Minneapolis.
Lucker, Edith M., Minneapolis.
Levin, H. E., Aurora.
Lillehei, I. L., Minneapolis.
Linnan, Margaret E., St. Paul.
Lougee, Clare L., Minneapolis.
Lucas, Mary A., Minneapolis.
Lumley, Stella M., Minneapolis.
Lunn, J. E., Carlton.
Lyon, Mabel E., Hastings.
Lyon, Maude H., Hastings.
McCune, Robert H., Benson.
McGarvey, G. A., Minneapolis.
McGrew, Charles D., Howard Lake.
MacKenzie, Harriet M., Minneapolis.
McQuat, F. M., St. Peter.
Mallory, Walter, St. Paul.
Manning, Vinon R., Cannon Falls.
Mansfield, Mabel, Minneapolis.
Marsh, Jessie M., Claremont.
Marshall, Sara, Minneapolis.
Martens, Josephine, Minneapolis.
Meech, Robert Lyon, Mandan, N. D.
Melony, Alice F., Minneapolis.
Mikesh, James S., Minneapolis.
Millie, Mabel F., Minneapolis.
Moore, Harriet D., St. Paul.
Morgan, Edith, Minneapolis.
Morris, Wm. B., Winona.
Morse, Arthur A., Minneapolis.
Morse, Clayton H., Livermore, Ia.
Mottley, Frank W., Minneapolis.
Nelson, Anna L., Minneapolis.
Nelson, N. Frank, Heron Lake.
Nestaval, Stephen J., Montgomery.
Newton, Mary M., St. Paul.
Newton, Willis T., Minneapolis.
Nicholson, Mrs. E. E., Minneapolis.
Nordburgh, Marione, Minneapolis.
Nordin, Elsa R., St. Paul.
Norlander, Inez J., St. Paul.
Nye, Marguerite, Minneapolis.
O'Brien, Emma F., St. Paul.
Olson, M. N., Belview.
Osia, Catherine, Humboldt, Ia.
Ott, Hildegard L. E., Minneapolis.
Palmer, Andrew H., Minneapolis.
Paul, Florence E., Minneapolis.
Peebles, Thomas, Jr., Minneapolis.
Pennington, Hazel M., St. Paul.
Peterson, Albert S., Wheaton.
Petterson, Bernard, St. Paul.
Pickler, Alfred A., Faulkton, S. D.
Polley, Grace E., Grand Rapids.

Ponthan, Marie W., St. Paul.
Pope, Alice G., Minneapolis.
Porcher, Lillian, Minneapolis.
Putnam, Alice E., Minneapolis.
Randall, H. L., Mankato.
Randall, Robert C., Minneapolis.
Ray, John H., Mankato.
Reinberg, Alida, St. Paul Park.
Remer, Charles F., Waconia.
Richmond, Margaret S., Minneapolis.
Rittenhouse, Catherine, Minneapolis.
Robb, W. C., Minneapolis.
Robbins, Ruth, Robbinsdale.
Rosdahl, Signe, Wheaton.
Rossman, Harold, St. Paul.
Rowberg, H. C., Hanley Falls.
Sachs, G. M., New Prague.
Safford, Orren E., Aitkin.
Salisbury, Maurice E., Minneapolis.
Sanford, LeRoy W., Minneapolis.
Saterlie, Julia K., Hagan.
Sawyer, Alma P., Minneapolis.
Schaetzel, Mina L., Minneapolis.
Schmidt, Pauline S., Minneapolis.
Schneiderhan, Albert G., Jordan.
Schons, Emily, St. Paul.
Schow, Susie S., Minneapolis.
Schroeder, Florence C., Perham.
Sevatson, Ella, Windom.
Shaver, Gertrude A., Excelsior.
Shaw, Wilbur D., Minneapolis.
Shiely, Mary E., St. Paul.
Simerman, Helen M., St. Paul.
Sly, Florence A., Minneapolis.
Smith, Anna M., Minneapolis.
Smith, Dan, Caledonia.
Smith, Harriet L., Minneapolis.
Smith, Irma P., Minneapolis.
Smith, J. Russell, Minneapolis.
Smith, Winifred R., Duluth.
Solensten, R. T., Minneapolis.
Southworth, Mira M., Minneapolis.
Spink, Helen, White Bear.
Spooner, Kathryn, Minneapolis.
Stake, Alma L., Anoka.
Sterling, Georgina, Red Wing.
Stewart, Dorothea, Minneapolis.
Stewart, Edna, Minneapolis.
Streissguth, Otto, Arlington.
Swan, James E., Mankato.
Switzer, Abbie D., Minneapolis.
Taafe, Agnes K., Minneapolis.
Theisen, Elnora B., Minneapolis.
Thompson, Claire V., Minneapolis.
Thompson, Della F., Minneapolis.
Thompson, Gertrude M., Minneapolis.
Thorson, Ella B., Winthrop.
Trimble, Margaret H., Minneapolis.
Tuthill, William M., Anoka.
VanRhee, George J., Milaca.
Waddell, Mamie E., St. Louis Park.
Wales, Gertrude, Minneapolis.
Walker, Margaret E., Minneapolis.
Wasser, Ruby, Minneapolis.
Watson, Alice A., St. Paul.
Weinstein, Freda, Helena, Mont.
Welch, Louise M., St. Paul.
Whittier, Albert A., Red Wing.
Whittle, Sadye, Minneapolis.
Wiggen, Charlotte A., Red Wing.
Wilder, Susan Z., Minneapolis.
Williams, Beatrice J., Minneapolis.
Williams, Mary L., Cedar Lake.
Wilson, Chester S., Stillwater.
Wolfe, Elizabeth, Ruthton.
Woodke, Luella M., Le Mars, Ia.
Yerxa, Elizabeth, Minneapolis.

SOPHOMORES—307.

Acomb, Marie R., Minneapolis.
Adams, C. Roy, Austin.
Ahlquist, Perry K., St. Paul.
Anderson, Carl A., Hutchinson.
Anderson, Fred A., Minneapolis.
Anderson, Herbert I., Goodhue.
Anderson, Roscoe B., Winona.
Austin, Alice A., Minneapolis.
Austin, Florence C., St. Paul.
Babcock, Fager M., Minneapolis.
Backus, Clinton J., St. Paul.
Bailiff, Matilda V., Osakis.
Bakalyar, George, Lakefield.
Balcom, W. G., Chatfield.
Bardsley, Myrtle B., Minneapolis.
Batterton, Lyle K., Minneapolis.
Beals, James B., St. Paul.
Beardsley, Edith, Hibbing.
Beck, Clara L., St. Paul.
Bell, Grace M., St. Paul.
Bennett, Lillian, Madison.
Berchem, Pauline J., St. Paul.
Berger, Nanda M., St. Paul.
Bibb, Frank L., Minneapolis.
Bickford, E. Abbi, Minneapolis.
Birkenhauer, Mary G., Minneapolis.
Blakey, Roy, Estherville, Ia.
Blanchett, Fred, Minneapolis.
Bleifuss, Grace A., Sioux Falls, S. D.
Brewster, Donald, Minneapolis.
Briggs, Florence Mayfred, St. Paul.
Brink, Irma, Minneapolis.
Brooks, Frank, Minneapolis.
Brown, Mayme E., Granite Falls.
Bruhn, L. Hedwig, Morris.
Burgan, Myrle E., Minneapolis.
Burns, Margaret F., Graceville.
Buswell, Claire, St. Paul.
Cahill, Thomas, Mabel.
Cain, Jennie K., Lake City.
Cater, Louise K., St. Cloud.
Cant, Harold G., Duluth.
Carlson, Anna C., St. Cloud.
Carlson, Charles E., Albert Lea.
Carroll, Alice, Miller, S. D.
Cassidy, Anna C., Eyota.
Chamberlain, Raymond, Minneapolis.
Chase, Marjorie, Minneapolis.
Child, Emily, Minneapolis.
Child, Sherman W., Minneapolis.
Collins, Melva A., St. Paul.
Connelly, John, Lakeville.
Conway, Ethelyn, Marshall.
Crosby, Adelaide, Minneapolis.
Crozier, H. B., Hutchinson.
Crozier, Lulu H., Minneapolis.

Dahleen, Harry W., Maynard.
Dale, Ludvig D., Willmar.
Daniels, Winifred C., Benson.
Danielson, Jessie L., Litchfield.
Dart, Flora L., St. Paul.
Daubney, Dora E., Lakefield.
Davidson, Hazel, Minneapolis.
Davies, Marion, Minneapolis.
Davis, Alfred, Buffalo.
Degnan, John P., Winona.
Dellinger, Virginia E., St. Paul.
Diamond, Lewis S., Mankato.
Dickerson, Helen, Minneapolis.
Dinsmoor, Viola C., Austin.
Disen, Helga A., Minneapolis.
Dunivon, Nellie, St. Paul.
Dunning, Frances.
Duvigneaud, Jeannette A., Minneapolis.
Dvorak, Joseph W., Renville.
Eddy, Beatrice E., Minneapolis.
Edgerton, Blanche, Minneapolis.
Engle, Marguerite L., Minneapolis.
Engstrom, Lillian F., Minneapolis.
Erdall, Agnes R., St. Paul.
Erickson, Jennie S., Anoka.
Evans, E. Winton, Winona.
Ewing, Marjorie, River Falls, Wis.
Ewy, E. W., Butterfield.
Fancher, Harlan R., Minneapolis.
Finkle, Lillian, Minneapolis.
Ford, Gertrude, St. Paul.
Foulke, Robert W., St. Paul.
Fraiken, Wanda I., Minneapolis.
Francis, Helen E., Minneapolis.
Franklin, Laura G., Blue Earth.
Frazier, Earl H., Verndale.
French, Anna M., Minneapolis.
French, Lafayette, Austin.
Frenzel, Rose M., St. Paul.
Gardner, Alice, Minneapolis.
Gausemel, A. N., Kenyon.
Gilbert, Grace, St. Paul.
Gilbertson, Albert N., Willmar.
Gould, Marian R., Minneapolis.
Gray, Calista G., Minneapolis.
Grimes, Gordon, Minneapolis.
Grinsted, Grace A., Minneapolis.
Gunn, Edith E., Minneapolis.
Hale, Beatrice E., Spring Valley.
Hall, Ruth K., Minneapolis.
Hallock, Mary J., Duluth.
Hamilton, John A. J., Carrington, N. D.
Hanaford, A. Ruth, Monticello.
Hanratty, Catherine, Graceville.
Hanson, Bertha M., Minneapolis.
Harding, Fred A., Hudson, Wis.
Hart, Una M., Anoka.
Hawley, Jess B., Minneapolis.
Herum, Helen, Hudson, Wis.
Hess, C. L., Glencoe.
Hewitt, Marie A., Minneapolis.
Hillman, Frank M., Owatonna.
Hixon, Agnes, Minneapolis.
Hoag, Richard L., Minneapolis.
Hoffman, Arthur C., Minneapolis.
Holcomb, Dora M., Warren.
Holt, Mabel, Minneapolis.
Hoovel, Violet D., Jackson.
Houck, Norman A., Minneapolis.
Hough, Jay E., Wabasha.
Hovey, Albert P., Minneapolis.
Hovey, Inez I., Alexandria.
Hubbard, Katherine D., Mankato.
Hudson, Dorothy R., Minneapolis.
Hudson, Neva B., Minneapolis.
Hull, Gertrude R., Minneapolis.
Hull, Harold, Wahpeton, N. D.
Hull, Wm., Minneapolis.
Hunt, Thomas F., Le Sueur Center.
Jackson, Mabel C., St. Paul.
Jenness, Maurice V., Willmar.
Jensen, Louise E., Minneapolis.
Johnson, Esther C., Minneapolis.
Johnson, Jense, Lake Crystal.
Johnson, Olga, Blackduck.
Kane, Adelia S., Lanesboro.
Kearney, Mabel A., Minneapolis.
Kelley, Frances R., Minneapolis.
Kessel, Martha C., Cresco, Ia.
Kief, Alphonso E., Montevideo.
Kimball, Ruth A., Minneapolis.
Kingsbury, F. A., Osage, Iowa.
Kline, Gertrude E., Austin.
Knopp, Harold F., St. Paul.
Knowlton, Edith V., Minneapolis.
Knutson, Dagny, Minneapolis.
Krueger, Richard G., Bellingham.
Lambert, Percy, Sauk Centre.
Lambie, Ethel L., Minneapolis.
Lees, Millicent, Minneapolis.
Leonard, Elva L., Minneapolis.
Leuthold, Walter M., Spring Valley.
Leveroos, Ethel S., Minneapolis.
Leviston, Alice M., St. Paul.
Lewis, E. Genevieve, Minneapolis.
Lien, Arnold J., Delavan.
Longstaff, William H., Huron, S. D.
Loudon, George, Minneapolis.
Lovick, Paul J., Minneapolis.
Lowenthal, Max, Minneapolis.
Lycan, Donna M., Crookston.
Lynch, Helen, St. Paul.
McFetridge, Auverne, St. Paul.
McGuigan, Dora, Millville.
McIvor, Helen, St. Paul..
McKennan, Pearl G., Minneapolis.
Machen, Jane E., Savanna, Ill.
Maland, Joseph O., Elmore
Marden, Irene E., Barnesville.
Matson, Charlotte, Minneapolis.
Matthews, Alvah I., Minneapolis.
Matthews, Charles A., Minneapolis.
Maul, Earle C., Minneapolis.
Mecklenburg, George, Cedar.
Melin, E. Luther, Minneapolis.
Merrill, Robert C., Minneapolis.
Miles, W. C., Minneapolis.
Mooney, Florence H., Duluth.
Moore, Edna, St. Paul.
Moreland, Grace E., St. Paul.
Morgan, Marion, Zumbrota.
Mouser, Carl B., Huron, S. D.
Mousley, Josephine, Minneapolis.
Munroe, Margaret, Minneapolis.
Murray, Bessie L., Minneapolis.
Nelson, Elizabeth, Minneapolis.

Nelson, Owen N., St. Paul.
Nelson, Robert, Minneapolis.
Nielsen, Marie B., St. Paul.
Norelius, William, Luverne.
Norris, Sadie A., Minneapolis.
Norton, W. W., Minneapolis.
Nystrom, Hilda, Minneapolis.
Olsen, Clare, Minneapolis.
O'Neill, Clare A., Graceville.
Oppegard, Lawrence S., Madison.
Overpeck, Nellie, St. Paul.
Palmer, Alice H., Minneapolis.
Palms, Edith, Hudson, Wis.
Peterson, Sigurd H., Minneota.
Pfaff, Miriam, St. Paul.
Phelan, Mary F., Graceville.
Pidgeon, Vernon C., Minneapolis.
Pitblado, Annie, Minneapolis.
Plummer, John F., Faribault.
Potter, Zenas L., Minneapolis.
Prosser, Eugene, Minneapolis.
Puffer, Anna M., Minneapolis.
Putnam, Gladys, Minneapolis.
Quigley, Alice R., Bird Island.
Reely, Stella A., Minneapolis.
Rehnke, Edgar B., Kenyon.
Reid, Harry C., Sleepy Eye.
Rice, Mary G., Minneapolis.
Richards, Grace E., Minneapolis.
Richards, Mary E., Duluth.
Ries, Joseph A., Fairfax.
Riheldaffer, Helen, Minneapolis.
Robbins, Darwene, Minneapolis.
Robbins, Eva, Anoka.
Robinson, F. A., Minneapolis.
Robinson, Helen, St. Paul.
Rockwood, Edith, Minneapolis.
Rogers, Caroline E., Minneapolis.
Rossman, Harold, St. Paul.
Rothrick, H. B., Winona.
Roverud, Nora G., Caledonia.
Ruger, Rosa C., Devils Lake, N. D.
Rushfeldt, Elise, Hawley.
Savage, George F., Minneapolis.
Schaller, Karl A., Hastings.
Scharf, A. L., Lake City.
Schriber, Alice E., St. Paul.
Schroeder, Anna T., Perham.
Seaman, Susie, Minneapolis.
Shadewald, Lily E., Minneapolis.
Sheild, Marcellus C., Winona.
Shepardson, Elizabeth, Minneapolis.
Shonts, Mary O., Fergus Falls.
Simmons, Juliet F., Hunter, N. D.
Simms, Marjorie, Minneapolis.
Simpson, Jessie, Minneapolis.
Sinclair, Catherine E., Fairmont.
Sleeper, Raymond A., Sheldon, Ia.
Smiley, William Y., LeMars, Ia.
Smith, Audrey N., Minneapolis.
Smith, Corinne J., Minneapolis.
Smith, Marjorie E., Minneapolis.
Snyder, Mabelle, Minneapolis.
Solon, Helen L., Minneapolis.
Spear, Florence H., Minneapolis.
Stegner, Hope A., St. Paul.
Stork, Allen B., Harmony.
Strate, Clara, Moorhead.
Strelow, Laura, Minneapolis.
Stromgren, Lucia, J. M., Center City.
Sturtevant, Abby, Minneapolis.
Sveegan, Peter A., Red Wing.
Svensrud, Ida, Minneapolis.
Swanstrom, Henry, Lake Park.
Tallant, Ruth, Minneapolis.
Tanikawa, Yoshio, St. Paul.
Taylor, Jessie E., Minneapolis.
Terriere, Margery, Minneapolis.
Terry, Leslie, St. Paul.
Thayer, Majorie, Minneapolis.
Thompson, Marjorie, Minneapolis.
Thorson, Elizabeth, Minneapolis.
Todd, Erma E., Minneapolis.
Toomey, Mary L., St. Paul.
Trask, Bertha M., Bemidji.
Turnbull, Lloyd W., Glencoe.
Ueland, Elsa, Minneapolis.
Uzzell, Thomas, Morgan Park, Ill.
Vance, Stanley M., Winona.
VanSlyke, Lois C., Minneapolis.
Vickery, Myra L., Mora.
Vidall, James H., Minneapolis.
Waite, Camelia, Minneapolis.
Wales, Geneve, Minneapolis.
Ware, Grace, Minneapolis.
Warren, Wm. A., St. Paul.
Webber, Hazel, Austin.
Wedge, Vera E., Zumbrota.
Weese, Asa O., Hutchinson.
Weld, Helen, Minneapolis.
Welch, Clarke T., Shelbyville, Ia.
Weston, L. Helen, Minneapolis.
Weston, Pearl E., Minneapolis.
Whaley, Amanda, St. Paul.
White, Renee C., Minneapolis.
Whittle, Anna, Minneapolis.
Wier, Carl H., Huron, S. D.
Wigforss, Nanna H., Red Wing.
Williams, Edna, Lake Crystal.
Williams, Mabel R., Minneapolis.
Wilson, Clyde H., Minneapolis.
Witchie, Leila A., Minneapolis.
Wolsted, Ole A., Harmony.
Woolsey, Leona, Ft. Dodge, Ia.
Yates, Fannie A., St. Paul.
Yeaton, Walter J., Livingston.

FRESHMEN—480.

Abbott, Louise I., Minneapolis.
Aichele, Johanna M., St. Paul.
Akerson, George E., Minneapolis.
Alden, Wm. E., Minneapolis.
Allen, Terry, Fort Snelling.
Amundson, Albert, St. Paul.
Anderberg, Irene A., Sisseton, N. D.
Anderson, Carolyn M., Smith's Mills.
Anderson, Erhard A., Stephen.
Anderson, Iva, Minneapolis.
Anderson, Walter E., Stillwater.
Andrews, Dalton, St. Paul.
Barclay, Gladys, St. Paul.
Barclay, Lurvia W., Minneapolis.
Barke, Arthur R., Fergus Falls.
Barlow, Frank A., Minneapolis.

Barnard, Paul J., Minneapolis.
Barr, Jean B., Minneapolis.
Bartlett, James, Minneapolis.
Beal, William W., Minneapolis.
Bell, Julia B., Minneapolis.
Benson, Eva T., Maple Plain.
Benson, Paul, Heron Lake.
Benton, Margaret, Minneapolis.
Bernhagen, Clara H., Minneapolis.
Bernhardt, Florence E., Minneapolis.
Berrisford, Mercedes G., St. Paul.
Berrisford, Paul D., St. Paul.
Bertelsen, Bertha, Fergus Falls.
Bethke, William, Franklin.
Birnberg, Rose, St. Paul.
Bjorklund, Nannie J., St. Paul.
Blauvelt, Katherine, Minneapolis.
Blumenfeld, Belle, South St. Paul.
Boody, C. Bruce, North St. Paul.
Bookwalter, Hazel, Minneapolis.
Bowen, Mercy H., St. Paul.
Boyes, Earle, Spring Valley.
Boyson, Maybelle M., Minneapolis.
Brady, Paul E., Winnebago.
Brann, Josephine, Minneapolis.
Brattland, Isabel, Ada.
Brattland, Minnie, Ada.
Brenner, Luella K., Minneapolis.
Brezler, Anna P., Anoka.
Bridges, Louise, St. Paul.
Brigham, Helen, Minneapolis.
Brin, John L., Stewartville.
Brinsmaid, Martha M., Minneapolis.
Brown, Edna M., Minneapolis.
Brown, Helen, Minneapolis.
Brown, Thirza, Minneapolis.
Browne, Marie, Minneapolis.
Bruce, Edna A., Minneapolis.
Bruce, Warner M., Minneapolis.
Bruer, Ella, Minneapolis.
Buck, Florence, Minneapolis.
Buell, Earle R., Red Wing.
Bullard, Elizabeth M., St. Paul.
Burns, Roger, Le Mars, Ia.
Burton, Lois L, Alden.
Cahaley, C. J., Jr., Minneapolis.
Caldwell, Josephine, St. Paul.
Calvert, Lila G., Minneapolis.
Cammack, William R., St. Paul.
Campbell, Charles A., Duluth.
Campbell, Hugh B., Stillwater.
Campbell, Stella W., Tracy.
Carleton, George, Minneapolis.
Carlson, C. Arthur, Minneapolis.
Carlson, Esther E., Minneapolis.
Carlson, Ethyl B., Minneapolis.
Casserly, Elizabeth B., Minneapolis.
Cawley, Charles, Little Falls.
Cawley, Frank S., Little Falls.
Chance, Harold K., Minneapolis.
Chandler, Ruth F., Fond du Lac, Wis.
Chenery, Isabella, Jamestown, N. D.
Clapp, Ella G., St. Paul.
Clark, Harriet O., Minneapolis.
Clark, Mary R., Minneapolis.
Clarke, Clara S., Minneapolis.
Claybourn, John G., Albert Lea.
Clendening, Gladys M., Minneapolis.
Cobb, Florence M., Minneapolis.
Cochran, Harrison H., Minneapolis.
Coleman, Myrtle I., Minnetonka Beach.
Colgrove, Chester, Minneapolis.
Collier, Frances L., Minneapolis.
Collins, Lucile R., Minneapolis.
Collins, Thomas J., Minneapolis.
Confer, Marie, Kansas City, Mo.
Cooke, Edith E., Minneapolis.
Coon, Chauncey C., Minneapolis.
Cooper, Winifred, Sauk Centre.
Cowling, Helen, Ely.
Cranbrook, Helen C., Faribault.
Crawford, Ruth, Minneapolis.
Crittenden, Ethel F., Minneapolis.
Crocker, Katherine, Minneapolis.
Crogan, Mattie, Minneapolis.
Currie, Helen H., Minneapolis.
Curtis, Josephine L., Minneapolis.
Cutler, Mary E., Minneapolis.
Dahl, Olga C., Minneapolis.
Daine, Etoile B., Farmington.
Daskam, Grace M., Minneapolis.
Deming, Portia, Minneapolis.
Dix, Gertrude E., Elroy, Wis.
Dodge, George P., Minneapolis.
Donaghue, Belle, Minneapolis.
Donahue, Stephen A., Sioux Falls, S. D.
Donohue, John N., St. Paul.
Dorsey, James E., Minneapolis.
Downey, Vina, Minneapolis.
Dunn, Herbert, St. Paul.
Dunn, Lewis E., Minneapolis.
Duxbury, Leland S., Caledonia.
Dvorachek, Henry E., Glencoe.
Eakins, Bessie D., Gary, S. D.
Eddy, Helen M., Minneapolis.
Edgerton, Lillian C., St. Paul.
Eenkema, Katherine B., Clara City.
Elke, Estella L., Chaska.
Ellis, Lynn, Minneapolis.
Elmquist, Marie A., St. Paul.
Elwell, Georgia B., Minneapolis.
Engson, Edward, Hallock.
Erdall, Leonard T., St. Paul.
Erickson, Beda, Minneapolis.
Erickson, Hilma E., Alexandria.
Erie, Angela H., Kinbrae.
Evans, Nevada S., Minneapolis.
Fagerstrom, Albert H., Minneapolis.
Fagundus, Ruth, Minneapolis.
Ferguson, Clare, Minneapolis.
Fernald, Robert W., St. Paul.
Ferris, Ellen G., Iona Lake.
Feton, Augusta A., Canby.
Fisher, Ethel E., Minneapolis.
Fisher, Harold C., Minneapolis.
Fiske, Cyrus H., St. Paul.
Fitzsimmons, Mary A., St. Paul.
Flaherty, John, St. Paul.
Flanagan, Florence A., Minneapolis.
Frank, Katherine E., Minneapolis.
Freeman, Howard H., Washburn Park, Minneapolis.
Frick, Laura G., Minneapolis.
Fritzberg, Huldah, Biwabik.
Funk, Charles D., Lake Benton.
Furstnow, Laura, Minneapolis.

Gaston, Mary H., Minneapolis.
Gaussle, George E., Minneapolis.
Gaylord, Robert M., Minneapolis.
Gehl, Minnie, Fraer, Ia.
Gibbs, Velzora, Minneapolis.
Giles, Aubrey L., Albert Lea.
Gilger, Bessie L., Minneapolis.
Gillette, Raymond M., Minneapolis.
Giltinan, Eleanor, St. Paul.
Gould, Anna M., Glencoe.
Graves, Pauline E., Hopkins.
Green, Ethelinda B., Stillwater.
Griswold, Ella M., Minneapolis.
Guild, Ruth E., Minneapolis.
Gullickson, Glenn, Minneapolis.
Gundersen, Margaret, Minneapolis.
Gurley, George P., Pipestone.
Gutgesell, Edith, St. Paul.
Gutgesell, Hazel, St. Paul.
Hague, Gertrude M., Minneapolis.
Haines, Helen, Minneapolis.
Hall, Katherine H., Minneapolis.
Hall, Ruby R., Wood Lake.
Hall, Ruth M., St. Paul.
Hamilton, Carl L., Dubuque, Ia.
Hamilton, Wm. J., Minneapolis.
Hanaford, R. C., Minneapolis.
Hank, Eva, Minneapolis.
Hankey, Clara, Minneapolis.
Hanson, Minnie O., Morris.
Hardick, Florence, St. Paul.
Hartley, Alice E, Sauk Centre.
Haupt, Mary C., St. Paul.
Hauschild, Lillian E., Minneapolis.
Hayes, Mary C., Minneapolis.
Hendrickson, Grace, Benson.
Heneman, Herbert, Lester Prairie.
Heritage, Mary H., Hudson, Wis.
Herring, Hazle S., Riceville, Ia.
Hetland, Harriet L., Ada.
Hewson, Katherine, Minneapolis.
Hobbs, Marabeth, Minneapolis.
Hobert, Margaret, Minneapolis.
Hoffmann, Pauline, St. Paul.
Holen, Oscar M., Argyle.
Holm, Gustave, Minneapolis.
Hudson, Mabelle, Minneapolis.
Hullsick, Karl L., St. Paul.
Hutchinson, Enid, Minneapolis.
Hyde, Emily W., Robbinsdale.
Jacobsen, Nora, Luverne.
Jensen, Dora, Minneapolis.
Jewett, Helen E., Fergus Falls.
Johnson, Einer, Minneapolis.
Johnson, Ella, Winona.
Johnson, Esther, Alexandria.
Johnson, Fred R., New Richland.
Johnson, Freda D., St. Paul.
Johnson, Millie E., Minneapolis.
Jones, Carl W., Minneapolis.
Kelley, A. R., Minneapolis.
Kellogg, Ada I., St. Paul.
Kemp, Etheleen F., Minneapolis.
Kent, Fay, Minneapolis.
Kepner, Ben Hur, Appleton.
Kimmerle, Charlotte C., Minneapolis.
King, J. C., Minneapolis.
Kingsford, Ethel H., Rushford.
Kitaji, Sentaro, Minneapolis.
Kling, David T., Donnelly.
Koerner, Illa S., St. Paul.
Kollitz, H. W., Odessa.
Kremer, Walter J., Cold Springs.
Lampert, Edna, Minneapolis.
Lane, Anna M., St. Paul.
Larrabee, Walter F., Minneapolis.
Larsen, John G., St. Cloud.
Larson, Albertina, Halstad.
Larson, Walter I., Lake Benton.
Lathrop, Elsie L., Minneapolis.
LaVayea, Florence, Minneapolis.
Lawler, Frank, Minneapolis.
Lawrence, Marion R., Minneapolis.
Leach, Grace E., Spring Valley.
Lederer, Katheryn, Minneapolis.
Lees, Margaret, Minneapolis.
Lenart, Daisy E., Minneapolis.
Leonard, Frank P., Minneapolis.
Lia, Alma, Hancock.
Lien, Luella C., Granite Falls.
Lloyd, Frances, St. Paul.
Lochren, W. A., Minneapolis.
Long, Will H., Elysian.
Longstaff, Ralph, Huron, S. D.
Loomis, Veda, Minneapolis.
Losse, Hyme, Minneapolis.
Lundeen, Marie, Minneapolis.
Lutz, Harold, Mantorville.
Lyon, Mary A., Minneapolis.
Lydon, Helen M., Minneapolis.
McCall, Margaret, Minneapolis.
Leuthhold, Bess J., Spring Valley.
Lyford, Stella E., Minneapolis.
McCourt, Katherine T., Minneapolis.
McCullough, Clara M., Buffalo.
McCune, Clara, Minneapolis.
McDermott, Joseph C., Clontarf.
McInnes, Alexander,
Devils Lake, N. D.
MacLagan, Bonnie, St. Paul.
McLeod, Veldora, Hibbing.
McMillan, Effe E., Luverne.
McNutt, Rebecca, Algona, Ia.
McRostie, Wm. M., Lake City.
Maginnis, Joseph P., Duluth.
Magnusson, Amy, Duluth.
Magnusson, Axel, Harris.
Mahoney, Mary, Minneapolis.
Mallory, Arthur, St. Paul.
Mansfield, Esther, Minneapolis.
Markham, Royal E., Rush City.
Marshall, Margaret, Minneapolis.
Marston, Walter L., Minneapolis.
Martindale, Bess, Litchfield.
Mathes, Florence, St. Paul.
May, Ellen, Minneapolis.
Mehegan, Blanche M., Appleton.
Miles, Mary R., Fergus Falls.
Miller, Arleigh R., Minneapolis.
Miller, Jensine M., Minneapolis.
Miller, Lillian G., Minneapolis.
Millspaugh, Lulu B., Little Falls.
Molenaar, Richard, Raymond.
Molstad, Alfred G., Clarkstad.
Monaghan, John, Duluth.
Monnea, George, Hutchinson.
Monroe, Ada A., Minneapolis.
Montgomery, John H., Minneapolis.

Morrissey, Mabel, St. Paul.
Morrow, Inez, Washington, Ia.
Morse, Elizabeth K., Minneapolis.
Munck, Harold P., Bixby.
Murray, Florence H., Minneapolis.
Murray, Jane, St. Paul.
Murseth, M. Lillian, Kenyon.
Naeve, Edith A., Minneapolis.
Nelson, Edna C., Red Wing.
Nelson, Herbert, Minneapolis.
Ness, John A., Hector.
Newhall, Richard A., Minneapolis.
Newton, Caroline E., Minneapolis.
Nichols, John Malcolm, St. Paul.
Nichols, Marjorie P., Pipestone.
Nichols, Ruth, St. Paul.
Nickell, Marion, Minneapolis.
Nienhauser, Roy B., St. Paul.
Nixon, Hugh H., Wells.
Nodell, Lillian L., Minneapolis.
Nutter, Hannah A., Minneapolis.
Nye, Katherine, Minneapolis.
Nygren, Selma, Lake City.
O'Connell, John F., Hastings.
O'Hara, Edward S., Minneapolis.
Olsgard, Eugene, Minot, N. D.
Orme, Thomas H., Racine, Wis.
Ovestrud, Edmund, Spring Grove.
Owen, Dana C., Osseo.
Paddock, Laura, Minneapolis.
Painter, Helen D., Minneapolis.
Parkell, Irene M., Minneapolis.
Parker, Alonzo, North Branch.
Partridge, George B., Minneapolis.
Paulson, Lawrence, Albert Lea.
Peck, Winifred, Shakopee.
Pershon, Erich, Young America.
Peterson, Andrew P., Lamberton.
Peterson, Ernest A., Albert Lea.
Peterson, Sydney C., Glenwood.
Pettersen, Huldah O., Madelia.
Pinkus, Olga, St. Paul.
Pomeroy, Eunice, Minneapolis.
Prime, Ruth E., Minneapolis.
Probst, Ilse G., St. Paul.
Putnam, Leslie R., Carrington, N. D.
Pye, Hugh J., Minneapolis.
Race, Adah M., Redwood Falls.
Radermacher, Walter H., Barron, Wis.
Ramsland, Rudolph, Sacred Heart.
Rand, Lars, Minneapolis.
Rankin, Edward P., Jamestown, N. D.
Rasmussen, Louis, Minneapolis.
Ray, Frank J., Dickinson, N. D.
Reed, Abbie M., Minneapolis.
Reed, Ethel E., Minneapolis.
Reidhead, Paris W., Jr., Osseo.
Renning, Clara F., Kasson.
Reusswig, Frank E., Grand Rapids.
Reynoldson, LeRoy A., Pringhar, Ia.
Rickard, Marian, Minneapolis.
Rickert, Paul M., Sisseton, S. D.
Ringsred, Ruth, Duluth.
Ripley, Ava A., Minneapolis.
Robb, Frances L., St. Paul.
Robbins, Esther, Robbinsdale.
Roberts, Marjorie E., Minneapolis.
Roberts, Thomas C., Minneapolis.
Robinson, Sarah A., Minneapolis.
Rodearmel, Myra B., Minneapolis.
Rossi, Julia, Mantorville.
Roth, Gertrude S., Livingston, Mont.
Rothschild, Warner, St. Paul.
Rowe, Elfie A., Minneapolis.
Rowe, Ina B., Minneapolis.
Ruff, Helen A., St. Paul.
Rumpeich, Erhard, Pisek, N. D.
Rydell, E. T., Minneapolis.
Sackett, Ina P., Minneapolis.
Salisbury, Eva, Minneapolis.
Salzer, Helen C., Minneapolis.
Sauer, Laura R., Eden Valley.
Saxton, Robert H., Minneapolis.
Schaller, Karl A., Hastings.
Schmidt, Mathilda W., Minneapolis.
Schneider, Cathryn, St. Paul.
Schneider, Jessie J., St. Paul.
Schrap, Evangeline, Dodge Center.
Schulte, H. F., Plato.
Schutte, Helen, St. Paul.
Seabury, Paul R., St. Paul.
Sedgwick, Fred G., Minneapolis.
Sefton, Adel, Ellendale, N. D.
Selover, Wm. P., Lake City.
Shea, E. M., Perham.
Shellenberger, Olive W., St. Paul.
Simmons, Marjorie, Hunter, N. D.
Simons, Clarence H., Waseca.
Simpson, Donald S., Minneapolis.
Sinclair, Myra Jean, Minneapolis.
Sinderson, E. Grace, Rockford, Ill.
Skartum, Bess L., Lake Benton.
Skoglund, Alma G., North St. Paul.
Sletten, George O., Willmar.
Smart, Alice L., Minneapolis.
Smart, Anna A., Minneapolis.
Smith, A. Blanche, Rochester.
Smith, Alfred H., Minneapolis.
Smith, Eunice H., St. Paul.
Smith, Harold S., Minneapolis.
Smith, J. Raymond, Barron, Wis.
Smith, Kenneth, St. Paul.
Smith, Maude M., Miles City, Mont.
Smith, Mollie, St. Ansgar, Ia.
Smith, Rollin L., Minneapolis.
Soare, Irma L., Minneapolis.
Soloway, Solomon, Portland, Me.
Souba, Lucie, Hopkins.
Spain, Lillian, Minneapolis.
Spies, Agnes, Graettinger.
Spring, Arthur D., Minneapolis.
Stadsvold, Millie, Fosston.
Stapf, Nita V., Minneapolis.
Starr, Elizabeth, Deephaven.
Stenvig, Walter E., Minneapolis.
Stockland, George, Minneapolis.
Stoft, Esther, Minneapolis.
Stone, Wylie W., Benson.
Strassburger, Ella, Crookston.
Stromme, Leonard, Volga, S. D.
Strong, Louise O., Minneapolis.
Sumpter, Arlo M., Riceville.
Sutton, Pearl G., Stillwater.
Swanson, Gertrude M., St. Paul.
Swedberg, Luella C., Luverne.
Swinburne, Gertrude, Minneapolis.
Tallant, Mary, Minneapolis.

Tate, Elizabeth, Faribault.
Taylor, Benjamin E., St. Paul.
Tebbets, Marion, Minneapolis.
Thoen, Carl, Litchfield.
Thompson, Margaret, Minneapolis.
Thompson, Susan Briery, Duluth.
Thomson, Theodore W., Minneapolis.
Thuet, Julia, South St. Paul.
Tillotson, Alice, Minneapolis.
Tornstrom, Mary F., Stillwater.
Toupin, Joseph A., Red Lake Falls.
Tribbey, Elton E., Minneapolis.
Tryon, John T., Minneapolis.
Turner, Winifred, Minneapolis.
Turnquist, Florence, Minneapolis.
Undine, Clyde A., Minneapolis.
Utendorfer, George W., Gaylord.
Vance, Erskine W., Crookston.
Vander Bie, Frank, Preston.
Vanderhiden, Alice, Minneapolis.
Vanderhiden, Delia, Minneapolis.
Wadden, Agnes R., Madison, S. D.
Warber, Gustav P., Dover.
Ware, Elizabeth R., Minneapolis.
Ware, Frederick, Minneapolis.
Warren, Jessie A., Minneapolis.
Wash, Allan J., Minneapolis
Washburn, Martha W., Minneapolis.
Watson, Anna K., St. Paul.
Webster, Jennie, Minneapolis.
Weiskopf, Jessie, Minneapolis.
Weitbrecht, Robert B., St. Paul.
Wenzel, Grace R., Minneapolis.
Wessberg, May, Fergus Falls.
Wetherby, Lucian P., Minneapolis.
White, Lucy J., Luverne.
Wieland, Walter F., Brainerd.
Will, Frank E., Minneapolis.
Williams, Charles A., Luverne.
Williams, Donald T., Minneapolis.
Williams, Elizabeth, Minneapolis.
Williams, Howard, Minneapolis.
Williams, Lillian E., Minneapolis.
Williams, Lorenzo, Minneapolis.
Williams, Mabel, Minneapolis.
Witchie, Hazel M., Minneapolis.
Wold, Benjamin, Barron, Wis.
Wolstad, Lillie, Minneapolis.
Wretling, Hilma E., Alexandria.
Wright, Florence I., Minneapolis.
Yorke, Georgia M., Minneapolis.
Young, Frances L., St. Paul.
Young, John P., Mankato.
Zehnder, Ida E., St. Paul.

UNCLASSED—84

Abrahamson, Frank, St. Paul.
Ainsworth, Charles L., Chippewa Falls, Wis.
Allen, Jennie, Minneapolis.
Baer, Gertrude, Kenyon.
Baer, Zella C., Minneapolis.
Benton, Elma H., Minneapolis.
Bouman, Mrs. K., Minneapolis.
Bruchholz, Kathryn, Minneapolis.
Bulen, Leon L., Minneapolis.
Bunge, W. W., Eityen, Minn.
Burke, James G., Stillwater.
Buto, Ken, Minneapolis.
Campbell, Anna, Minneapolis.
Carlson, Charles G., Mankato.
Carson, Philip, St. Paul.
Chase, Mabel L., Boulder, Colo.
Christensen, Oletha A., St. James.
Churchill, Alta, Reedsburg, Wis.
Crampton, Lora, Minneapolis.
Crosby, Adelaide, Minneapolis.
Davis, Mrs. Sexxa, Minneapolis.
Day, Constance M., St. Paul.
Dickey, June C., Minneapolis.
Donohue, Gertrude, Minneapolis.
Dorsey, Cora C., Minneapolis.
Farnam, F. C., Minneapolis.
Farnam, J. E., Minneapolis.
Fisher, Alice J., Steele, N. D.
Flaherty, Sheridan S., Morris.
Ford, Beth, Mazeppa.
Goodenow, Rae L., St. Paul.
Grunwald, R., Rockford, Ill.
Hauggi, John A., St. Paul.
Hayes, Annie M., Minneapolis.
Hayes, Bridget T., Minneapolis.
Herrick, R. D., Minneapolis.
Hofflin, Elizabeth, Hopkins.
Holt, Blanche, Minneapolis.
Huchthausen, John, Minneapolis.
Johnson, May J., Albert Lea.
Johnson, Thekla E., Lake City.
Jones, H. B., Morris.
King, Phoebe, Minneapolis.
Koren, Tulla, Minneapolis.
Larkin, A. E., St. Paul.
Latham, Fay I., Howard Lake.
Lawton, J. E., Worthington.
Lovell, Eleanor, Minneapolis.
Lynch, Maria, Minneapolis.
McFetridge, M. E., St. Paul.
McKinstry, June, Minneapolis.
Mearkle, Annie L., Minneapolis.
Mowry, J. L., Minneapolis.
Nevin, Frances, Cincinnati, Ohio.
Niederkorn, Hazel, Farmington.
Olsgard, Constance, Minot, N. D.
Olson, Didrick J., Belview.
Palmer, Alice H., Minneapolis.
Peck, Freda M., Minneapolis.
Roenisch, Clinton, Minneapolis.
Ryan, C. S., Albert Lea.
Shiba, Shigeyoshi, Japan.
Smith, Emmett W., St. Paul.
Smith, Nellie L., Minneapolis.
Snyder, Louise, Minneapolis.
Sommermeyer, Louise, Minneapolis.
Stephens, Stella M., Minneapolis.
Swain, George, Winona.
Taft, Wilbur R., Monticello.
Tallant, Webster, Minneapolis.
Taylor, Donald W., St. Paul.
Thompson, Edith, Houston.
Thompson, Ida B., Minneapolis.
Thorne, Charlotte I., Minneapolis.
Turnstrand, David, Minneapolis.

Ware, Jennie, St. Paul.
Webster, Mrs. F. P., Minneapolis.
Wenberg, E. A., Calumet, Mich.
Wheeler, Eva G., Minneapolis.
Wilcockson, Lillian M., St. Paul.
Wilkinson, Sarah, Minneapolis.
Wood, Stella, Minneapolis.
Woodcock, Anna L., Minneapolis.
Wyer, Ruth, Excelsior.

Six Year Medical Students

SOPHOMORES—26.

Anderson, Roscoe B., Minneapolis.
Barnard, Elizabeth, Minneapolis.
Barron, Moses, St. Paul.
Borgman, Melville B., Minneapolis.
Cram, Walter W., St. Paul.
Dedolph, Karl, St. Paul.
Dedolph, Theodore, St. Paul.
Emert, Harry F., Lockport, N. Y.
Foster, George K., St. Paul.
Freligh, Wilfred P., Stillwater.
Geist, George A., St. Paul.
Giessler, Paul W., Minneapolis.
Handy, John A., Good Thunder.
Hargesheimer, Walter S., Minneapolis.
Hoster, George W., Minneapolis.
Kittleson, Olaf L., Zumbrota.
Leitch, Archibald, St. Paul.
Madsen, Christenia A., Minneapolis.
Murphy, Lea M., Montevideo.
Nicholson, Murdock A., Willcox, Ariz.
Robertson, William P., Litchfield.
Robinson, Fred H., Scobey, Mont.
Strobel, William G., Mankato.
Tollefson, Theodore, Rochester.
Turnacliff, Dale D., Waseca.
Wilberton, George L., Winona.

FRESHMEN—48.

Abraham, Rudolph, Duluth.
Adams, Harold P., Minneapolis.
Aldes, Harry, St. Paul.
Bailey, Herbert B., Jackson.
Blume, Clarence E., Winona.
Bratrud, Arthur F., Spring Valley.
Carroll, William C., St. Paul.
Cooley, John Ford, Madelia.
Critchfield, Ralph J., Minneapolis.
Dietrickson, Gerhard, Minneapolis.
Dorge, Richard, Minneapolis.
Douglas, Jesse E., Blue Earth.
Eisengraber, Gustav, St. Paul.
Finney, Earl L., Hutchinson.
Frisch, Frank P., Grogan.
Gardner, Edwin L., Minneapolis.
Graham, Reginald D., West Duluth.
Griffin, Patrick J., Shakopee.
Hand, Robert D., Elbow Lake.
Haugen, Leslie, Albert Lea.
Hilger, Leo A., St. Paul.
Kirsch, Ralph L., Crookston.
Klein, Harry, Duluth.
Knutson, Knute J., Mankato.
Lepper, Lawrence E., Minneapolis.
McCoy, Lawrence R., E. Grand Forks.
Merrill, Fred B., Stillwater.
Michelson, Henry E.
Morris, Mary, Minneapolis.
Nordley, Harry R., Minneapolis.
O'Hare, Edward S., Minneapolis.
Oppel, Arthur F., Fulda.
Peppard, Thomas Albert, Minneapolis.
Pollock, Lee W., Rochester.
Pouliot, Joseph T., Hamel.
Reum, Arthur W., Minneapolis.
Satterlund, Victor L., New Richmond, Wis.
Seifert, Otto J., New Ulm.
Sexton, Patrick, St. Paul.
Sjaarda, John, Raymond.
Snell, Charles F., Detroit.
Snyder, George W., St. Paul.
Soelberg, Paul A., Granite Falls.
Stratte, Arthur, Dawson.
Sunwall, James O., Minneapolis.
Wetherby, Victor L., Minneapolis.
Whittier, Raymond W., Minneapolis.
Workman, Warner G., Tracy.

The College of Engineering and the Mechanic Arts

SENIOR CLASS.

CIVIL ENGINEERS, 12.

Ash, J. Wesley, Wendell
Cram, Clyde Maxwell, Zumbrota
Dougherty, Joe, Litchfield
Dunham, John A., Mason City, Ia.
Hawley, Harry G., Worthington
Haverson, Henry D., Winona
Hobart, Walter Beal, Minneapolis
Huston, David B., Minneapolis
Jones, Lewis Allen, Worthington
Swenson, Charles August, Winthrop
Tondel, Mandel Geo., Minneapolis
Van Cleve, Horatio P., Minneapolis

MECHANICAL ENGINEERS, 16.

Bell, Maurice Dwight, Minneapolis
Bjorge, Oscar Bernard, Underwood
Buhl, Paul Stephens, Graceville
Burwell, Loring D., Minnetonka
Fee, E. Frank, Duluth
Gessert, George Richard, St. Paul
Gilman, Nicholas Albert, St. Cloud
Krag, Walter C., Hampton, Ia.
Meany, James M., Lake City
Nekola, John, La Crosse, Wis.
Rawson, Ralph H., Faribault
Spring, Willis W., Minneapolis
Stacy, Elmer Neil, Eden Prairie
Stephenson, Oliver Harold, St. Paul
Tubby, Oliver George, St. Paul
Wagner, Otto Henry, New Richland, Wis.

ELECTRICAL ENGINEERS, 17.

Alton, Herbert Dennett, Ceylon
Andrus, Raymond J., Mason City
Baer, Louis Edward, Kenyon
Brown, Oliver Lindley, Minneapolis
Countryman, Peter Frederick, Appleton
Eddy, Lynne Walter, St. Paul
Fairchild, Albert Royal, Renville
Hovelson, Henry, Minneapolis
Kerns, Ralph W., Detroit
Norcross, Arthur Floyd, Minneapolis
Pearce, John Henry, St. Paul
Rezab, John Joseph, Winona
Smith, Byron Eton, Minneapolis
Smithson, John Edward, Hawick
Sternberg, Carl, St. Paul
Uzzell, George Walter, Minneapolis
Woehler, William Louis, New Rome

MUNICIPAL ENGINEERS, 5.

Batson, Charles D., White Bear Lake
Blomquist, Hjalmar F., Lake City
Grant, James Allen, Windom
Green, Fred Hall, Rushford
Kelly, Earl Wallace, Aitkin

JUNIOR CLASS.

CIVIL ENGINEERS, 31.

Barnes, Paul, Minneapolis
Borrowman, Leroy, Stillwater
Brenchley, Harry, Minneapolis
Comstock, John W., Sioux Falls., S. D.
Dallimore, Arthur Norman, St. Paul
Doeltz, Wm. Fred., Jr., Minneapolis
Ellis, Bruce B., Duluth
Fiske, F. William, Jr., St. Paul
Fleming, Douglas R., St. Paul
Fruen, Arthur B., Minneapolis
Furber, Pierce P., Northfield
Gage, Hugh Newton, Winona
Godward, Alfred C., Elbow Lake
Houston, Cecil C., Minneapolis
Hustad, Andrew P., Granite Falls
King, Robert Norris, Minneapolis
Knowlton, Herbert H., Minneapolis
Krauch, Wm. Louis, St. Paul
Lang, Fred, Austin
Longfellow, Dwight W., Minneapolis
McCall, Harry J., Minneapolis
McCree, Andrew A., St. Paul
Mitchell, John B., Zumbrota
Mowery, Clarence W., Northfield
Okes, Day Ira, Minneapolis
Quinn, John, Minneapolis
Robertson, Charles N., Sleepy Eye
Schlattman, Edward C., Alberta
Walker, George W., Minneapolis
Widell, Gust Fred, Mankato
Willis, Roy, St. Paul

MECHANICAL ENGINEERS, 22.

Anderson, Ole A., Hawley
Bachrach, Alfred, Faribault
Bingham, Stanley E., New Ulm
Boyum, Benjamin O., Rushford
Councilman, Halstead P., Minneapolis
Cox, Richard F., Graceville
Estep, Harvey Cole, Minneapolis
Fleming, Frank R., St. Paul
Frary, Hobart D., Minneapolis
Harwood, Stanley G., Minneapolis
Hetherton, Percival, Minot, N. D.
Holcomb, Myron D., St. Paul
Johnson, Frank, Willmar
Morris, Thomas C., Lime Springs, Ia.
Nemec, Frank L., Montgomery
Norelius, Emil F., Luverne
Norton, Clyde W., Lisbon, N. D.
Peterson, George T., New Ulm
Priedeman, George W., St. Paul
Raetz, Stephen Jas., Hastings
Souba, William H., Hopkins
Walsh, James, Northfield

ELECTRICAL ENGINEERS, 28.

Anderson, Frank Arthur, Wells
Barnes, Russell George, Duluth
Brown, George J., Minneiska
Carter, Robert J. S., Austin
Casberg, James W., LaCrosse, Wis.
Currie, Neil, Jr., Currie
Fitts, Joel A., Minneapolis
Frahm, Alfred R., Rochester
Hoppin, Glenn H., Northfield
Japs, Barney G., Carver

King, Alfred B., Welcome
Kreger, A. J., LeSueur
McAfee, Allan L., St. Paul
Pancratz, Frank J., Perham
Peterson, Clarence A., Blooming Prairie
Prentice, Robert S., Minneapolis
Robison, Archer R., Minneapolis
Schildt, Wm. F. H., Hastings
Schoepf, Alfred W., Appleton
Schow, William Peter, Stillwater
Scobie, Francis G., Duluth
Sturtevant, Percy G., Detroit City
Svendson, George P., Minneapolis
Swanstrom, Frank, Lake Park
Sweningsen, Oliver, Austin
Thornton, Edwin B., Benson
Weibler, William M., Belle Plaine
Zimmerman, Louis P., Waseca

MUNICIPAL ENGINEERS, 4.

Bergoust, Oscar J., Tacoma, Wash.
Norelius, Lewis M., Luverne
Olsen, Melvin S., Minneapolis
Wodrich, Oscar F., Dubuque, Ia.

SOPHOMORE CLASS.

CIVIL ENGINEERS, 37.

Alden, Herbert Claire, Minneapolis
Alwin, Sidney S., New Ulm
Asleson, Hans, Dawson
Atkinson, William B., Barnesville
Bazil, Joseph G., Montgomery
Berthe, Alfred, Winona
Boeringer, John R., St. Paul
Childs, James A., St. Paul
Effertz, Edward P., Norwood
Ellison, Jay T., St. Paul
Elsberg, William, Minneapolis
Esser, Frank F., Elsworth
Frahm, Herbert C., Rochester
Garen, George Mason, Stillwater
Geraghty, Hubert A., St. Paul
Gilbertson, John L., Atwater
Graham, James Ralph, Fort Worth, Texas
Hubbard, Frederick A., Minneapolis
Ingberg, Simon H., Hendrum
Ittner, William F., Red Lake Falls
Jaques, Robert, Duluth
Jensen, Arthur H., Kasson
King, Lawrence W., Minneapolis
Leach, Edward W., Winona
McMillan, Edward, Robbinsdale
Merriell, Walter H., Minneapolis
Merrill, Lewis H., Hutchinson
Montgomery, Grant, St. Paul
Olsen, Arthur O., Muskegon, Mich.
Paul, Fred T., Minneapolis
Ring, William E., Morris
Robbins, Raymond S., Red Lodge, Mont.
Schluter, Ernest A., Hutchinson
Sheffield, Fred W., Crookston
Shepard, George M., Kenyon
Shepherd, Franklin M., Maquoketa, Ia.
Torrance, Ell, Jr., Minneapolis

MECHANICAL ENGINEERS, 39.

Beery, Charles B., Minneapolis
Bieri, John B., Wells
Birnberg, Zingel, St. Paul
Bolton, John B., Minneapolis
Buck, Frederick W., Duluth
Buhl, John E., Graceville
Cone, Robert Allen, Minneapolis
Cummings, Alwin T., Duluth
Forfar, Donald M., Minneapolis
Gjerberg, Ole H., Red Lake Falls
Helm, Clyde B., Two Harbors
Hill, Clarence E., Minneapolis
Holden, Erick G., Sioux Falls, S. D.
Holmgren, Charles E., Breckenridge
Ingraham, Harry A., Minneapolis
Kircher, Frank J., Hudson, Wis.
Kircher, George A., Hudson, Wis.
Knopp, William R., St. Paul
Lambert, Edwin M., Young America
Lowey, Frank J., Brainerd
Mark, Walter J., St. Paul
Mencke, Paul A., St. Paul
Morris, John E., Minneapolis
Moyer, Amos F., Montevideo
Moyer, Malcolm B., Montevideo
Nelson, Edward S., St. Paul
Nichols, Browning, Montevideo
Robertson, Soren M., Artichoke Lake
Roundy, Pearl J., Wabasha
Shippam, Willis, Minneapolis
Starrett, Howard M., Minneapolis
Thompson, Herbert Leslie, Minneapolis
Thompson, Raymond S., Monticello
Tolstad, Martin, Starbuck
Udell, Carl D., Wells
Warren, Alvah H., St. Paul
Wilkinson, Charles P., Minneapolis
Williams, Wilbur S., Buffalo, N. Y.
Wright, Harris H., Farmington

ELECTRICAL ENGINEERS, 58.

Alton, Guy E., St. Paul
Anderson, Oscar P., Wells
Beckjord, Walter C., St. Paul
Brockway, Alvah E., Luverne
Carpenter, Ernest F., Redwood Falls
Chandler, Malcolm D., Minneapolis
Cobban, Rollo J., Luverne
Cook, Harry C., Red Wing

Cottingham, George, Jr., Helena, Mont.
Davies, Ralph M., Minneapolis
Drinkall, Leon R., Spring Valley
Duffy, Raymond V., Kalispell, Mont.
Duncanson, Archie V., Stewartville
Finke, Walter J., Charles City, Ia.
Foss, Elmer T., Minneapolis
Friedman, Benjamin, St. Paul
Gadsby, Lester H., Minneapolis
Grant, Fred R., Windom
Guderian, Milton L., Alexandria
Gustafson, Theodore A., Storden
Hitzker, Albert J., Winona
Hoagland, Mortimer R., Minneapolis
Hopkins, Mark L., Minneapolis
Hornibrook, James Wm., Tower
Hull, George E., Harwood
Johnson, Herman R., Minneapolis
Johnson, Leonard T., Lisbon
Kaplan, Eugene, Owatonna
Krauser, Aloysius J., Minneapolis
Kreitter, Arthur L., Duluth
Kruschke, George A., Duluth
Larson, Phinney O., Fosston
Layman, Jesse I., Minneapolis
Lenz, Frank J., Minneapolis
Lindelef, Charles G., Rush City
McKenzie, Lauren F., Glencoe
Muir, John S., Hampton, Ia.
Murrish, Fred E., Minneapolis
Nordin, Louis F., Lake City
Nutter, Clifford, St. Peter
Pardee, Harvey S., Minneapolis
Peterson, Henry N., Monticello
Peterson, James C, Alden
Pettijohn, Lyle, St Paul
Piper, Herman, Stillwater
Poore, Orson B., Bird Island
Powles, James W., St. Paul
Rasmussen, Carl R., Faribault
Schain, George A., Browns Valley
Simonson, Ernfried T., Minneapolis
Skytte, Ernest, St. Paul
Slayton, Ernest R., Sault Ste. Marie, Ont.
Stahlman, Henry C. G., St. Paul
Stillman, Marcus H., Austin
Swenson, Theodore M., St. Paul
Turner, Leslie E., St. Paul
Vita, Theodore, New Prague
Walling, Benjamin B., Winona

MUNICIPAL ENGINEERS, 3.

Moe, Alfred H., Duluth
Okes, Sidney R., Minneapolis
Weld, Quade C., Minneapolis

FRESHMAN CLASS.

CIVIL ENGINEERS, 57.

Adams, Ben, Pine Island
Anderson, Arthur E., Goodhue
Baird, Edward R., St. Paul
Betcher, Alfred, Ada
Blanchard, Cecil David, St. Paul
Bolme, Ole M., Sperry, N. D.
Buhl, Thomas, Graceville
Chapman, Berton L., Westbrook
Counter, John, Graceville
Critchett, Francis E., New Ulm
Crockard, Geo. E., Britton, S. D.
Dahlquist, Philip L., Minneapolis
Davison, Dodo E., Granada
Ekman, Claes T. S., St. Paul
Ferguson, Walker, Mankato
Fields, Howard H., St. Paul
Ford, Paul B., Bridgeton, N. J.
Fossen, George, Fergus Falls
Fox, Milo P., Mankato
Fredin, Conrad G., Duluth
Haberle, Edward L., Winona
Harms, Henry W., Wentworth, S. D.
Hartnett, John G., Graceville
Hauser, Rupert V., St. Paul
Haven, Frank, Minneapolis
Hedenstrom, Carl W., St. Paul
Huntington, Edward H., Paynesville
Hutchinson, Clement J., Faribault
Jevne, George W., Minneapolis
Johnson, Lynn R, Benson
Johnson, Paul A., Minneapolis
Lutzi, Roy P., Rochester
McGinnis, William H., Staples
McLeoud, Jason A., Lake City
Mark, Reuben A., St. Paul
Meyer, C. Foerster, Minneapolis
Motl, Charles L., Alpha
Nason, George L., St. Paul
Orbeck, Martin J., Eau Claire, Wis.
Overholt, Harley G., Minneapolis
Pratt, Benjamin A., Minneapolis
Ramsell, Roy E., Huron, S. D.
Rolfe, West A., Ada
Sawyer, Emerson D., Minneapolis
Simons, Almon R., St. Paul
Smith, Curtis E., Minneapolis
Smith, George H., Spring Valley
Smith, Richard Thorne, Superior, Wis.
Sommerfield, Adolph A., Sleepy Eye
Swedberg, M. Roy, Luverne
Timperly, William D., Minneapolis
Walby, Arthur C., Minneapolis
Walker, Herbert E., St. Paul
Wardell, John M., Jr., Tracy
Wentzel, Charles B., Warren
White, Clarence A., Montevideo
Wolff, Henry Ernest, St. Paul

MECHANICAL ENGINEERS, 33.

Barney, Hadwen C., Minneapolis
Blair, Clyde A., Minneapolis
Blake, Donald A., Minneapolis
Bush, John C., Jr., Duluth
Clark, Herbert B., Minot, N. D.
Cobb, Robert L., Minneapolis

Comb, Fred R., Minneapolis
Crosby, Frederic, St. Paul
Day, Roy M., Minneapolis
Du Toit, George A., Jr., Chaska
Frear, Jenness B., Excelsior
Hawley, Robert, Minneapolis
Hess, Arba L., Watertown, S. D.
Hicks, Emery A., Minneapolis
Hodgman, Herbert P., St. Paul
Holbrook, Gordon G., Minneapolis
Huseby, John S., Cloquet
Kannenberg, Louis W., Renville
Kleinegger, Frederick F., Akeley
Lagerstrom, Cornell A., Minneapolis
Larson, M. S. Red Wing
Lutz, Robert A., Mantorville
Malmquist, John W., Cokato
Meixner, Bernard A., Owatonna
Miner, Robert I., Excelsior
Montgomery, James S., Minneapolis
Olstad, Oscar A., Minneapolis
Oram, Robert C., Willmar
Palmer, Porteus B., St. Paul
Salisbury, Willis R., Minneapolis
Sukey, Paul G., Minneapolis
Wesbrook, Donald McD., Minneapolis
Worcester, Harold A., Minneapolis

ELECTRICAL ENGINEERS, 75.

Anderson Adolph A., Langford, S. D.
Anderson, Oscar V., Hudson, Wis.
Arvold, Henry M., Strong's Prairie, Wis.
Ashworth, R. H., Mankato
Barden, Chauncey H., Minneapolis
Beck, Vernon S., Minneapolis
Bradley, Lemi F., Lake Benton
Brohaugh, George O., Shelby
Budde, Emil, Rochester
Bury, Frank E., Two Harbors
Camp, John W., Wayzata
Carpenter, Wesley W., Minneapolis
Chapin, Sprague L., Luverne
Chapman, Arthur G., Minneapolis
Chapman, Charles S., Lanesboro
Clarkson, Cyrus E., St. Charles
Conley, Wilfred E., Lake Mills
Cooper, Ray Lee, Britton, S. D.
Councilman, Walter L., Minneapolis
Dahlstrom, Raymond E., St. Paul
Denneen, John F., New Richmond, Wis.
Elmer, Herbert K., Minneapolis
Flaherty, John J., St. Paul
Fleming, Laurence T., Minneapolis
Foker, Arnold Max, Minneapolis
Gaethke, Harry, Lake City
Grinols, Earl L., Fair Haven
Hansen, Christian, St. Paul
Hagstrom Herbert E., Minneapolis
Hawley, Robert C., Lanesboro
Healy, Ralph L., Red Lake Falls
Hinkle, Robert, Little Falls
Hush, Howard R., Minneapolis
Hyser, George W., Minneapolis
Jaqua, John R., Minneapolis
Jesperson, Clarence M., Minnetonka Beach
Jones, Watkin W., Windom
Josephson, Eliot B., Red Wing
Kelty, Harland E., Minneapolis
Landeen, Arvid G., Garfield
Lyford, Dartt H., Minneapolis
McClure, Howard W., Litchfield
McQuillan, Raymond E., Britton, S. D.
Markoe, James C., St. Paul
Martin, Wallace H., Willmar
Myers, James, Great Falls, Mont.
Nelson, Fred C., Chatfield
Nelson, Hugo C., Minneapolis
Ober, Floyd H., Sheldon, Ia.
Olson, Clarence, Two Harbors
Packer, Alfred H., St. Paul
Pease, Maynard W., Minneapolis
Pelton, Alvin E., Lyons, Ia.
Phelps, Ray R., St. Paul
Purcell, Richard T., Minneapolis
Rafferty, Thomas W., Minneapolis
Reid, Harry A., Mankato
Reiff, Ernest R., No. St. Paul
Richley, Clyde A., Minneapolis
Rockwell, Henry G., Kidder, S. D.
Shane, William G., Gladstone
Shepard, Donald D., Waseca
Soulek, Joseph H., Montgomery
Stillman, Paul R., Riceville, Ia.
Stinchfield, Fred Roscoe, Robbinsdale.
Stone, Webster H., Alden
Stover, Lester A., Minneapolis
Streich, Harry C., Winona
Swenson, Albert, Willmar
Ulm, Lynne C., Red Wing
Utne, Andrew O., Dalton
Wade, Arthur M., Hopkins
Wells, Ralph C., Paynesville
Wilder, Curtis W., Minneapolis
Woollett, Guy H., Minneapolis

UNCLASSED, 14.

Arndt, William P., Pine Island
Bowen, Clarence W., Pasadena, Cal.
Campbell, George A., Minneapolis
Chase, Bertram E., Preston
Dillingham, Edgar B., Minneapolis
Ellis, Joseph F., Jr., Barrett
Hartman, Edward Robert, Fairmont
Hill, Wilmer Warren, Minneapolis
Hovey, Frank A., Minneapolis
McKeehan, Louis W., Minneapolis
Rollins, Lewis M., Minneapolis
Schmidt, Robert J., Rochester
Simpson, Laurus, L., Minneapolis
Todd, Milo E., Vermillion, S. D.

GRADUATE, 1.

Rose, Norman W., Duluth

SCIENCE AND TECHNOLOGY.

JUNIOR CLASS, 2.

Clarke, Charles P., Elysian
Curtiss, Lindsley B., Minneapolis

SOPHOMORE, CLASS, 2.

Carleton, Henry G., Minneapolis
Thomson, Henry Sears, Minneapolis

FRESHMAN CLASS, 2.

Buffington, J. Raymond, Minneapolis
Hopkins, Kenneth N., Minneapolis

SUMMARY.

Total Enrollment 458

The College of Agriculture

GRADUATE STUDENTS—2.

McDonald, William, Ph.D., Transvaal, Africa.
Fulkerson, Vincent, St. Anthony Park.

SENIORS—10.

Allen, Phillip T., Wolverton, Minn.
Blair, Donald Scripture, St. Anthony Park.
Cady, Le Roy, St. Anthony Park.
Gaumnitz, Carl, St. Cloud.
Heringa, Edward, Arnhem, Holland.
McDonald, May C., Minneapolis.
Mowry, H. H., Washington, D. C.
Pfaender, Maximillian, New Ulm.
Rose, John de Cew, St. Anthony Park.
Tomhave, William H., Fergus Falls.

JUNIORS—7.

Ainslee, George G., Rochester.
Foster, Jeannette Ora, St. Anthony Park.
Frear, Dana Walter, St. Anthony Park.
Mayland, Edwin, Rushford.
Moore, Walter M., Merriam Park.
White, Hall B., Winnebago.
White, William, Camden, N. J.

SOPHOMORES—14.

Bergstrom, Chester H.
Blackburn, James Raymond, Royal, Neb.
Carroll, Harry B., St. Paul.
Cooper, Thomas P., Minneapolis.
McNelly, Chester L., Caledonia.
Miller, Ralph C., Minneapolis, Sta. F., R. 1.
Orr, George Raymond, Michigan City, Ind.
Paterson, Thomas G., St. Cloud.
Peterson, Elvin Le Roy, Olivia.
Robinson, Mabel M., Minneapolis.
Russell, Hoy S., St. Anthony Park.
Titrud, Ole Lee, Cokato.
Underwood, Clarence, Hutchinson.
West, Ralph L., Minneapolis.

FRESHMEN—40.

Benson, Arnold Orlando, Glenwood.
Benzin, Bazil, Minneapolis.
Berry, James Bert, St. Paul.
Birdsall, Grace E., Minneapolis.
Chambers, Frank Ray, Havana.
Cleator, Fred William, Minneapolis.
Crandall, Le Roy V., Red Wing.
Crimmins, Ellen May, Minneapolis.
Daine, Henry Wells, Farmington.
Ellis, Ruberta, St. Paul.
Gaumnitz, Florence, St. Cloud.
Gillis, James R., St. Paul.
Gore, John E., San Dimas, Cal.
Hartzell, Mary K., Minneapolis.
Hohle, Ola Arnold, Hector.
Jacobson, Norman, Port Washington, Wis.
Johnson, Frederick O., St. Anthony Park.
Krauch, Herman, St. Paul.
Laate, Gurid, St. Anthony Park.
Lathrop, Elbe Allen, Hugo.
Lewis, Charles L., Jr., St. Paul.
Lind, Emma S., Houston.
McCabe, Eva.
Marsden, Edith Viola, Edgerton, Wis.
Merrill, Alfred Stiles, Minneapolis.
Nelson, Marie Louise.
Peterson, Eric Ludwig, Dawson.
Pond, Harold H., Minneapolis.

Raymond, Charlotte A., Little Falls.
Robb, George Frederick, St. Paul.
Robinson, Alta E., St. Paul.
Rosholdt, Charles Eugene, Annandale.
Schrepel, Minnie Anna, Le Sueur.
Strunk, Blanche Alice, Faribault.
Svarstad, Anne, Bath, S. D.
Thompson, Arthur H., Minneapolis.
Underwood, William, Hutchinson.
Waller, Conrad Judson, St. Paul.
Ware, John F., St. Paul.
Wiegand, William G.

SPECIALS—2.

Garrett, Harry D., Osseo.
Valentine, Mrs. Wells. Minneapolis.

The School of Agriculture

STUDENTS 1906-7.

Intermediate year	11	
A Class	91	
B Class	146	
C Class	316	
		564
Farmers' Short Course		82
Dairy School		106
		752
College course		72
Total in Department of Agriculture		824
Less 5, twice counted		5
TOTAL		819

"INTERMEDIATE YEAR," 11.

Billings, Carlos R., Audubon.
Dahlquist, Henry D., Warren.
Gillis, James R., St. Anthony Park.
Hille, Hans O., Webster.
Hjermstad, Morten, Balaton.
Krogh, George F., St. Anthony Park.
Lathrop, Orley K., Hugo, R. 29.
Perkins, Bert B., Monticello.
Schrepel, Minnie A., LeSueur.
Sonstegard, Peter O., Georgeville, R. 1.
White, Frank W., Marshall.

"A" CLASS, 91.

Anderson, Reuben W. E., Lindstrom.
Ashworth, Harold E., Anoka.
Atz, Lloyd A., Farmington.
Bassett, Morton H., Rushmore.
Belgum, Ella H., Farwell.
Berg, Joseph H., Willmar.
Bohanon, Charles A., Minneapolis.
Brandt, Henry P., Morris.
Brown, Edward W., Luverne.
Carlisle, Clifford A., Stacy.
Carpenter, Paul J., Sleepy Eye.
Chermak, Mabel C., Chatfield.
Chermak, Minnie, Chatfield.
Clark, Scott G., Morris.
Cleator, Fred W., Minneapolis.
Comings, George H., Eau Claire, Wis.
Dayton, George N., Minneapolis.
Drysdale, Clarence, St. Charles.
Durkee, Flora B., Hancock.
Erb, Thomas H., Clarence, New York.
Evans, Catherine M., Merriam Park.
Field, Carl, Nora Springs, Iowa.
Field, Martin, Nora Springs, Iowa.
Foslien, Theodore, Garfield.
Gaumnitz, Carl, St. Cloud.
Gilles, De Witt C., Minneapolis.
Greenwalt, Dorothy A., Withrow.
Greenwalt, James A., Withrow.
Halvorson, Emily J., Norway Lake.
Harper, Sidney R., West St. Paul.
Haw, John W., Superior, Wis.
Held, Julius W., St. Louis Park.
Haywood, Ralph M., Minneapolis.
Higgins, Bradley C., Levant, Maine.
Holden, N. Dee, Amboy.
Jacobson, Mabel L., Baldwin, Wis.
James, Edwin, Glenwood.
Johnshoy, Selma Helena, Starbuck.
Johnsrud, Peder L., Spring Grove.
Keller, Martha K., Dundas.
Kern, Harry Elsworth, Minneapolis.
Kronlokken, Martha G., Renville.
Lamb, Eva J., Mazeppa.
Lane, Dwight J., Minnetonka.
Lewis, Pauline L., Long Lake.
Lowe, Florence L., St. Anthony Park.
Lundgren, Magda E., Excelsior.
Lundholm, Agnes M., St. Paul.
Lydiard, Susie C., Long Lake.
Marple, Paul A., Wendell.
Marsden, Viola E., Edgerton, Wis.
Maylott, George A., Hancock.
Mayne, Mac H., Maple Lake.
Miller, Estella A., Excelsior.
Monson, Irving A., Elbow Lake.
Monson, Laura L., New London.
Moore, Walter M., Merriam Park.
Nicholson, Ivy M., St. Paul.
Norling, Albert L., Svea.
Pengilly, Mary E., Shakopee.
Peterson, Edwin R., Willmar.
Peterson, Elwin L., Olivia.
Peterson, John M., Dawson.
Peterson, Walter I., Canton.

Phillips, Ellen A., Excelsior.
Phillips, Richard, Le Sueur.
Potter, Olive M., Springfield.
Quam, Oscar A., New London.
Robbins, Leon H., Clear Water.
Robinson, Alta E., Merriam Park.
Samuelson, Levi W., Lafayette.
Sandager, Martin N., Belview.
Sauby, Julia T., Elbow Lake.
Scott, Warner C., Minneapolis, R. 3.
Shelley, Ella E., Hanska.
Sherman, Alton C., Clinton.
Solhaug, Louis G., Starbuck.
Stickney, Horace T., Clear Lake.
Strombo, Mattie P., Dalton.
Stuhr, Anna H., Buffalo.
Swedberg, Jasper I., White Bear Lake.
Thom, John R., Stewart.
Thompson, Norris R., Cottage Grove.
Titrud, Ole Lee, Cokato.
Tompte, George A., Sacred Heart.
Trieloff, Erich C., Carver.
Underleak, Frances M., Chatfield.
Venzke, Harry E., Cardigan Junction.
Ward, Guy H., Carver.
White, Winnifred E., Winnebago.
Wilcox, William W., White Bear Lake.

"B" CLASS, 146.

Adkins, Alice E., Minneapolis.
Ahlquist, Margaret E., St. Paul.
Albers, Mary W., Northfield.
Allan, William D., Little Falls.
Anderson, Agnes E., Alexandria.
Anderson, Elmer O., Alexandria.
Anderson, Fred A., Minneapolis.
Bacheller, Herbert S., Forest Lake, R. 26.
Beckstrand, Andrew C., Brookfield, R. 1.
Berg, Alma, Minneapolis.
Bofferding, Clara S., Minneapolis.
Bouman, Ado, Minneapolis.
Butterfield, Elsie M., Faribault.
Calkins, John E., Imogen, R. 1.
Cantwell, Wm. F., White Bear.
Carpenter, Fred B., Sleepy Eye, R. 5.
Charles, Ernest H., Hancock.
Church, George H., St. Paul.
Cleland, Edgar J., Waseca.
Cole, Mary E., New York Mills.
Colombe, Robert D., Little Falls.
Cooper, Percy E. R., Sta. F., R. 5, Minneapolis.
Cowin, Alton B., Minneapolis.
Cranmer, Max A., Duluth.
Cross, Harrison J., Childs.
Demann, Frank A., Lonsdale, R. 2.
Denison, Ena L., Faribault, R. 7.
Dorn, Ivan C., Brooklyn Center.
Dow, Charles F., Worthington.
Durkee, Philander A., Hancock.
Eklund, Carl J., Brookston.
Englestad, Louise E., Thief River Falls.
Engstrand, Adolph G., Dawson.
Enright, John P., Rose Creek.
Finkbiner, David E., Royersford, Pa.
Flaten, Mabel, Granite Falls.
Follingstad, Henry A., Zumbrota, R. 6.
Forbes, Charles S., W. Side Sta., St. Paul.
Gaumnitz, Emma M., St. Cloud, R. 1.
Gee, Merrill H., Minneapolis.
Gillingham, Emilie J., St. Paul.
Hall, Fay E., Morris.
Hall, Jessie M., Minneapolis.
Hancock, Morris W., Mankato.
Hanscome, Clarence P., Brooklyn Center.
Hanson, Willie H., Big Lake.
Harrison, Earl D., Osseo, R. 1.
Hart, Iva P., Farmington.
Haslerud, Oliver, Rushford, R. 3.
Hasslen, Anna, St. Paul.
Hazleton, Lyman W., Cutler.
Helgemoe, Julia E., Canby.
Herum, Haldor C., New Centerville, Wis.
Hickman, Emmett E., Minneapolis.
Holmquist, Oscar W., Dawson, R. 1.
Holt, Harry G., Delhi.
Hovde, Frederick T., Hanska
Howard, Burt B., Madelia.
Hunt, Florence A., St. Cloud.
Hunt, Freed K., St. Cloud.
Huseby, Bennie J., Adams.
Irvine, Robert, St. Paul.
Johnson, Clara V., New Richmond, Wis.
Johnsrud, Clara L., Spring Grove, R. 3.
Johnston, Theo. H., Madison.
Jones, Clarence A., Duluth.
Jones, Myrtle M., Le Sueur, R. 6.
Keller, John W., Dundas, R. 1.
Kelley, Lloyd S., Markville.
Kilham, Addie F., St. Paul.
King, Edwin H., Spring Valley, R. 4.
Lambert, Lenora M., Withrow.
Lane, George E., Minnetonka, R. 2.
Larson, Henrietta A., Ulen, R. 1.
Lathrop, Alden B., Hugo, R. 29.
Laughlin, Lee, Ada.
Leathers, Stanley W., Brooklyn Center.
Lewis, Roy, Lewisville.
Linde, Ernest A., Abercrombie, N. D.
Linder, Leopold S., Mankato.
Loegering, Aloysius J., Long Prairie.
Lundgren, Wm. A., Excelsior, R. 3.
Lundquist, Mabel V., Winthrop.
Lyman, Walter S., Clinton.
McCurry, Joseph H., Westport.
Marquardt, Minnie E., St. Paul.
Maylott, Eugene A., Hancock, R. 2.
Miller, LaVerne A., St Paul.
Monson, Clara, Kenyon, R. 4.
Monson, Grace Viola, Elbow Lake, R. 2.
Nash, Floyd E., Robbinsdale.
Nelson, Emil R., Canby.
Nelson, Ida C., Alexandria.
Noltimier, Mark, Hamline.

O'Bryan, Allen P., Little Falls.
Oleson, Victor, Perley.
Olson, Luther E., Cannon Falls, R. 8.
Orton, Herbert O., Elk River.
Overlie, John E., Wrenshall.
Parish, David A., Mondovi, Wis.
Pattee, Ralph E., Minneapolis.
Paulson, Emil, Windom.
Pedrick, Wm. H., Minneapolis.
Person, Fred A., Withrow.
Peterson, Alice B., New Ulm, R. 3.
Peterson, Fred O., Olivia.
Potter, Reuben M., Springfield.
Reasoner, Margretta, New Brighton.
Rice, Edson C., Lewiston.
Ricks, Nelson D., Minneapolis.
Ringrose, Lura, Hancock.
Robertson, John E., Appleton.
Rollefson, Theo. S., Clarkfield.
Ruth, Anton C., Morgan.
Routhe, Walter L., Morgan.
Sagnes, Lena H., Sacred Heart, R. 2.
Sargent, Ray L., Red Wing, R. 2.
Schmidt, Wm. A., Osseo, R. 1.
Selbig, Florence M., St. Paul.
Sheaff, Phillip L., Stillwater.
Shumway, Frank E., Minneapolis.
Smith, Wycliffe M., St. Paul.
Spence, Alice V., Hamilton, Ill.
Spence, John C., Hamilton, Ill.
Squire, Homer H., Hanley Falls.
Staples, Alice M., W. Side Sta., St. Paul, R. 2.
Staples, Myrtle C., W Side Sta., R. 2., St. Paul
Stepka, Sadie M., Minneapolis.
Strand, Elmore A., Ada, R. 2.
Swain, Lawrence B., St. Paul.
Swanson, Robert J., Dassel.
Thoe, Bertha F., Hayfield.
Thordsen, Clara, Hanska.
Trieloff, Hattie L., Carver.
Trondson, Theo. H., Lakefield.
Trow, Clinton F., Glenville.
Turner, Esther May, St. Peter, R. 1.
Valleau, Dorney W., St. Anthony Park.
Van Doren, Amy L., Farmington.
Watkins, Walter O., Carlton.
Webber, Steven B., White Bear.
White, Sherman L., Marshall.
Wilkins, Chester A., Minneapolis.
Wilson, Lillie May, Granite Falls, R. 1.
Wolfe, Sydney J., Morristown.
Wright, Albert D., St. Cloud.

"C" CLASS.—316.

Aakre, Clara, Hayfield.
Adley, Charles L., Northome.
Agre, Martin, Sacred Heart.
Ahlers, John B., New York Mills.
Ainsworth, Walter S., Minneapolis.
Albee, Charles B., Caledonia.
Albers, Walter, Northfield.
Albertson, Rudolph, Lamberton.
Allen, Percy R., Winona.
Ames, Hazel E., Hutchinson.
Anderson, Esther J., Minneapolis.
Anderson, George M., Minneapolis.
Anderson, Jessie L., Dell Rapids, S. Dak.,
Anderson, Lillian L., Lindstrom.
Anderson, Orley E., Medford.
Anderson, Phillip A. W., Forest Lake.
Anderson, Raymond E., Maple Plain.
Anderson, Sophus H., St. Anthony Park.
Anderson, Walter Roy, Belgrade.
Arndt, Pauline M., Crystal, N. Dak.
Arneson, Joseph, Canton, R. 1.
Arny, Albert C., St. Paul Park.
Ashbach, Otto B., Ada.
Austin, Florence M., Winnebago.
Backer, Roy F., New Ulm.
Baker, Matt H., Wood Lake.
Barsness, Alfred, Brandon.
Bartlett, Irving J., Mound.
Beard, Lee A., Kasson.
Behlen, Henry W., Appleton.
Benson, Edwin B., Jackson, R. 4.
Berg, Edgar F., Dundas.
Billings, Bessie A., Audubon.
Blackburn, Robert A., Royal, Neb.
Blackburn, Ralph C., Royal, Neb.
Bolkcom, Harry G., Sta. F., R. 1, Minneapolis.
Bornhoft,, George C., Arcola.
Boudrye, Ada A., Granada.
Bredvold, Jacob S., Belview.
Brekken, Ole, Sacred Heart.
Briggs, George M., Houston.
Briggs, Mary O., Houston.
Brown, Anna B., Pipestone.
Brown, Mabelle C., Pinestone.
Brownell, Max C., LaCrosse, Wis.
Brummer, John, Renville.
Buck, Cecil, Minneapolis.
Burfeind, Arthur H., Minneapolis.
Bushard, Francis, New Ulm.
Busse, Florence A., Merriam Park, R. 8
Busse, Rose Olive, Merriam Park, R. 8
Butterfield, James, Long Lake.
Byrne, Vincent M., Ruscomb Sta., Ont.
Calkins, Clara A., Imogen, R. 1.
Cantine, Sarah A., Walnut Grove.
Carlson, Elvira S., Minneapolis.
Carlson, Mabel H., Minneapolis.
Cass, Lucilla, Brainerd.
Charlwood, H. J., London, Eng.
Chase, Elizabeth M., Farmington.
Chase, Vere E., Minneapolis.
Chester, Amanda O., Osseo, Wis.
Christopherson, Edna H., Sioux Falls, S. D.
Churchill, Charles P., Fort Dodge, Ia.
Clark, Miles D., St. Paul.
Coburn, John M., Pipestone.
Comnick, Bertha J., Westbrook.
Corser, John, Minneapolis.

Craik, William C., Edina Mills.
Crary, Frank H., Northfield.
Crippen, Lee A., Langdon, R. 16.
Critchfield, B. H., Minneapolis.
Croxen, John B., Monticello.
Crysler, Flossie W., Sioux Falls, S. D.
Dahlberg, Oscar F., Minnetonka.
Danielson, Daniel,
East Grand Forks, R. 1.
Davis, Clinton T., Akeley.
Dawson, Vincent, St. Paul.
Dewar, Archibald F., Lewisville.
Doten, Grace E., Minneapolis.
Dubbles, Joseph, Viola.
Durland, James, LaCrosse, Wis.
Eggers, Edward, Cologne.
Ehlers, Frederick L., Marshall.
Eid, Otto J., Granite Falls.
Einarson, Baldwin, Duluth.
Ekelund, Herman A., Minneapolis.
Eklund, Nels A., Brookston.
Epperson, Hugh W., Brookston.
Ericson, Dwight S. E.,
Goodhue, R. 6.
Erickson, Richard I., Stillwater.
Faulk, Ellen V., Willmar.
Ferraby, Ethel S., Minneapolis.
Fleming, Albert, St. Paul.
Foster, Benjamin, Marshall.
Francis, Merritt, Minneapolis.
Fruechte, Louis H., Eitzen.
Gammon, Lee M., Excelsior, R. 3.
Garrison, Elda, Hamline.
Giere, Constance B., Sacred Heart.
Gilbertson, Clara A., Ada.
Gillingham, Alma E., St. Paul.
Goenner, Henry H., Clear Lake.
Golberg, Germanda E., Kasson.
Grimm, Ida L., Hector.
Grimsgard, H., Grove City.
Grinols, Ross C., St. Cloud.
Hagen, Cora S., Granite Falls.
Hagen, Nellie C., Hagan.
Hagen, Norman, Granite Falls.
Hall, Jennie F., Buffalo Lake.
Hallan, Henry A., Spring Grove.
Halvorson, Mabel A., Norway Lake.
Hamilton, Vida L., Brooklyn Center.
Hammerberg, Arvid, Shafer.
Hanson, Clarence J., Hutchinson.
Hardesty, Frank J., Minneapolis.
Harris, Geo. E., Marshall, R. 3.
Harvey, Charles I., St. Paul.
Hastad, John L., Appleton.
Hauenstein, Irma, New Ulm.
Havreberg, Arne, Bricelyn.
Heinecke, Geo. H., Appleton.
Helgeson, Emil G., Bruce.
Hendrickson, Wm., Northfield.
Henry, John R., Chatfield.
Herum, Norman S., River Falls, Wis.
High, Herman, New Ulm, R. 3.
Highum, Henry B., Rushford.
Hinshaw, Guy M., St. Paul.
Hodorff, Gustave, Dixville.
Hoffman, Ernest D., Marshall.
Holbrook, David W., Markesan, Wis.
Holden, Edwin B., Corson, S. D.
Holmberg, Katherine M., Minneapolis.
Holmberg, Mabel O., Minneapolis.
Hordum, Florence A.,
Merriam Park, R. 8.
Hovelsrud, S. Hjalmer, Lakefield.
Huntley, Herbert C., Hancock.
Jacobs, Flora A., Chaska.
Jacobson, Cecile L., Madison.
Jacobson, Emma C., Elmdale.
Jacobson, Henry, Marshall.
Jaquith, Harold H.,
Minnetonka, R. 1.
Johnson, Arthur Simeon, Harris, R. 2.
Johnson, Henry A., Taylors Falls.
Johnson, Joseph A., Center City.
Johnson, Joseph H., Madison, R. 1.
Johnson, Myron H., Goodhue.
Johnson, Stella A.,
Cannon Falls, R. 3.
Kastama, Jalmer J., Deer Creek.
Kenney, James, Beardsley.
Kern, Frederick D., Minneapolis.
Kirkwood, Elizabeth C., Wabasha.
Kittleson, Edward, Litchfield.
Knoll, Gustave C.,Minneapolis.
Knutson, E. George, St. Cloud.
Kottke, Edward A., Hutchinson.
Krefting, Carl L., Minneapolis.
Kroeger, Carl H., New Albin, Ia.
Krusemark, Clarence W.,
St. Paul Park.
Kuschel, Herman, Dixville.
Kvalheim, Andrew, Whalan.
Lamb, Harvey H., Mazeppa.
Larsen, LeRoy E., Annandale, R. 1.
Larson, Frank S., Northfield.
Larson, Levia, Balaton.
Larson, Sallie Marie, North Branch.
LaRue, Mary E.,
Elizabethtown, Ky.
Lawrence, Frank E.,
Litchfield, R. 4.
Lefeber, Wilbur F., Wauwatosa, Wis.
Lemke, Wm. A., Albert Lea, R. 4.
Lenz, Valentine L., Albert Lea.
Lien, Harry A., Montevideo.
Lien, Oscar L., Renville.
Lindall, Carl O. R.,
Parkers Prairie.
Lindquist, Nels W., Lamberton.
Loftus, Grace M.,
St. Anthony Park.
Ludwick, Lottie, Hamline.
Lund, John E. L., Walnut Grove.
Lundeen, John E.,
White Bear Lake, R. 1.
Lyman, Richard E., Clinton.
McCall, Arthur R., Minneapolis.
McCarty, Raymond U.,
Good Thunder.
McCurry, Margaret E.,
West Union, R. 1.
McCurry, Myrtle V., West Union, R. 1.
McKinney, Jesse A.,
Indianapolis, Ind.
McNee, William, Spring Valley.
McNelly, Charles E., Caledonia.
McNelly, Mary E., Caledonia.
McNelly, Robert J., Caledonia.
Mallery, Erna, Lakeville.
Maltrude, Helen O., Granite Falls.
Manahan, Mary D., Chatfield.

Manahan, Matthew, Chatfield.
Manning, Nydia A., St. Paul.
Mark, Levi, Goodhue, R. 5.
Martensen, Elvina M.,
Martensen, Wis.
Mather, Wm. E., Faribault.
Mattson, Elizabeth,
St. Anthony Park.
Mellenthin, Albert A.,
Marshall, R. 3.
Melwold, Dena, Fairfax, R. 1.
Meyst, Bessie L., Minneapolis.
Minton, Harry S., Francis,
Sask., Can.
Moak, Inez M., St. Paul.
Monson, Mary C., St. Paul.
Montgomery, Tracy W.,
Minneapolis.
Mortenson, Alfred T., Albert eLa.
Murray ,Margaret S., St. Paul.
Myhre, Oluf, Spring Grove.
Nahrgang, John H., Lewiston.
Nelson, Arthur O., Stillwater, R. 7.
Nelson, Arthur S., Afton.
Nelson, Ellen L., Hector.
Nelson, Helmer N., Wood Lake.
Nelson, Hilma F., Litchfield.
Noltimier, Roy A., St. Paul.
Noltimier, Warren H., St. Paul.
Norman, Edwin C., Traverse.
Nyberg, Minnie C., Hamline.
O'Brien, Vincent, St. Paul.
O'Leary, Louis, Beardsley.
Olson, Burke A., Alberta.
Ostendorf, Alford,
Somerset, Wis., R. 2.
Ostrem, Martin J., Lanesboro, R. 1.
Ott, John C., Albert Lea, R. 4.
Padden, Roscoe L., Stewart.
Page, Clarence P., St. Paul.
Palmer, Karl V., Harris.
Papez, Rose B., Hector.
Parker, Frank, Hamline.
Partridge, Ruth H.,
St. Anthony Park.
Patten, Norman B., Minneapolis.
Patton, Kenneth M., Superior, Wis.
Peck, Frank W.,
St. Anthony Park.
Pederson, Inga M., Astor, Ia.
Pengilly, Alice L., Shakopee.
Pentz, Bertha E., Faribault.
Pentz, Kenneth W., Faribault.
Peterson, August W., Brookfield.
Peterson, Ellen W., Layfayette.
Peterson, Herbert C., White Bear.
Peterson, Thorwold, Excelsior, R. 3.
Phillips, Dinah S., LeSueur.
Pike, Vida J., Marshall.
Poore, Iantha E., Bird Island.
Potter, Melvin C., Wahpeton, N. D.
Qualy, Sarah E., Caledonia.
Rasmusson, Nellie R., Willmar.
Rentz, Della F., Morris.
Richter, Edward A.,
Montgomery, R. 1.
Rignell, Agnes D., Winthrop.
Robertson, Charles J.,
Merriam Park, R. 2.
Ruble, Rollo J., Fairmont.
Russell, Hoy S., St. Anthony Park.
Sargent, Clara, Red Wing, R. 2.
Schreck, John P., Appleton.
Schrepel, Leo C., LeSueur.
Schwab, Francesca L., Bennettville.
Schwantes, Anna Minnie, New Ulm.
Sizer, Mary A., St. James.
Skaar, Alfred, Hayward.
Skalbeck, Joseph, Sacred Heart.
Skoog, Lillian C., Willmar.
Skoden, Harriet A., Lamberton.
Smith, Ralph V., Parkers Prairie.
Smogard, Bernhart, Madison, R. 1.
Sontag, Geo. A., Somerset, Wis.
Southmayd, Winthrop S., Braham.
Spencer, Arthur, Beardsley.
Squire, F. P., Hanley Falls.
Standish, Wm. R., Minneapolis.
Stark, Arthur, Harris.
Stauffer, Clarence L., Winnebago.
Stenson, Sophia, Wilder.
Stewart, Clarence E., Forest Lake.
Stone, Allen W., Park Rapids.
Strand, Annie L., Ada.
Strate, Wilbur J., New Ulm, R. 1.
Sullivan, Jessie A., Minneapolis.
Sundboom, Helen E., Mora.
Thornton, W. A., Appleton, R. 1.
Tibbitts, Lee E., Marshall.
Titrud, Albert, Cokato.
Tomlinson, Francis H.,
Hutchinson.
Torgrimson, Theofred, Hanska.
Torne, Henry, Rich Valley.
Tripp, Harry P., Beardsley.
Turner, Amelia, H., St. Peter, R. 1.
Turner, Evelyn M.,
St. Louis Park, R. 1.
Twedt, Swen A., Ulen.
Twitchell, Inez G., Stacy, R. 1.
Undlin, Ole, Madison, R. 1.
Upham, Thomas M., Monticello.
Utter, Gustaf W., Ceylon.
Vagt, John, Jackson.
Veblen, T. Alfred, Stillwater.
Verbeck, Wilber L., New York Mills.
Victor, Emmy M., Lindstrom.
Viets, John J., Minneapolis.
Voxland, Olaf L., Kenyon.
Wakeman, Walter Earl, Marshall.
Wallace, Arthur M., Spring Grove.
Warwick, James T., Goodhue, R. 5.
Washburn, Etta R., Minneapolis.
Watson, Irene, Merriam Park.
Weidt, Elsie M., Merriam Park, R. 8.
Weinmann, Oren M., St. Paul.
Wessel, Anthony A., White eBar.
Westby, Sigurd; Bath, S. Dak.
Westmark, Henry A.,
Minnetonka Mills, R. 2.
Wilson, Laura E., Clarkfield.
Wilson, Walter A., Granite Falls.
Workman, George, Millard.
Wright, Charles R., Fergus Falls.
Zastrow, John C., Vernon Center.

SHORT COURSE STUDENTS, 82.

Adams, Guy A., Owatonna.
Anderson, Abram, Worthington.
Anderson, John, Dodge Center.
Austin, Perry, Worthington.
Bahls, Ervin, St. Paul Park.
Billings, J. P., Fergus Falls.
Biorn, Aimer, Zumbrota.
Blume, Irvine, Jordan.
Bogren, C. O., Woodhull.
Budde, Theodore G., Kellogg.
Buell, K. W., Preston.
Bush, Lloyd, Pine Island.
Byrne, Fred, Hart.
Carey, John, Minnesota Lake.
Carlton, J. S., Owatonna.
Chase, Budd E., Blue Earth.
Cofer, A. J., Howard Lake.
Coghlan, E. R., Wood Lake.
Cook, Ernest, Westport.
Dille, Oliver V., Dassel.
Ditsch, Thomas, St. Bonifacius.
Ekstrand, Peter W., Cokato.
Ellingson, H. T., Hanley Falls.
Elthon, Hans O., Nerstrand.
Erlandson, Richard, Enoch.
Evenson, Herman, Jackson.
Fleener, Kate, Howard aLke.
Gabel, Jacob, Afton.
Hagen, H. M., Granite Falls.
Hagen, John J., Farwell.
Halls, Arthur, Hills.
Handy, Harold B., Willmar.
Hauge, Edwin, Pennock.
Hallickson, L. N.,
Aberdeen, S. Dak.
Healy, H. W., Mapleton.
Hellerud, John M., Nerstrand.
Hille, A. J., Webster.
Hinz, Wm., Zumbrota.
Hjelle, Otto, West Valley.
Holden, G. E. Petersburg.
Holmberg, A. W., Avoca.
Hunter C. C., Minneapolis.
Iverson, Joseph, Ashby.
Jensen, A. P., Minneapolis.
Johnson, Augusta, New Ulm, R. 6.
Keil, G. L., Breckenridge.
Kemp, Orville, Hector.
King, Eugene, St. Paul.
Klinke, Charles, Taylors Falls.
Knutson, Louis, Belview.
Krueger, Fred, Stillwater.
Lambert, Dan, West Concord.
Leasman, Charles, Hector.
Lind, Charles, Kennedy.
Lindstrom, Emil, Cokato.
Ludlow, H. M., Worthington.
McGlashen, J. G., Edgerton.
Melwold, Matilda, Fairfax.
Naegli, Joseph, Elizabeth.
Olson, Herbert, Lonsdale, R. 2.
Olson, Otto, Emmons.
Olstad, Theo., St. James.
Parker, Frank, Hamline.
Peterson, H. A., Sacred Heart.
Robbinson, H. A., Minneapolis.
Rosenquist, O. H., Oakes, N. Dak.
Roske, Ed. H., Olivia.
Senechel, Herman, Drake, N. Dak.
Shelley, Albert, Madelia.
Shelley, Emil, Hanska.
Storlie, Oliver, Reville, S. Dak.
Tuvey, James, Taylor Falls.
Vail, J. C., Fulda.
Vollmer, Bertha, Sleepy Eye.
Wamstad, C. O., Tracy.
Webb, Geo. M., Morristown.
Westerson. Oscar A., Minneapolis.
Wiedeman, Henry, Sabin.
Wiker, N. H., Mabel.
Wolfer, C. R., Stillwater.
Wolfer, H. J., Stillwater.
Zastrow, John C., Vernon Center.

DAIRY SCHOOL STUDENTS, 106

Albertson, Edmund, Kellogg.
Bringgold, Abram G., West Concord.
Bettner, Henry, Owatonna.
Baltes, Anton, Melrose.
Bechtel, William, Brookfield.
Bergren, Hjalmer, Cannon Falls.
Beyl, Alfred, Osceola, Wis.
Bohlig, Charles, Spring Hill.
Bondeson, Andrew, Minneapolis.
Brown, Oscar, Annandale.
Bush, Sidney, Cannon Falls
Cardinal, Felix C., St. Onge, S. Dak.
Carlson, William, Harris.
Chancellor, Harrison, Delano.
Cleveland, William E., Minneapolis.
Colin, John W., Rush City.
Curtis, L. O., Lewiston.
Dahlberg, Arnold, Clear Lake, Wis.
Donney, W. H., Glencoe, R. 3.
Drevlow, W. E., Round Prairie.
Duclos, L. F., Austin.
Dummer, Otto, Brookfield.
Erickson, Axel J., Browerville.
Erickson, John, Bertha, R. 2.
Gausmoe,, Arthur S., Mankato.
Gilmer, W. H., Royalton.
Gramith, Charles, Chaska.
Granley, Emil O., Fertile.
Gunstensen, Gustave, Fisher.
Graunke, Louis K., Garfield.
Greethurst, Charles, Lewiston.
Germain, William, Sommerset, Wis.
Hansen, C. M., Rockville.
Heyes, John J., Oakland.
Holzman, W. H., Hanover.
Hovland, Gilbert, Fertile.
Jensen, J. L., Edgerton.
Jensen, Marinus, Darfur.
Johnson, A. J., Cokato, R. 5.
Johnson, Edward, Cokato.
Johnson, Frank, St. George.
Jonson, Oscar H., Dassel.
Knobel, Harry A., Minneapolis.
Krueger, Paul, Hutchinson, Kans.

Kunze, Albert, St. Bonifacius.
Langenfield, Matthew, Vermillion.
Larsen, George, Lansing.
Larsen, W., Frederick, S. Dak.
Lindholm, J. E., Harris, R. 2.
Lewis, L. H., Dawson, N. Dak.
Lindstrom, William, Glenville.
Logelin, Frank, St. Bonifacius.
Lueth,, George A., Rush City.
Lundborg, John, St. Paul.
Madsen, Anton, Morgan.
McCoid, G. B., Rushmore.
Malmquist, Robert, Rush City, R. 1
Mader, Carl, Minneapolis.
Martin, E. J., Waukon, Ia.
Mau, Otto R., Young America.
Meyers, Lue, Minneapolis.
Nelson, Ernest, Upsala.
Nelson, A. H., Cokato.
Nelson, F. N., Minneapolis.
Nelson, John, Thief River Falls.
Norsen, Nathaniel, Wheaton.
Olson, Ole B., Northwood, Ia.
Olson, Oscar, Carver.
Olson, Peter J., Grandy.
Osberg, George A., Dassel.
Overland, Gynther, Bratsburg.
Paulson, Warren G., Clayton, Wis.
Peterson, G. C., Annandale.
Peterson, Iver K., Minneapolis.
Quade, Gustave, Sauk Center.
Rickers, Julius W., Braham.
Rogers, George B., Wyoming.
Runke, William, Mapleton.
Russell, Ernest, Tracy.
Schneider, John, Almena, Wis.
Schulke, W. F., Garfield.
Schneider, Anton H., Lake Elmo.
Schleppenbach, Anton, Melrose, R. 3.
Schmidt, John, Victoria.
Schreiner, Henry, Watkins.
Schreeden, Herman, Meridian, Wis.
Seeger, Ernest, Red Lake Falls.
Seidel, Albert, Owatonna.
Skare, T. H., Wegdahl.
Siegel, Max, Bertha.
Sommer, William R., Rush City.
Steinke, J. H., Freeport.
Stoughton, Harry E., Fisher.
Swanson, J. E., Kindred, N. Dak.
Swee, Martin A., Wanamingo.
Simpson, James A., Lowry.
Slaughter, Albert, St. Paul.
Taftner, Oscar, Gary.
Utigard, Enoch, Millville.
Vollrath, Otto, St. Bonifacius.
Wallin, E. G., Atwater.
Welke, Frank A., New Auburn.
Wittrup, Charles E., Pine City.
Wolesky, Frank J., Owatonna.
Wroble, Frank, Holdingford.
Youngquist, Joseph, Northbranch, R. 1.

The College of Law

FOR THE DEGREE OF DOCTOR OF CIVIL LAW—6.

Bates, William Earl, LL.M., ... Minneapolis
Denegre, James D., LL.M., ... St. Paul
Hermann, Arthur L., LL.M., ... Minneapolis
Mercer, Hugh Victor, LL.M., ... Minneapolis
Moore, Albert R., LL.M., ... St. Paul
Willis, Hugh E., LL.M., ... Minneapolis

FOR THE DEGREE OF MASTER OF LAWS—9.

Allen, Gustavus William, LL.B., ... Minneapolis
Chase, Josiah H., LL.B., ... Minneapolis
Crouley, William D., LL.B., ... Redwood Falls
Humphrey, J. H. K., LL.B., ... Minneapolis
Lundquist, Seth, LL.B., ... Minneapolis
Smith, Charles Elmer, LL.B., ... Wadena
Thomas, David Richard, LL.B., ... Minneapolis
Van Dusen, George C., LL.B., ... Minneapolis
Waters, Sam Mathew, LL.B., ... Minneapolis

FOR THE DEGREE OF BACHELOR OF LAWS.

SENIOR DAY—70.

Amundson, Walter G., ... St. Peter
Asher, Allan Preston, (1 yr. U. of M. Sc.) ..... Granite Falls
Barry, John Sumner, (A.B., U. of Wis.) ..... Phillips, Wis.
Baudler, Otto, ... Austin

Bingham, Henry G., ... New Ulm
Branham, Harold D., ... Minneapolis
Brooks, William Clark, (1 yr. U. of M. Sc.) ..... Minneapolis
Blu, Elmer Francis, (P.S. Northwestern) ..... Millford, Ill.
Brush, Percy P., (A.B. Macalister) ..... St. Paul
Carlson, Elof J., ... Meridian, Ia.
Casey, Edward Luther, ... Minneapolis
Cloutier, Harry Hubert, ... Minneapolis
Colburn, Algernon, (2 yrs. U. of M. Sc.) ..... Minneapolis
Coleman, John Patrick ..... Anoka
Cooper, Clayton E., ... Adrian
Costello, William P., ... Graceville
Condon, E. St. John, ... Minneapolis
Culhane, Michael Edward, ... Brookings, So. Dak.
Davis, David, ... Duluth
Doane, William Cleveland, ... St. Cloud
Eckhardt, John Henry, ... Mankato
Flynn, Francis Earl, ... Lake City
Gault, Lorenzo J., ... St. Peter
Gould, Raymond Milton, ... Minneapolis
Harris, Rex, ... Webster, So. Dak.
Jackson, Frank Alonzo, (3 yrs. Ripon) ..... Abbottsford, Wis.
Johnson, Arthur J., ... Gibbon
Johnson, John Ludwig, ... Little Falls, Wis.
Johnson, Joseph T., ... Kasota
Kremer, George E., (1 yr. U. of M. Sc.) ..... Minneapolis
Langland, George, ... Marshall
Luce, Erle D., (1 yr. U. of M. Sc.) ..... Minneapolis
McHugh, Edward E., ... Goodhue
McManigal, Kenneth George, ... St. Paul
McQuat, R. A., (1 yr. U. of M. Mines) ..... St. Paul
Marshall, Robert Wells, ... Minneapolis
Meader, George F., ... Minneapolis
Murphy, Charles T., ... Moorhead
Nelson, Oscar H., ... Zumbrota
Nilson, Clifford N., ... Morris
Ober, Bernard A., ... Minneapolis
Park, Herbert T., ... Minneapolis
Peterson, John W., (1 yr. U. of M. Sc.) ..... Montevideo
Peterson, John O., ... Minneapolis
Poppe, Forest Robert, ... St. Paul
Ransom, John E., (2½ yrs. U. of M. Sc.) ..... Albert Lea
Richardson, Howard Gray, ... Madison, Ind.
Robertson, Hugh A., ... Sleepy Eye
Ronken, Oscar Christian, ... Ostrander
Savela, August, ... Franklin
Schaetzel, Jacob A., (2 yrs. U. of M. Sc.) ..... Minneapolis
Schain, Josephine (1 yr. U. of M. Sc.) ..... Brown's Valley
Schouten, Charles P., (A.B., U. of M.) ..... Lisbon, No. Dak.
Schutz, Rollin Hunt, ... Marshall
Schultz, William Alvin, ... Sleepy Eye
Schwartz, L.L., (1 yr. U. of M. Sc.) ..... Minneapolis
Snyder, Fred A., (1 yr. U. of M. Sc.) ..... Austin

Stockton, Charles Murray, (1 yr. U. of M. Sc.) .....Faribault
Swanson, Gotfred Swantie, ...Brainerd
VanVorst, Melvin J., ...New Paynesville
Walchli, Hans, (2 yrs. U. of M. Sc.) .....Kalispell, Mont.
Wheeler, Harry Earl, ...Minneapolis
Warner, Cecil Elisha, (A.M., U. of M.) .....Minneapolis
Wells, W. Roy, (1 yr. U. of M. Sc.) .....Aberdeen, So. Dak.
Wilmot, Earl C., ...Farmington
Wilson, Roy, (1 yr. U. of M. Sc.) .....Minneapolis
Woodward, Herbert Starr, (1 yr. U. of M. Sc.) .....Minneapolis
Woodworth, Rees Paul, ...Winona
Wright, Frank E., ...Appleton
Wyman, Earl C., ...Minneapolis

SENIOR NIGHT—24.

Allen, Edmund Pratt, (3½ yrs. U. of M. Sc.) .....Minneapolis
Bicknell, Lewis William, ...Minneapolis
Brekke, Edward Albertin, (A.B., Luther) .....Spillville, Ia.
DeVaney, John P., (A.B., U. of M.) .....Lake Mills, Ia.
Doanes, Ira Chapman, (A. B., Wesleyan) .....Minneapolis
Feroe, Helmer Mathew, ...Granite Falls
Folsom, Arthur Russell, ...Lake Crystal
Gilmore, Charles E., (A.B., U. of M.) .....Lake Crystal
Greer, Allan James, ...St. Paul
Hewitt, H. R., (2 yrs. U. of Wis.) .....Minneapolis
Jackson, Louis Freeman, (1 yr. U. of M. Sc.) .....Minneapolis
Knapp, Cleon T., ...St. Paul
Lien, Elias Johnson, ...St. Vincent
L'Herault, Napoleon Alexander, ...Minneapolis
Lemen, Denny Price, ...Minneapolis
Moore, Russel L., ...St. Paul
Murfin, Walter Henry, (A.B., U. of M.) .....Minneapolis
Peterson, Victor Muller, (A.B., U. of M.) .....Minneapolis
Reiff, I. Merton, (Mt. Morris·Col.) .....Minneapolis
Roup, Clarence J., ...Ames, Ia.
Ryan, Edward Faustinius, (B.A., LaValle) .Georgetown, Pr. Ed. I,Canada
Stone, Raymond Theodore, ...Morris
Wiggin, Richard S., ...Rogers
Williams, Wadsworth A., (A.B., Carlton) .....Minneapolis

MIDDLE DAY—72.

Allison, Lawrence R., ...Minneapolis
Andrews, George J., ...New London
Baker, James Bradford, ...Brownton
Batzer, Reinhold Erick, ...Royalton
Beckwith, George C., ...Minneapolis
Bollou, Ellis Luverne, ...Larrabee, Ia.
Cady, Edward Phillip, (2 yrs. U. of M. Sc.) .....Pipestone
Campbell, Roy, ...Minneapolis
Carnes, Raymond John, ...Renville
Carson, Harry Summers, ...Minneapolis
Champine, Clifford C., (1 yr. U. of M. Sc.) .....Fargo, No. Dak.
Cole, James R., ...Minneapolis

Crawhall, Lester William, ... Minneapolis
Dempsey, William Henry, ... Wakasha, Wis.
Donohue, William John, ... Minneapolis
Dougherty, John Francis, (A. B., Georgetown,) .... Park River, No. Dak.
Doyle, David Wilfred, ... Great Falls, Mont.
Dunn, Ney Marshall, ... Jackson
Dacey, Walter F., ... Eveleth
Davenport, Murray T., (A.B., U. of M.) ..... Minneapolis
Eenkema, Abelius, ... Clara City
Evans, Eliza P., ... Minneapolis
Forbes, Mason Merrill, ... Minneapolis
Flinders, Orlow Bailey, (A.B., U. of M.) ..... Sutherland, Ia.
Fulton, David Langdon, (U. of Wis.) ..... Minneapolis
Gage, Leroy Arthur, ... Montrose, So. Dak.
Giles, Leon L., ... Albert Lea
Gleason, John Lucis, (A.B., U. of M.) ..... Minneapolis
Greene, Hammond Bey, ... Sheldon, No. Dak.
Haas, William Hanson, (A.B., St. Thomas,) ..... St. Paul
Hamrum, Alfred Ulysses, ... Franklin
Higgins, Harry Getchell, ... Minneapolis
Henderson, George Norman, ... Red Wing
Jensen, Carl A., ... Minneapolis
Jensen, Harry Nils, ... Detroit City
Jevne, Franz, ... Meridian
Johnson, Sidney Kenneth, ... Jennings, Ia.
Johnson, Robert E., ... Marshalltown, Ia.
Joyce, Wilbur B., ... Minneapolis
Kells, Lamel L., (1 yr. U. of M. Sc.) ..... Sauk Centre
Klancke, Albert C., ... Norwood
Leach, Helon Edwin, (A.B., U. of M.) ..... Spring Valley
Lockerby, Charles Emory, ... Mapleton
Logan, Carlton, ... Pelican Rapids
Lohn, Lewis Kent, ... Fosston
McLaughlin, Mark M., ... Mapleton
Maloy, Charles Edward Hill, ... St. Cloud
Morse, Frank Leonard, ... Minneapolis
Massee, Edward K., ... St. Paul
Molyneaux, Francis A., ... Winnebago City
Myron, Olin C., (A.B., U. of M.) ..... Vermillion, So. Dak.
Nelson, Severt A., ... Humbolt, Ia.
O'Gordon, Joseph Arthur, ... Minneapolis
Oyen, Brynjolf, (A.B., Augsberg,) ..... Watson
Piper, Ralph Jefferson, ... St Paul
Running, Albert, (A.B., U. of M.) ..... St. James
Rustad, Garfield H., ... Moorhead
Russell, John C., ... Fairfax
Schwartz, Louis Benjamin, ... St. Paul
Searls, Spencer Judd, ... St. Paul
Sigmond, Lloyd Edgar, ... Zumbrota
Senn, Henry B., ... Kasson
Sinclair, John Archibold, (A.B., Hobart,) ..... Fairmont
Sigerfoos, Edward, (A.B., Ohio State,) ..... Minneapolis
Sorenson, Niles Madison, ... Hayfield

Spooner, Paul Lord, (A.B., U. of M.) .....Morris
Stearns, Harry, ...St. Paul
Strand, O. B., ...Zumbrota
Storer, George Lord, ...Minneapolis
Sullivan, George Francis, ...Shakopee
Thompson, Charles Richard, (A.B., U. of M.) .....Mankato
Washington, Derwood, ...Glendive, Mont.

MIDDLE NIGHT.—32.

Braisted, Royal S., ...Minneapolis
Brown, Marcus Edward, ...St. Paul
Burk, Harvey B., (A.B., Carlton,) .....Leedit Falls, Oh.
Case, George Leland, ...St. Peter
Cribb, Ernest C., ...Minneapolis
Dolan, Francis Marion, (A.B., U. of M.) .....St. Paul
Everhard, Frank T., (A.B., U. of M.) .....Minneapolis
Edquist, Reuben J., ...Minneapolis
Force, Edwin A., ...Minneapolis
Foster, Willie Kerr, ...Renville
Gates, Cassius E., (2 yrs. U. of M. Sc.) .....Alma City
Greening, Charles William, (A.B., Carlton,) .....Minneapolis
Groat, Benjamin Feland, (A.B., U. of M.) .....Minneapolis
Grettenberg, C. Hale, (2 yrs., Carlton,) .....Osage, Ia.
Gurnee, William Harold, ...Minneapolis
Heily, Patrick Robert, (A.B., U. of M.) .....Graceville
Houck, Stanley B., (2 yrs. U. of M. Sc.) .....Minneapolis
Hosp, Joseph Abraham, ...Hopkins
Johnson, Chester Marius, ...Austin
Lucker, William Alfred, ...Minneapolis
Luxton, Harry Addison, ...Minneapolis
Machatanz, Karl Adolph, (A.B., Ohio, Wesleyan,) .....St Anthony Park
Mulally, James H., (A.B., Dartmouth,) .....St. Paul
Nicholas, Edwin Herbert, (A.B. U. of M.) .....Minneapolis
Running, Clarence Herman, ...Ada
Smiley, William C., ...St. Paul
Smiley, Henry L., ...Minneapolis
Stratton, Paul D., (A.B., U. of M.) .....Granite Falls
Tatam, John Ernest, ...Minneapolis
Turnquist, Ralph A. E., ...Minneapolis
Weston, Alfred Sewall, (A.B., Princeton,) .....Minneapolis
Works, Robert, ...Augusta

JUNIOR DAY.—115.

Agnew, Omer, ...Saint Marie, Mich.
Anderson, Axel, ...Detroit
Angell, James Bradley .....White Bear
Barron, Edward, (2 yrs. U. of So. Dak.) .....Ipswich, So. Dak.
Bartlett, James, ...Minneapolis
Bingham, Charles B., ...Sleepy Eye
Blanding, Howard D., ...St. Croix Falls, Wis.
Bowe, George D., ...Waseca
Boynton, Tom, ...Osage, Ia.
Breen, Jos. A., ...Minneapolis

Brin, John Leonard, ... Stewartville
Bremer, Paul Grover, ... St Paul
Broom, Jay R., ... Minneapolis
Bruce, Robert Cameron, ... Minneapolis
Cahaley, Cottrell James, ... Minneapolis
Campbell, Heil Stillman, ... Mantorville
Carpenter, Cyrus Clay, ... Summit, So. Dak.
Casserly, Bernard A., ... Minneapolis
Chase, John Armstrong, ... Farmington
Christofferson, Lewis Christian, ... Pewaukee, Wis.
Cobb, Robert L, ... Minneapolis
Constantine, Earl Gladstone, (A.B., U. of M.) ..... St. Paul
Coleman, Henry J., ... Chippewa Falls, Wis.
Craiswiller, Harold D., ... Duluth
Crooks, Bernard S., ... St. Paul
Dahlby, Henry, ... Moorhead
Dickson, Marshall J., ... Fulda
Doerr, Harry, ... Minneapolis
Donahue, George Francis, ... Sioux Falls, So. Dak.
Donahue, Keron Daniels, ... Minneapolis
Dowdall, Augustus Sylvester ..... Minneapolis
Duff, Hartman Blaine, ... Superior, Wis.
Eickemeyer, Herbert R., (1 yr. U. of M. Sc.) ..... Winona
Eickhorn, Edmund, ... Minneapolis
Erickson, Harold, ... Hancock
Ervin, William S., ... Mankato
Flachsenhar, Walter Roscoe, ... Mankato
Fligelman, Sol, ... Minneapolis
Forbes, Vernon Alex, ... St. Croix Falls, Wis.
Furni, Edward, ... Duluth
Fullerton, Ralph, ... Webster City, Ia.
Gansle, George Earl, ... Minneapolis
Garberg, Peder, ... Mariata
Goerger, Philip, ... St. Cloud
Green, Raymond Joe, ... Austinburg, Oh.
Hanson, Martin Adolph, ... Stevens
Hanrahan, Morgan John, (A.B., Creighton,) ..... Clare, Ia.
Henderson, Fred Savage, ... Northfield
Hodgson, Chester Powner, ... Hastings
Hopkins, Kenneth Norton, ... Minneapolis
Huber, Earl Eldon, ... Ellsworth, Wis.
Hughes, James E., ... New Richmond
Hunter, Asa J., ... Minneapolis
Houck, Norman Albert, (1½ yrs. U. of M. Sc.) ..... Minneapolis
Kearney, George Sylvester, ... Minneapolis
Kelehan, James H. L., ... Granite Falls
King, Richard, ... Minneapolis
Kohn, Louis, ... Minneapolis
LaPalme, Camille, ... Minneapolis
Lampert, Jacob, ... Minneapolis
Lauderdale, Henry William, (2 yrs. U. of M. Sc.) ..... Minneapolis
Leak, John Roy, ... Brainerd
Lund, Carl Frederick, ... Waseca
McCanna, Simon Michael, ... Minneapolis

McCarthy, Frank M., ... Luverne
McCoy, Charles Vaughan, ... Duluth
McLean, Charles R., ... Duluth
McMillan, Malcolm Dana, ... St Paul
McNamara, Charles, ... Montello, Wis.
Marcy, Frank Lemuel, (1 yr. Columbia) ..... Minneapolis
Marsh, Fayette Elain, ... Stillwater
Matchan, Roy ..... Minneapolis
Mellenthin, Alfred Ira, ... Sleepy Eye
Montgomery, James S., Jr., ... Minneapolis
Moore, Earl M., ... Minneapolis
Morse, David Lawrence, (3 yrs. Cornell, Ia.) ..... Belmond, Ia.
Muir, Robert W., ... Hunter, No. Dak.
Murphy, Eugene Horton, ... Minneapolis
Michaud, Arthur A., ... Duluth
Norris, John Herbert, ... Annandale
O'Brien, Giles Patrick, ... Brainerd
Oswald, John J., ... Minneapolis
Oswald, Henry William, ... Minneapolis
Pearson, William Edward, ... Fisher
Peck, Frank W., ... Minneapolis
Persinger, Floyd T., (Ph.B., Hamline) ..... Minneapolis
Phinney, Brinton Harry, (1 yr. U. of M. Sc.) ..... Herman
Prigge, Lambert F., ... Ada
Randall, Frank E., (2 yrs. Hamline,) ..... Hamline
Rasmussen, William J., 1 yr. U. of Wis.) ..... Phillips, Wis.
Reitz, Alfred E., ... Chaska
Richardson, Wayne E., ... Thief River Falls
Ripley, W. C., (1½ yrs. Ripon,) ..... Minneapolis
Salzer, John E., ... Minneapolis
Sandberg, Sivert A., ... Malneo
Senn, Fred William, ... Kasson
Smith, William Cornell, ... Elroy, Wis.
Spicer, Fred Hopper, ... Minneapolis
Stern, Sam, ... Fargo, No Dak.
Taylor, Wilfred Brunson, ... Litchfield
Thorson, Edward, (Augsberg) ..... Maple Plain
Unger, Adolph, ... Neelsville, Wis.
Vance, Stanley Maybury, ... Winona
Walker, Arthur J., ... Minneapolis
Walker, Charles John, ... Spencer Brook
Watts, William A., ... Crookston
Webster, Clarence Bernhard, ... St. Peter
Wendtlandt, Edward W., ... Manchester, Wis.
West, John B., Jr., (B.S., Harvard,) ..... St. Paul
Wheeler, George Charles, ... Kekoskee, Wis.
White, James Asa, (Fisk) ..... Minneapolis
White, Earl M., ... Duluth
Wilmsen, Harry Robert, ... Hecla, So. Dak.
Wilson, Oscar Sylvanus, ... Minneapolis
Woolley, Mark J., ... Howard Lake

JUNIOR NIGHT...77.

Akutsu, Kenji, ... Tochigi, Japan

Anderson, Albert George, ... Starbuck
Anderson, Eric, (A.B., Oberlin,) ..... Minneapolis
Barrett, Clement J., ... Minneapolis
Blackburn, Nathan Bishop, (A.B., U. of M. '07.) ..... Minneapolis
Block, Robert W., ... St. Paul
Bonde, Thomas E., (1½ yrs. Luther,) ..... St. Paul
Bowen, Oscar, ... Minneapolis
Brown, Montreville J., ... Minneapolis
Broderick, Leo C., ... Minneapolis
Broderick, George Henry, ... Minneapolis
Broderick, George M., ... Winona
Brouillard, Thomas L., (Charles City College,) ..... Charles City, Ia.
Burroughs, Walter S., ... Winona
Campbell, P. P., ... Mayer
Casey, Martin J., ... Jordan
Clutter, Guy Earl, (A.B. U. of M.) ..... Anoka
Coapman, Wall G., (A.B., U. of M. '07) ..... Minneapolis
Coppage, Earl R., ... Minneapolis
Dart, Ray H., (A.B., U. of M. '07.) ..... Litchfield
Davis, Theodore A., (1 yr. U. of M. Sc.) ..... Lake Park
Doud, Fred L., (1 yr. Carlton) ..... Chatfield
Easton, Dana Magoon, (A.B., U. of M. '07.) ..... Minneapolis
Fontaine, Kern Blaine, ... Minneapolis
George, David Wickham, (½ yr. U. of M., Mines,) ..... Minneapolis
Greaves, Glenn Henry, (A.B., U. of M.) ..... Glencoe
Godfrey, LeRoy D., ... Minneapolis
Haldeman, Horace, ... St. Paul
Hinshaw, Virgil G., (A.B., Penn. Col.,) ..... Minneapolis
Houston, Claude Ross, ... Minneapolis
Hubbard, Will A., ... Minneapolis
Huntley, Earl W., (A.B., U. of M. '07.) ..... Spring Valley
Kjome, Hans Olof, (A.B., Luther,) ..... Decorah, Ia.
Kutnewsky, W. K., (A. B., U. of M. '07.) ..... Redfield, So. Dak.
LaBelle, Dezara, ... Minneapolis
Larson, Ned LeRoy, ... Atwater
Lindahl, Albert L., ... Minneapolis
Little, George Rudd, (A.B., U. of M. '07.) ..... Kasson
Loomis, Floyd Sterling, (A. B., U. of M. '07.) ..... Owatonna
Lowenthal, Archie, ... Minneapolis
McKellar, Robert Smithson, ... Minneapolis
Malm, P. V., ... Minneapolis
Marwin, Paul, (1 yr. U. of M. Sc.) ..... Minneapolis
Melville, Frank, ... Minneapolis
Miller,H. H., (A.B., U. of M. '07.) ..... Minneapolis
Moe, Herman, (3 yrs. Augsberg,) ..... Minneapolis
O'Neil, Edward J., (A.B., U. of M. '07.) ..... Minneapolis
Ohman, John, ... Gleenwood, Wis.
Peterson, Adolph C., (A.B., U. of M.) ..... Minneapolis
Peterson, William LeRoy, ... St. Cloud
Phillipson, Albert A., (A.B., Lawrence,) ..... Minneapolis
Plouf, Felix Cornelius, ... Minneapolis
Pohlman, Ed. J., (A.B., U. of M. '07.) ..... Minneapolis
Putnam, Fred W., (A.B., U. of M.) ..... Minneapolis
Quackenbush, Harry C., (A.B., U. of M. '07.) ..... West Concord

Randall, Claude David, (A.B., U. of M. '07.) ..... St. Paul
Rieke, Ray Edgar, ... Kingsley, Ia.
Rollinson, A., ... Minneapolis
Rolph, Emry Amile, ... Minneapolis
Sachs, Gustave, ... New Prague
Schuknecht, John Robert, ... Minneapolis
Skaug, Julius, ... Minneapolis
Speeter, Harold J., ... St. Charles
Stevens, Frank B., (A.B., Yankton) ..... Minneapolis
Stine, Harry Erwin, ... Minneapolis
Schwestka, Claude Burr, (Ph.B., Upper Ia.,) ..... West Union, Ia.
Smith, Carroll, (A.B., U. of M.) ..... Minneapolis
Towler, Robert Silas, ... Minneapolis
Vallbrecht, Robert, (2 yrs. Col City of N. Y.) ..... Minneapolis
Velikanje, Emil B., ... Minneapolis
Walker, Frank Gleed, ... Minneapolis
Wassing, Ole M., ... Minneapolis
Waterbury, Roy Russell, ... St. Paul
White, Grant A., (A.B., U. of M. '07), ... Luverne
Wilhoit, Albert Davis, (A.M., U. of M.), ... Kansas, Ill.
Woods, George William, ... St. Paul
Younquist, Charles, ... Minneapolis

SPECIAL STUDENTS—93.

Anderson, C. J. O., ... Kerkhoom
Anderson, Charles J., ... Minneapolis
Andre, Nate, ... Minneapolis
Atkins, Arthur B., ... Columbia, So. Dak.
Baker, Clayton R. C., ... Brownton
Barrett, George W., ... Minneapolis
Berkey, Andrew De Graff, ... St. Paul
Bott, Herman, ... Minneapolis
Brill, Harry Hosiah, ... Minneapolis
Brown, Hosner, ... Brownsdale
Burfening, Peter John, ... Kuhn, No. Dak.
Campbell, Hugh Robinson, ... Minneapolis
Capron, George, ... Minneapolis
Casserley, Paul N., ... Marshall
Chaffee, Edward Denzel, ... Lake Crystal
Chase, Van R., (A.B., U. of M.), ... St. Paul
Christiansen, Otto Dwight, ... Minneapolis
Cook, Frank Arthur, ... Minneapolis
Costello, Cyril, ... St. Anthony Park
Crolius, Ralph S., ... Minneapolis
DeCoursey, John C., ... St. Paul
Davis, Carl J., ... Minneapolis
Dodge, William E., ... Minneapolis
Duffy, Timothy E. J., ... Minneapolis
Edwards, William James, ... Minneapolis
Ervin, John Lewis, ... Minneapolis
Evans, William, ... Minneapolis
Fitchette, Edward D., ... Minneapolis

Frary, Grace B., ... Minneapolis
Fountain, Percival T., ... Hawley
Fuller, George, ... Minneapolis
Fry, Henry, ... St. Paul
Franklin, William, H. H., ... Minneapolis
Gavere, Harry, ... Minneapolis
Gaus, Fred William, ... Minneapolis
Golden, Richard I., ... Minneapolis
Gowen, Albert Stewart, ... Minneapolis
Graham, Raymond A., ... Rochester
Greenley, William L., ... Minneapolis
Harlis, Alben Mate, ... Minneapolis
Hendrickson, Ward Grosvenor, ... Comodale
Henny, Carl Christian, ... Minneapolis
Hoidale, Hjalmar Lund, ... New Ulm
Hinch, Frederick Mortenson, ... Minneapolis
Jelle, Gilbert, ... Bricelyn
Johnson, L. Eldora, (2 yrs. U. of M. Sc.), ... Casselton, No. Dak.
Jones, Walter Bancroft, ... Minneapolis
Judson, George H., ... Crookston
Kiernan, Edward Francis, ... Watkins
Kreuter, Charles F., ... Minneapolis
Kopplin, Frederick William, ... St. Paul
Larson, Arthur E., ... Lake City
Liggett, Walter W., ... St. Anthony Park
Lindall, Walter, ... Parker's Prairie
Lovell, John Whitcomb, ... Vernon Center
Leonard, Patrick Fehr, ... Wabasha
Lewis, Harold Martin, ... Minneapolis
McAlmon, Herbert Ross, ... Madison, So. Dak.
McCanna, Edwin Thomas, ... McCanna, No. Dak.
McCallum, William B., ... Barry
McKay, Fred E., ... Minneapolis
McClain, Burns E., ... Minneapolis
Mather, Verne Thomas, ... Minneapolis
Miller, William Eugene, ... St. Charles
Miller, Albert J., ... St. Paul
Mitchell, John W., ... Minneapolis
Morrison, Neal, ... Minneapolis
Munson, Arthur, ... Bradley, So. Dak.
Nelson, John A. R., ... Parker's Prairie
Norton, John ..... St. Charles
Olsgard, Melvin Gerhard, ... McVille, No. Dak.
Olson, Arthur E., ... Afton
Peterson, Adolph Martin ..... Minneapolis
Piper, Louis Hunter, ... Minneapolis
Porter, Lynn A., ... Le Roy
Posey, James, ... Courtenay, No. Dak.
Poucher, Jay Colton, ... Minneapolis
Quilty, James M., ... Minneapolis
Riley, Henry John, ... Minneapolis
Robinson, Howard Edwin, ... Minneapolis
Ristey, Edward, ... Sioux Falls, So. Dak.
Rose, Frank Dunham, ... Minneapolis

Ryan, Arthur, ... Duluth
Saari, John, ... Sparta
Smith, Howard, ... St. Paul
Simmons, William Reed, ... Minneapolis
Toombs, Roderick M., ... Minneapolis
Williams, Frank Joseph, ... Minneapolis
Wheeler, Hilfred B., ... Minneapolis
Sprague, Walter Hubbard, ... St. Paul
Villaume, Louis Alphonse, ... St. Paul
Whitaker, Maurice L., ... St. Paul
Winthroop, Max S., ... Minneapolis

SUMMARY.

D. C. L. Students		6
LL. M. Students		9
Undergraduates—		
Senior Day	70	
Senior Night	24	
Middle Day	72	
Middle Night	32	
Junior Day	115	
Junior Night	77	
Special Students	93	
		483
Total		498

The College of Medicine and Surgery

1906-1907

GRADUATE STUDENTS—4.

Gilfillan, James S., ... St. Paul, Minn.
M. D., University of Minnesota '97, University of Pennsylvania '98.
Rose, Frances Eastman ..... Fargo, N. D.
M. D.
Smith, Charles Pliny, ... St. Paul, Minn.
M. D., University of Buffalo, '85.
Townsend, Edmund ..... St. Paul, Minn.
M .D., Keokuk College of Physicians and Surgeons, '75.

FOURTH YEAR—41.

Barclay, Alexander, Jr., ... St. Paul, Minn.
Boyum, Peter Arndt, ... Rushford, Minn.
Chesley, Albert Justus, ... Minneapolis, Minn.
Colp, Donald G., ... Robbinsdale, Minn
A. B., *A. M.*, Fargo College, North Dakota, *B. D.*, Yale.
Current, Earl, ... New Ulm, Minn.
Cutts, George, ... Minneapolis, Minn.
Egan, John Michael, ... Osseo, Minn.
Eklund, Elmer Julius, ... Young America, Minn.
Emanuel, Henry J., ... Milnor, N. D.
Estrem, Carl Olaf, ... New London, Minn.
A. B., '01, Luther College.
Foster, Bainbridge William, ... Hector, Minn.
Ph. B., '00, Hamline University.
Jennings, George, ... Cavalier, N. D.
B. A., '03, University of North Dakota.
Jones, Elmer Mendelssohn, ... Minneapolis, Minn.

Judson, William E., ... Forman, N. D.
Ph. B., '99, Hamline University.
Karn, Bert Ruthvin ..... Ortonville, Minn.
Kelsey, Carlton Gale, ... Minneapolis, Minn.
A. B., '04, University of Minnesota.
Labbitt, Roy Henry, ... Detroit, Minn.
Larsen, Oscar O., ... River Falls, Wis.
A. B., Luther College.
Lemstrum, Jarl Ferdinand, ... Minneapolis, Minn.
Phil. Kand., University of Helsingfors, Finland.
Loomis, Earl Alfred, ... Owatonna, Minn.
A. B., University of Minnesota.
McGroaty, John James, ... Rosemount, Minn.
B. A., '00, St. Thomas College.
McMillan, Mary Adelia, ... St. Peter, Minn.
Maland, Clarence, ... Rushford, Minn.
A. B., '04, University of Minnesota.
Martin, Thomas Roy, ... Mantorville, Minn.
A. B., '04, University of Minnesota.
Pederson, Harold, ... Grand Forks, N. D.
A. B., St. Olaf.
Poppe, Frederick Harold, ... Minneapolis, Minn.
A. B., University of Minnesota.
Quist, Henry William, ... Chisago City, Minn.
Rodgers, Charles LeRoy, ... Farmington, Minn.
Rosenthal, Ignatius Paul, ... St. Paul, Minn.
Sanborn, Courtland Rockwell, ... Faribault, Minn.
Scace, Lee Arbor, ... Pringhar, Iowa
Smith, Clark Sherwood ..... Brainerd, Minn.
Smith, Ernest Vernon, ... Crawfordsville, Ind.
Strathern, Moses Lane, ... Rich Valley, Minn.
A. B., '04, University of Minnesota.
Stevens, Charles S., ... Farmington, Minn.
A. B., '04, University of Minnesota.
Strang, David Monticue, ... Alexandria, Minn.
B. S., '01, Carleton College.
Swanson, Cephas, ... Minneapolis, Minn.
A. B., Gustavus Adolphus.
Varco, A. Raymond, ... Austin, Minn.
A. B., '04, University of Minnesota.
Weyrens, Joseph Peter, ... Watkins, Minn.
Ph. G., Northern Indiana School of Pharmacy, *B. S.*, '05, University of Minnesota.
Wiik, Johan Christian, ... Minneapolis, Minn.
Youngs, Alfred Hinks, ... Minneapolis, Minn.

THIRD YEAR—36.

Alexander, Ida Mary, ... Carver, Minn.
A. B., University of Minnesota.
Andrews, Roy Newberry, ... Mankato, Minn.
Bloom, Charles Joseph, ... Clear Lake, Wis.
A. B., '04, Carleton College.
Bock, Rolland, ... St. Paul, Minn.
Phar. C., University of Minnesota.
Bostrom, August Edward, ... Minneapolis, Minn.
B. S., '06, University of Minnesota.
Boyd, Leon Morelle, ... Alexandria, Minn.
Buckley, John, ... Farmington, Minn.
Burns, Herbert, Arthur, ... Hutchinson, Minn.
Brown, John C., ... Minneapolis, Minn.
A. B., '99, Leland Stanford University.
Dahleen, Henry, ... Granite Falls, Minn.
Engstrom, Fred Alonzo, ... Cannon Falls, Minn.
Esser, John, ... Austin, Minn.
Eusterman, George Bysshe, ... Lewiston, Minn.
Freedman, Isaac Valera, ... Minneapolis, Minn.
Grangaard, Henry Oswald, ... Kindred, S. D.
A. B., Luther College.

Hemingway, Ernest Eugene, ... Minneapolis, Minn.
B. A., '98, Ripon, *M. A.*, '03, University of Minnesota, *Ph. D.*, '04, University of Minnesota.
Hensel, Charles Norton, ... St. Paul, Minn.
Hitchings, William Sidney, ... Sutherland, Iowa
Johnson, Carl Martin, ... Minneapolis, Minn.
B. A., Augsburg.
Johnston, Edward James, ... St. Cloud, Minn.
Kvittum, Joseph Marcus, ... Minneapolis, Minn.
Lawrence, Edward John, ... Marshall, Minn.
Lindberg, Arvid C., ... Harris, Minn.
Maertz, Will Francis, ... New Prague, Minn.
Magnuson, Gustaf Alfred ..... Harris, Minn.
A. B., University of New Mexico.
Manley, James Rollin, ... Duluth, Minn.
Nelson, Melvin Sylvanius, ... Dawson, Minn.
B. S., '06, University of Minnesota.
Robertson, Archibald Wright, ... Litchfield, Minn.
Ryan, Dennis Edward, ... Shakopee, Minn.
A. B., St. Thomas.
Stadfield, Clayton Grube, ... St. Paul, Minn.
Stebbins, Eugene Benson,, ... Barron, Wis.
Strachauer, Arthur Clarence, ... Minneapolis, Minn.
Walker, John Frank, ... St. Paul, Minn.
Walker, George Hamilton, ... Minneapolis, Minn.
B. S., University of Nebraska.
Watson, Tolbert, ... Cashel, N. D.
B. A., Macalester.
Wilson, Doxey R., ... San Francisco, Cal.

SECOND YEAR—57.

Anderson, Oscar H., ... Star Prairie, Wis.
Baker, Ernest L., ... Fairmont, N. D.
Barney, Leon A., ... Gettysburg, S. D.
Black, William, ... Minneapolis, Minn.
A. B., '03, Wabash College.
Blegen, Hallward M., ... Minneapolis, Minn.
A. B., '04, Augsburg College.
Booren, Clifton A., ... Stillwater, Minn.
B. S., '07, University of Minnesota.
Brimmer, Archie E., ... St. Paul, Minn.
Brooks, Charles N., ... Minneapolis, Minn.
Caldwell, James P., ... St. Paul, Minn.
Campbell, Albert A., ... St. Paul, Minn.
Coleman, Fred, ... Minneapolis, Minn.
Ph. B., Hamline University.
Critchfield, Lyman R., ... Hunter, N. D.
B. S., '07, University of Minn.
Delmore, John L., ... Marshfield, Wis.
B. S., '07, University of Minn.
Doolittle, Leeroy E., ... Sioux Falls, S. D.
A. B., University of Minnesota.
Drake, Charles R., ... Rushford, Minn.
Earl, George A., ... Minneapolis, Minn.
A. B., University of Minnesota.
Fiksdal, Mads J., ... Webster, S. D.
Foshager, Henry T., ... Pennock, Minn.
B. S., St. Olaf's College.
Furber, James H., ... Minneapolis, Minn.
Gardner, Ray, ... Mantorville, Minn.
Glyer, Richard T., ... Superior, Wis.
Griebenow, Frederick, ... Alexandria, Minn.
A. B., '04, University of Minnesota.
Hayes, Michael F., ... Lanesboro, Minn.
B. S., '07, University of Minn.
Healy, Raymond T., ... Minneapolis, Minn.
Johnson, Selmer M., ... New Richland, Minn.
Kellog, Paul M., ... Red Wing, Minn.
Kjelland, Andrew A., ... Rushford, Minn.
Kurz, John W., ... Annandale, Minn.

Larsen, Martin, ... Attwater, Minn.
B. S., '07, University of Minn.
Libby, Miss Elva E., ... Spokane, Wash.
A. B., Washington College.
McIntyre, Phillip H., ... Eden Valley, Minn.
Maloney, James F., ... St. Paul, Minn.
Maxeiner, J. Stanley R., ... Minneapolis, Minn.
Mendelson, Oscar, ... Minneapolis, Minn.
A. B., '05, University of Minnesota.
Meyerding, Henry W., ... St. Paul, Minn.
B. S., '07, University of Minn.
Milner, Augustus F., ... Chicago, Ill.
Mortensen, Nels, G., ... St. Paul, Minn.
Murphy, Ignatius J., ... Lakefield, Minn.
B. S., '07, University of Minn.
Olson, William P., ... St. Paul, Minn.
Ostergren, Edward W., ... St. Paul, Minn.
Oyen, Martin, ... Watson, Minn.
Paulsen, Edward L., ... Hanska, Minn.
B. S., '07, University of Minn.
Perry, Clarence G., ... St. Paul, Minn.
B. S., '07, University of Minn.
Peterson, Henry F., ... Chisago City, Minn.
A. B., '02, Gustavus Adolphus College.
Piper, Monte C., ... Mankato, Minn.
Robitshek, Irving H., ... Minneapolis, Minn.
Ph. C., '05, University of Minnesota.
Rowe, William H., ... St. James, Minn.
A. B., '06, University of Minnesota.
Schmidt, Henry A., ... Westbrook, Minn.
Smith, Alfred N., ... Wheatland, N. D.
Stewart, Miss Elsie, ... Blackduck, Minn.
B. S., Iowa State Normal.
Sundt, Mathias, ... Minneapolis, Minn.
A. B., University of Minnesota.
Sutton, Charles S., ... Prior Lake, Minn.
A. B., University of Minnesota.
Thompson, Herbert H., ... St. Paul, Minn.
Trowbridge, E. H., ... Minneapolis, Minn.
Walker, James D., ... Moorhead, Minn.
A. B., University of North Dakota.
Zander, Chas. H., ... Rochester, Minn.
Ph. C., '02, University of Minnesota.
Zoerb, Edward F., ... Algoma, Wis.
B. S., '07, University of Minnesota.

FIRST YEAR—52.

Allen, Charles C., Jr., ... Ada, Minn.
B. A., '07, Carleton College,
Binger, Henry E., ... Tulare, S. D.
Brey, Frank, ... Lafayette, Minn.
Chernausek, Samuel, ... Hutchinson, Minn.
A. B., '03, University of Minnesota.
Christianson, Andrew ..... St. Paul, Minn.
Cole, Wallace, ... St. Paul, Minn.
Dickson, Thomas H., Jr., ... St. Paul, Minn.
A. B., Macalester.
English, Burt, ... Fort Snelling, Minn.
D. V. M., Cornell, '02, 2d Cavalry, U. S. A.
Flynn, Robert E., ... Caledonia, Minn.
Forbes, Robert S., ... Minneapolis, Minn.
Frise, Dudley C., ... Minneapolis, Minn.
Ph. C., '06, University of Minnesota.
Hanvey, Geo. A., Jr., ... Fort Snelling, Minn.
B. S., '98, Clemson College, S. C.; *D. V. S.*, Kansas City, '05; U. S. Artillery.
Hasty, Miss Ella M., ... Minneapolis, Minn.
Hayes, James M., ... Millville, Minn.
B. S., '04, Carleton College.

Heidel, Cecil T., ... Sherburn, Minn.
Hobson, Carl L., ... Hampton, Ia.
Hoff, Alf., ... St. Paul, Minn.
Holland, Angell S., ... Benson, Minn.
Johnson, Carl M., ... Pelican Rapids, Minn.
Kemper, William, H., Jr., ... Minneapolis, Minn.
Kesting, Herman, ... Boyd, Minn.
Larkin, Chandler C., ... Mankato, Minn.
Lysne, Henry, ... Northfield, Minn.
B. S., '06, St. Olaf's.
McCarten, Robert E., ... Fargo, N. Dak.
McEwan, Samuel W., ... Alexandria, Minn.
Montelius, Geo. E., ... Minneapolis, Minn.
(Special) *D. D. S.*, '04, University of Minnesota.
Nordin, Charles G., ... St. Paul, Minn.
Ohage, Justus, Jr., ... St. Paul, Minn.
Olson, Charles A., ... St. Paul, Minn.
Oppegard, Manford, ... Madison, Minn.
Papez, James, W., ... Hector, Minn.
Pennington, Miss G., ... Minneapolis, Minn.
(Special) *A. B.*, '07, University of Minnesota.
Peterson, Hugo O., ... St. Anthony Park, Minn.
Preine, Irving A. ..... Minneapolis, Minn.
Satermoen, Theodore, ... Lac que Parle, Minn.
Schneider, Edwin H., ... St. Paul, Minn.
Schrader, Herman F., ... St. Paul, Minn.
A. B., '02, *A. M.*, '03, University of Minnesota.
Seham, Max, ... Minneapolis, Minn.
Severeid, Luther, ...
A. B., '06, Luther College.
Simons, Jalmar H., ... Wauseca, Minn.
Smith, Leon G., ... Benson, Minn.
Souba, Frederick J., ... Hopkins, Minn.
Treat, Albert M., ... Blooming Prairie, Minn.
Thompson, Victor C., ... Preston, Minn.
Tyrell, Alfred A., ... Waterville, Minn.
Vigeland, Jorg G., ... Nielsville, Minn.
B. A., St. Olaf's College.
Watson, Earl M., ... Crawfordsville, Ind.
A. B., Wabash College.
Williams, John T., ... Frankfort, Ky.
(Special) *A. B.*, Kansas College.
Williams ,Miss L., ...
Wyman, Kate, ... Northfield, Minn.
A. B., '00, Carleton College.
Yoerg, Otto W., ... Winthrop, Minn.
Zimmerman, James, ... Vandalia, Ill.
A. B., Wabash College.

Six-Year Medical Students

SOPHOMORES—26.

Andrson, Roscoe B., Minneapolis.
Barnard, Elizabeth, Minneapolis.
Barron, Moses, St. Paul.
Borgman, Melville B. , Minneapolis.
Cram, Walter W., St. Paul.
Dedolph, Karl, St. Paul.
Dedolph, Theodore, St. Paul.
Emert, Harry F., Lockport, N. Y.
Foster, George K., St. Paul.
Freligh, Wilfred P., Stillwater.
Geist, George A., St. Paul.
Giessler, Paul W., Minneapolis.
Handy, John A., Good Thunder.
Hargesheimer, Walter S., Minneapolis.
Hoster, George W., Minneapolis.
Kittleson, Olaf L., Zumbrota.
Leitch, Archibald, St. Paul.
Madsen, Christenia A., Minneapolis.
Murphy, Lea M., Montevideo.
Nicholson, Murdock A., Wilcox, Ariz.
Robertson, William P., Litchfield.
Robinson, Fred H., Scobey, Mont.
Strobel, William G., Mankato.
Tollesson, Theodore, Rochester.
Turnacliff, Dale D., Waseca.
Wilberton, George L.,Winona.

FRESHMEN—48.

Abraham, Rudolph, Duluth.
Adams, Harold P., Minneapolis.
Aides, Harry, St. Paul.
Bailey, Herbert B., Jackson.

Blume, Clarence E., Winona.
Bratrud, Arthur F., Spring Valley.
Carroll, William C., St. Paul.
Cooley, John Ford, Madelia.
Critchfield, Ralph J., Minneapolis.
Dietrickson, Gerhard, Minneapolis.
Dorge, Richard, Minneapolis.
Douglass, Jesse E., Blue Earth.
Eisengraber, Gustav, St. Paul.
Finney, Earl L., Hutchinson.
Frisch, Frank P., Grogan.
Gardner, Edwin L., Minneapolis.
Graham, Reginald D., West Duluth.
Griffin, Patrick L., Shakopee.
Hand, Robert D., Elbow Lake.
Haugen, Leslie, Albert Lea.
Hilger, Leo A., St. Paul.
Kirsch, Harry, Duluth.
Knutson, Knute J., Mankato.
Lepper, Lawrence E., Minneapolis.
McCoy, Lawrence R., E. Grand Forks.
Merrill, Fred B., Stillwater.
Michelson, Henry E.
Morris, Mary, Minneapolis.
Nordley, Harry R., Minneapolis.
O'Hare, Edward S., Minneapolis.
Oppel, Arthur F., Fulda.
Peppard, Thomas Albert, Minneapolis.
Pollock, Lee W., Rochester.
Pouliot, Joseph T., Hamel.
Reum, Arthur W., Minneapolis.
Satterlund, Victor L., New Richmond, Wis.
Seifert, Otto J., New Ulm.
Sexton, Patrick, St. Paul.
Sjaards, John, Raymond.
Snell, Charles F., Detroit.
Snyder, George W., St. Paul.
Soelberg, Paul A., Granite Falls.
Stratte, Arthur, Dawson.
Sunwall, James O., Minneapolis.
Wetherby, Victor L., Minneapolis.
Whittier, Raymond W., Minneapolis.
Workman, Warner G., Tracy.

SUMMARY.

COLLEGE OF MEDICINE AND SURGERY.

Graduate Students		4
Fourth year class		41
Third year class		36
Second year class		57
First year class		52
Total		190
*"Six-year Medical" Sophomore class	26	
*"Six-year Medical" Freshman class	48	
Total	74	

*These are pre-medical students taking combined course leading to B. S. and M. D.

The College of Dentistry

Third Year—31.

Aarness, Walter Stain, Montevido.
Alrick, Owen Kinnie, Minneapolis.
Barnitz, Robert Andrew, Austin.
Bauer, Theo. Philip, Minneapolis.
Birnberg, Ansel, St. Paul.
Borgwardt, George, Peterson, Ia.
Butter, Archibald B., Moline, Ill.
Carlaw, Allen Chester, Northfield.
Conway, Steven Vincent, Minneapolis.
Damon, Geo. Myron, Worthington.
Doely, Owen Eugene, Spring Grove.
Fitzgerald, Francis Gerald, Lake City.
Glimme, Knute Arthur, Kenyon.
Griffith, Chas. Arthur, Hector.
Heiele, Orlen, St. Paul.
Higgins, Clifford Crumbaugh, Kirkwood.
Hollern, Edward John, Sauk Rapids.
Jones, Rolland Ralph, Minneapolis.
May, Clyde Luther, Young America.
Niemi, William, Superior, Wis.
Page, Wright Benton, Minneapolis.
Pinney, Egbert Ralph, Mankato.
Purdon, Cleveland A. Wahpeton, N. D.
Ramstead, Henry Geo., Eau Claire, Wis.

Rauch, Charles, Minneapolis.
Rosendahl, Peter Oscar, Spring Grove.
Seebach, Oscar Christian, Red Wing.
Smith Nat Cyrus, Fair Haven.
Thomas, Thos. Heathcote, Spencer, Ia.
Weaver, Homer Abraham, Lancaster, Pa.
Zierold, Arthur Adelbert, Granite Falls.

Second Year—53.

Andrews, Samuel, Minneapolis.
Bandelin. William John, Arlington.
*Basford, Clarence Meredith, Austin.
Bergh, Charles John, St. Paul.
Broderson, Clarence, Fountain City, Wis.
Bunce, Elmer Wayland, Minneapolis
Capron. Harry, Minneapolis.
Carpenter, Dwight Jefferson, Minneapolis.
Coleman, Lauren M., Ellendale, N. D.
†Collins, Myron Eugene, Spring Valley.
Conway, Jesse Francis, Lake City.
Countryman, Ralph Williams, Minneapolis.
Donald, Raymond Bristol, Minneapolis.
Franta, Valentine Adolph, Montgomery.
Grafslund, Edwin, Lake Park.
Hagberg, Gust Adolph, Brainerd.
Harrison, Francis Randall, St. Cloud.
Herring, Guy, St. Paul.
James, Meredith Jay, Lake Crystal.
James, William Henry, Lake Crystal.
‡Johnson, Geo. Lionel, Minneapolis.
Johnson, Joseph, Edina Mills.
Johnson, Reuel Warren, Cannon Falls.
Kaiser, Frederick John, Wells.
Kjelland, Joseph Almon, Rushford.
Knoche, Karl George, St. Paul.
Kohagen, John Benjamin, Duluth.
Lawton, Harry Comegys, St. Paul.
Leary, Daniel James, Portage, Wis.
Lier, Edorf Menton, Ashby.
*McMullen, John Stephen, Hutchinson
Madden, Fred M., Watertown.
Miesen, Peter James, St .Peter.
Mittwer, Arthur Edward, Minneapolis.
Moore, Thomas John, Chatfield.
Munns, Herbert Allen, Minneapolis.
Olson, Charles John, Hastings.
*O'Neil, James, Lake City.
Radermacher, Harley Adolph, Barron, Wis.
Rayman, Frederick Luverne, Austin.
Remele, Herman Charles, Minneapolis.
Ringnell, Ernest Berrhart, Minneapolis.
Sandstrom, Carl L., Cloquet.
Schapler, John Earl, Pipestone.
Schmitz, Leroy Christian, Jamestown, N. D.
Simon, Edwin James, Faribault.
Snyder, Lynn, Lake City.
Spurbeck. Lee, Two Harbors.
Trench, William, Dennison.
Van Dyke, Arthur Alexander, Alexandria.
Whitson, Abram Page, Packwauckee, Wis.
Will, Mellville Bruce, Mapleton.
Williams, Louis, Ashland, Wis.

†Died October 10, 1906.
‡Died January 5, 1907.
*In attendance part of semester.

First Year—70.

Bakke, Frederick Charles, Stephen.
Benjamin, Harlay George, Minneapolis.
Bird, Clement Keyes, West Concord.
Brady, Charles Patrick, Red Lake Falls.
Cahill, John Francis, Waseca.
Chapman, Edgar, Minneapolis.
Coad, Cecil Walters, Minneapolis.
Coulter, Mellville Rankin, Anoka.
Crone, William Herman, Minneapolis.
Cryderman, William Jacob, Devils Lake, N. .D
Danielson, Henry, Minneapolis.
Davis, Oscar DeForest, Detroit.
Dufner, James Jacob, St. Cloud.
Ernst, Max Emil Paul, St. Paul.
Ertl, Rudolph William, Minneapolis.
*Falkenreck, William Michael, Brainard.
Greenberg, Jack, Grand Forks, N. D.
Gustafson, Richard Elmer, Winthrop.
Haarlow, Arnold William, Baldwin, Wis.
Hart, Grant Taylor, Mabel.
Ingersoll, Howard George, Brainerd.
Janecky, Joseph William, Hutchinson.
Key, John Lewis, Huron, S. D.
Larson, Arnold John, Minneapolis.
Lawrence, Edward, Winthrop.
Linder, William Floyd, Minneapolis.

Lippitt, Dunbar Francis, Duluth.
Lommen, John Sigurd, Caledonia.
Lund, William Theodore, Dawson.
McFadden, Charles Atkinson, Duluth.
McPhail, Archie, Spring Valley.
Metcalf, George Robert, Osakis.
Michalson, Abraham, Hudson ,Wis.
Miner, Kenneth Warren, Janesville.
Mittelstaedt, Frank August, Milbank, S. D.
Moorehouse, Raymond Richard, Minneapolis.
Moos, William H., St. Cloud.
Nesse, George Allen, Mabel.
Nordin, Emil Nels, Marine Mills.
*North, Peter George, River Falls, Wis.
Pagenkopf, Alford Albert, Mapleton.
Peterson, Carl Emmanuel, Willmar.
Phillips, Frank John, Lansing.
Porter, Irving Lester, Willmar.
Quast, Louis Chris, Janesville.
Rand, Henry Dane, St. Paul.
Rayman, Fay Washington, Austin.
Robertson, Chester James, Casselton, N. D.
Roth, Albert Casper, Norwood.
Ruggles, Arthur Millette, Osakis.
Russell, Hubert Vroone, Canton.
Salisburg, Earl, Minnewauken, N. D.
*Schmidler, Alfred Michael, Port Washington, Wis.
Schmidt, Adolph Robert, Springfield.
Schwartz, Charles, Minneapolis.
Scott, Louis William, Waseca.
Scribner, Marguerite Sawyer, Minneapolis.
Sheils, Arthur George, West Concord.
Solberg, Chris Bernard, Montevideo.
Solem, Paul Oscar, Minneapolis.
Stewart, Clarence Roland, Huron, S. D.
Stockwell, John Dudley, Hudson, Wis.
Stone, Milton Blau, St. Peter.
Swanson, Arthur Emanuel, Minneapolis.
Thulien, Carl Augustus, St. James.
Verne, Paul Conrad, Minneapolis.
Walker, Arthur William, Alexandria.
Wiethoff, Charles, Minneapolis.
Wilson, Edgar Osiander, Kasson.
Winter, Seward Randall, Minneapolis.

*In attendance part of semester.

Specials—8.

Britzius, Harry Adam, Minneapolis.
Chapman, LeRoy Marion, Lanesboro.
Froelich, George Henry, Winnebago City.
Harmon, Harry Weston, Faribault.
Hull, Isaac Stephenson, St. Paul.
*Sivright, Guy Herbert, Hutchinson.
Tanner, William Paul, Cannon Falls.
Vaughn, William Henry, Minneapolis.

*1st semester.

College of Pharmacy

JUNIORS, 45.

Alcott, Dolph C., Lakefield.
Anstine, George C., St. Paul.
Becker, Frank A., Montgomery.
Baukol, Harris, Starbuck.
Breckenridge, John Y., Pine City.
Casey, John A., Aitkin.
— Carlson, Helma A., Miss, Erskine.
— Cochrane, Edith, Miss, St. Paul.
DeWitz, Frank A., Rochester.
Diessner, Charles O., Waconia.
Doty, Archie G., Eyota.
Earle, Fred W., Rochester.
Eckstein, Arthur W., New Ulm.
Eichstadt, John, Stewartville.
Emmans, Floyd H., Minneapolis.
Erckenbrack, Earl S., Parkers Prairie.
Green, Everhard, Hankinson, N. D.
Gunderson, Alfred J., Pelican Rapids.
Gronvold, Bernt O., Kenyon.
Holmgren, George A., Breckenridge.
Holt, Dennis H., Rochester.
Hooper, Archie J., Minneapolis.
Hanson, Harry, Rochester.
Hanson, Wm. C., Sleepy Eye.
Hotvedt, Elmer L., Eau Claire, Wis.
Hohn, Walter G., St. Paul.
—Heath, Marie G., Miss, Riga, N. D.
Jones, Edward P., Blue Earth.
Klovstadt, Thos., Milan.
Kelly, Charles F., Webster, S. D.
Kellam, Ansel B., Heron Lake.
Kusterman, Frederick G., St. Cloud.
Kurth, Asa F., Hendricks.
Lambert, Ray R., Royalton.
Lovdahl, Arthur E., Park Rapids.
McMiller, Paul R., Carrington, N. D.
—Nesse, Ella M., Miss, Mabel.
Pladson, Ingvald S., Glenwood.

Puhl, Richard H., Menomonie, Wis.
— Snyder, Bessie E., Hector.
Stoppel, Ernest A., Rochester.
Spengler, Wm., St. Paul.
Stover, Charles E., Minneapolis.
Welch, Leo S., Glencoe.
Zender, Charles H., Henry, S. D.

SENIORS, 30.

COLLEGE OF PHARMACY.

Aker, Emil C., Montevideo.
Allen, C. Herbert, Minneapolis.
—Austin, Albertha J., Milbank, S. D.
Blosmo, Oscar, Menomonie, Wis.
Bohland, Carl P., St. Paul.
Bolton, John F., Plainview.
Bowman, Fred M., Browns Valley.
Brede, Otto H., Minneapolis.
Carlson, Arthur E., Willmar.
—Caton (Mrs.), Charlotte E., Minneapolis.
Cleveland, Zina, Northfield.
Day, Benjamin H., St. Paul.
Deterling, Bernhard A., Gaylord.
Dretchko, Alvin LeRoy, Winthrop.
Egbert, Henry G., Winona.
Gronvold, Bernt O., Kenyon.
Hanscom, George S., Willmar.
Holmes, Robie E., Billings, Mont.
Jamieson, Roy R., St. Paul.
Kelly, John V., St. Paul.
Larson, Ned L., Atwater.
Knapp, John A., River Falls, Wis.
Nott, R. J., Brownton.
Olverson, Oscar A., Clark, S. D.
Quick, Frank R., St. Paul.
Schreiter, Norman C., Red Lake Falls.
Thompson, Charles A., Buffalo.
Turton, Floyd E., Alexandria.
Weber, George C., Rochester.
Van Campen, Harry Alton, Cannon Fal.

SPECIAL STUDENT, 1.

Frost, W. A., Ph. G., St. Paul.

School of Mines

SENIORS—19

Bassett, R. H., Minneapolis.
Cowin, James, Minneapolis.
Gillan, S. L., Minneapolis.
Jackson, Charles F., Minneapolis.
McCreery, Arthur, Northfield.
McRae, Randolph J., Duluth.
Malcolmson, G. E., Minneapolis.
Noehl, B. F., Kasson.
Oberg, Anton C., Watertown.
Olund, H. E. St. Paul.
Parker, Walter H., Stillwater.
Parks, Edgar K., St. Paul.
Probst, E. A., Minneapolis.
Roed, Olaf, Minneapolis.
Smith, Edgar W., Minneapolis.
Steele, Charles W., Minneapolis.
Swenson, Karl P., Minneapolis.
Wiest, M. A., New Rome.
Ziesemer, Harry M., Fergus Falls.

JUNIORS—20

Bischoff, Harry, St. Paul.
Boyle, Patrick J., Brainerd.
Crowley, Jay, Stillwater.
Cullyford, James A., Duluth.
Dahl, C. F., St. Hilaire.
Deichen, William A., St. Paul.
Farnam, F. C., Minneapolis.
Fuglie, A. E., Ashby.
Goodwin, W. R., Minneapolis.
Grimes, John Alden, Minneapolis.
Hoaas, Ole G., McIntosh.
Hanks, I. B., Minneapolis.
Kennedy, J. J., St. Paul.
Knickerbrocker, Arthur, Staples.
Locke, Alfred, Minneapolis.
Olmstead, John S., St. Paul.
Parkhill, Walter, Pelican Rapids.
Peterson, Joseph S., Minneota.
Strong, John L., St. Paul.
Tyler, Adin P., Minneapolis.

SOPHOMORES—24

Channon, William, Minneapolis.
Cole, Willard, Libson, N. D.
Conkey, Charles R., Minneapolis.
Flanner, Edwin T., Minneapolis.
Fritzberg, Ernest A., Biwabik.
Gavin, Lawrence F., Staples.
Grant, Roy C., Duluth.
Grybla, Eugene, Minneapolis.
Halladay, F. C., Brainerd.
Hoyt, Samuel, Minneapolis.
Kennedy, Thomas, St. James.
Moir, Arthur D., Minneapolis.
Moody, R. G., Minneapolis.
Mowatt, William F., Delano.
Newell, John R., Shakopee.
Rood, Lynn, St. Paul.
Santo, Julius H., Janesville.
Snyder, S. O., St. Paul.
Swanson, Axel, Monticello.
Swartz, Samuel G., St. Paul.
Taylor, Harold, Minneapolis.
Wharton, N. Earl, Ashland, Wis.
Williams, Homer A., Minneapolis.
Wood, Sheldon V., Minneapolis.

FRESHMEN—7

Bailey, Paul, Minneapolis.
Barrett, Joe D., Hutchinson.
Bills, Eugene L., Minneapolis.
Bouzer, Clarence, Monticello.
Buck, Roland C., Minneapolis.
Burgess, Robert J., Jr., Minneapolis.
Canning, Harry W., Minneapolis.
Chesley, J. G., Minneapolis.
Carson, Clarke J., Glenwood.
Clark, Edward K., Minneapolis.
Cobb, R. J., Minneapolis.
Devereux, Lawrence, Minneapolis.
Dickinson, Roy E., Minneapolis.
Dickinson, Wallace, Minneapolis.
Duncan, Kenneth J., Fergus Falls.
Dunn, James, Minneapolis.
Elliot, Jay R., Minneapolis.
Farnam, Henry E., Minneapolis.
Fixen, Victor L., Minneapolis.
Frisch, Frank P., Grogan.
Giltinan, George M., St. Paul.
Goodrich, Norman P., Minneapolis.
Graves, Arthur R., Minneapolis.
Harmon, Benjamin G., St. Paul.
Harrington, Clifford A., Hutchinson.
Heath, Clarence L., Janesville.
Heidel, Charles S., Minneapolis.
Herring, William E., Easton.
Hill, Arthur S., Minneapolis.
Hoagland, Edwin W., Minneapolis.
Hognason, Frank G. B., Minneota.
Holler, Fred W., St. Paul.
Holman, Charles F., Minneapolis
Hyatt, Frank L., Minneapolis.
Jacobsen, Harry, Fergus Falls.
Johnson, Algot F., Cannon Falls.
Johnson, Milford, Albert Lea.
Jones, L. R., Minneapolis.
Jones, Philo Ernest, Red Wing.
Kearney, George S., Minneapolis.
Kennedy, Arthur T., Duluth.
Kleinschmidt, Clarence, St. Paul.
Larson, Clarence L., Waseca.
Leonard, Forest M., Minneapolis.
Loudon, George S., Minneapolis.
Loyhed, Tom, Faribault.
McKenzie, James R., Adrian.
McMillan, Howard, Minneapolis.
Merrill, F. B., Stillwater.
Meyer, William, Minneapolis.
Mihleisen, Fred R., Minneapolis.
Minder, Paul L., St. James.
Miner, Robert, Excelsior.
Oppel, Arthur F., Fulda.
Ostrand, Peter M., Minneapolis.
Pattee, Gordon J., Minneapolis.
Peck, Frank W., Minneapolis.
Pershon, Erick, Young America.
Quade, Edward H., Janesville, Minn.
Rand, H., Minneapolis.
Serum, Philip C., Jackson.
Sherburne, Arthur, Minneapolis.
Shields, Lytton J., St. Paul.
Simpson, William F., Minneapolis.
Smith, Charles C., St. Paul.
Stanley, Ward A., Hot Springs, S. D.
Stewart, Gordon, Monticello.
Strane, Archie, St. Paul.
Sundness, Odin A., Fergus Falls.
Tainer, H. M., Winthrop.
Thomas, Clarence J., Minneapolis.
Turner, H. Milton, Crookston.
Waldon, Clarence, Minneapolis.
Wilkinson, Clarence, Minneapolis.
Wingate, John F., Minneapolis.

The School of Chemistry

FRESHMEN—20

Bicknell, Henry R.
Blair, Frederick H.
Dahiels, Farrington.
DeWitt, Joseph H.
Dingle, Charles C.
Fairchild, Charles W.
Gutsche, Frank C.
Hansen, Edward H.
Hanson, Victor.
Hawley, Raymond W.
Johnston, William W.
Olsen, Victor.
Olson, A. Orlando.
Rockwood, Ralph H.
Schroeder, William F.
Smith, Sheldon H.
Swanman, Ira C.
Tronson, Carl.
Walker, Geo. Warren.
Williams, Joseph C.

SOPHOMORES—19

Baas, Roy S.
Bacon, Charles.
Brown, Caro.
Castor, Paul B.
Chesnut, Edward T.
Dahlberg, Henry W.
Dresser, Eva L.
Gaston, LeRoy.
Lathrop, Harry A.
Mitchell, Donald F.
Morey, George W.
Nye, Lillian L.
Pratt, Robert A.
Roehrich, Victor H.
Selvig, Walter A.
Sterling, Faith.
Stone, George H.
Weeks, Arthur F.
Young, Andrew.

JUNIORS—5

Badger, Walter L.
Barnaby, William E.
Kueffner, Otto K.
Lowe, John M.
McBride, Russell S.

SENIORS—13

Anderson, Edward.
Cressy, Charles R.
Davies, Edwin T.
Doran, James M.
Frazier, William H.
Haggard, Mildreth.
Halvorson, John O.
Kennedy, William W.
Manuel, Earl V.
Neill, Hazel.
Newton, Hjalmar M.
Porter, A. Harold.
Von Kuster, Edith.

UNCLASSED—3

Allen, H. W. (Grad. Student).
Merrill, A. Reba.
Smith, Carolyn H.

The College of Education

SENIORS, 3.

Carrie Bush
Edgar Higbie
C. G. Selvig

JUNIORS, 14.

Laura Benz
Vera Billings
Maude Bush
Lillian Colter
Ruth Colter
Kate Greeley
Lucy Hutchinson
Florence Jones
Margolee Lewis
Hilda Miller
Willis Newton
Honore Rouse
J. E. Swan
Alice Winter

The Graduate School

CANDIDATES FOR DEGREES, JUNE, 1907

FOR DOCTOR OF PHILOSOPHY—2.

William Macdonald (B. S. '98), Minnesota .....Pretoria, South Africa
Major, Agriculture; Minors, Horticulture, Botany.
Thesis: The Reclamation and Settlement of Arid Lands.

Anthony Zeleny (B. A. '92, M. S. '93), Minnesota.....Minneapolis
Major, Physics; Minors, Mathematics, Chemistry.
Thesis: The Capacity of the Mica Condenser and Its Application as a Standard for the Comparison of Electrical Quantities.

FOR MASTER OF ARTS—20

Levi Harrison Beeler (B. A. '96), Macalester.....Stillwater
Major, Education; Minors, History, Political Economy.
Thesis: Suggestions for the Elementary Course of Study.

Thomas P. Beyer (B. S. '03), Wesleyan University.....St. Paul, Minn.
Major, Shakspere; Minors, Tennyson, Beowulf.
Thesis: An Inference as to the Personality of Shakspere, drawn from his Works.

Theodore A. Buenger (B. A. '06), Minnesota .....St. Paul
Major, Latin; Minors, Greek, Botany.
Thesis: Cicero's *Pro Caelio.*

Frederick William Gates (Ph. B. '99), Wisconsin .....Minneapolis
Major, Mathematics; Minors, Mathematics, Astronomy.
Thesis: Abridged Notation.
Harriet Jane Hutchinson (B. A. '03), Minnesota .....Minneapolis
Major, Mathematics; Minors, English, Education .
Thesis: The Monroe Doctrine and Its Application to the Venezuela-Guiana Boundary Dispute.
Charles Eugene Johnson (B. A. '06), Minnesota.....Minneapolis
Major, Embryology; Minors, Entomology, Botany.
Thesis: The Thymus Gland and Its Development in the Pied-billed Grebe.
Edward Carl Johnson (B. A. '06), Minnesota .....Minneapolis
Major, Botany; Minors, Entomology, German.
Thesis: The Wintering over of various Cereal and Grass Rusts.
Ida Amanda Johnson (B. A. '06), Minnesota.....Rochester
Major, History; Minors, Economics, German.
Thesis: The True Magna Carta Concept.
Alois F. Kovarik (B. A. '04), Minnesota .....Minneapolis
Major, Radioactivity; Minors, Heat, Mechanics.
Thesis: Radioactive Emanations.
Linda H. Maley (B. A. '01), Minnesota.....Minneapolis
Major, English; Minors, Rhetoric, Italian.
Thesis: The Technique of the Modern Drama.
Frederick C. Miller (B. A. '03), Minnesota.....St. Paul
Major, Politics; Minors, History, Geology.
Thesis: History and Organization of the Police.
George Norton Northrop (B. L. '01), Minnesota.....Madison, Wis.
Major, English; Minors, Economics, French.
Thesis: A Study of Florio.
Louis W. Rapeer (R. S. '04), University of Chicago .....Minneapolis
Major, Education; Minor, Sociology.
Thesis: The Problem of Grammar in the Elementary Curriculum.
Amy Irene Robbins (B. S. '01), Minnesota.....Robbinsdale
Major, English; Minors, Archæology, Historic Design.
Thesis: The Dramaturgy of Ibsen.
William C. L. Shafer (B. A. '06), Minnesota.....St. Paul
Major, Education; Minors, Psychology, German.
Thesis: The Need of Men as Educators.
Homer W. Stevens (LL. M. '06), Minnesota .....Minneapolis
Major, Politics; Minors, Economics, Law.
Thesis: Corporation Taxation in the State of Minnesota.
Alice M. Stewart (B. A. '06), Minnesota.....Mankato
Major, Latin; Minors, German, Mathematics.
Thesis: A Comparison of Nature Treatment in the Georgics of Vergil and the *De Rerum Natura* of Lucretius.
Anna Sophia Swanson (B. L. '96), Carleton College .....Minneapolis
Major, English; Minors, Sociology, Scandinavian.
Thesis: The Problem Drama.
Kenneth Taylor (B. A. '06), Minnesota.....St. Paul
Major, Biology; Minors, Botany, Geology.
Thesis: The General Morphology of the Aphididae.
Roy Albion Vickery (B. A. '06), Minnesota.....Minneapolis
Major, Entomology; Minors, Botany, Paleontology.
Thesis: A Comparative Study of the External Morphology of the Aphididae.

FOR MASTER OF SCIENCE—4.

Adolph P. Andrews (B. S. '99), Minnesota.....Minneapolis
Major, Physics; Minors, Elect. Eng. Subjects, Mech. Eng. Subjects.
Thesis: The Capacities of Paper Condensers and Telephone Cables.
Elting Houghtaling Comstock (B. S. '97), Wisconsin.....Minneapolis
Major, Mathematics; Minors, Applied Mechanics, Mineralogy.
Thesis: Infinite Series.
Vincent Fulkerson (B. S. '05), S. D. Agr. College.....St. Anthony Park
Major, Horticulture; Minors, Agr. Chemistry, Thremmatology.
Thesis: Plant Breeding.
Roy S. King (M. E. '04), Ohio State University.....Columbus, O.
Major, Experimental Laboratory; Minors, Thermodynamics, Gas Engine Design.
Thesis: An Air Compressor Test.

CANDIDATES ENROLLED FOR THE DEGREE OF DOCTOR OF PHILOSOPHY—9.

Brohaugh, George O. (B. A. '89, LL. B. '93), Minnesota.....Red Wing
Erickson, Henry A. (E. E. '96), Minnesota .....Minneapolis
Major, Physics; Minors, Mathematics, Physics.
Hall, J. O. (B. A., M. A. '05), University of Denver.....Forest City, Ia.
Major, Scandinavian; Minor, Philosophy.
Johnson, Mrs Julia M. (M. A. '05), Minnesota.....Macalester College
Major, English; Minors, Latin, Philosophy.
Kovarik, Alois F. (B. A. '04, M. A. '07), Minnesota.....Minneapolis
Major, Radioactivity; Minors, Heat, Magnetism, and Electricity.
Malmin, R. (B. A. '82, M. A.), Luther College.....Decorah, Ia.
Major, Hebrew; Minors, Aramaic, Jewish History.
Melby, Gustav (M. A. '06), Minnesota.....Minneapolis
Major, Scandinavian; Minors, Philosophy, English.
Melom, C M. (B. L. '01, M. A. '02), Minnesota.....Minneapolis
Major, French; Minor, Spanish.
Miller, Frederick C. (B. A. '03, M. A. '07), Minnesota.....St. Paul
Major, Politics; Minors, History, Geology.

CANDIDATES ENROLLED FOR THE DEGREE OF MASTER OF ARTS—30

Burger, J. A. (B. S. '01), Minnesota .....Staples
Education, Psychology.
Burrill, Paul C. (B. A. '02), Minnesota.....Minneapolis
Mathematics, Physics, German.
Chapple, B. P. (B. L. '91), Minnesota.....Faribault
Education, Psychology.
Colberg, Ernest J. (B. A. '06), Gustavus Adolphus College .....St. Peter
English, Scandinavian, Latin.
Dorrum, I. (B. A. '04), Decorah, Ia. .....Fergus Falls
Education, Psychology.
Driscoll, A. E. (B. A. '89), University of Manitoba.....St. Paul
Sociology, Psychology, English.
Edwards, E. R. (B. S. '02), Carleton College .....Minto, N. D.
Education, Psychology.
Gannon, Michael H. (B. A. '98), Gonzago College.....Minneapolis
Geology, Mineralogy, Chemistry.
Hargis, S. E. (B. S. '04), Ottawa University.....Lake Park
Education, Psychology.
Hatch, E. S. (B. A. '03), Steinman College, Dixon, Ill. .....St. Louis Park
Education, Psychology.
Haven, Ruth (B. L. '99), Carleton College.....St. Paul
English, Comparative Philology.
Leding, Lars (B. S. '04), St. Olaf's College .....Red Lake Falls
Education, Psychology.
Lurton, Freeman E. (B. S. '94, M. S. '97), Carleton.....Fergus Falls
Education, Psychology.
Nordgaard, Olive (B. A. '06), Gustavus Adolphus College.....Minneapolis
English, Latin, French.
Payne, Carroll E. (Ph. B. '98), Hamline.....Long Prairie
Education, Psychology.
Pederson, A. C. (B. A. '04), Luther College.....Minneapolis
English, History, Philosophy.
Pryor, Leonard H. (B. A. '02), Minnesota.....Breckenridge
Education, History.
Reynolds, Richard (B. A. '05), Redfield College, S. D.....Minneapolis
History, Economics, English.
Sheldon, Eleanor (B. A. '04), Minnesota .....Minneapolis
English, Rhetoric, German.
Shirer, William G. (B. A. '03), Cornell College, Ia.....Buffalo
Education, Psychology.
Slaven, Estella (B. A. '06), Minnesota.....Austin
Education, History.
Smith, Elliott (B. A. '03), Minnesota .....Fairmont
Education, Psychology, Mathematics.
Stenberg, Theodore (B. A. '06), Minnesota .....Minneapolis
English, Psychology, Education.
Stewart, Mark L. (B. A. '06), Minnesota.....Balaton
Education, Psychology.

True, Blanche (B. A. '02), Wellesley.....Fargo, N. D.
Comparative Philology, French, Greek.
Trygstad, Christian (B. A.), St. Olaf's College.....Northfield
German, Latin, French.
Tucker, Florence M. (B. A. '04), Minnesota .....New London, Conn.
Latin, German.
Van Cleve, C. W. (B. A.), Ottawa University.....Barnesville
Education, Psychology.
Yeager, C. S. (B. A. '96), Minnesota.....Fosston
Education, Psychology.
Zwinggi, Emma (B. S. '84), Minnesota.....Traverse, R. R. No. 1
Education, Psychology.

STUDENTS ADMITTED TO GRADUATE WORK, NOT YET ENROLLED AS CANDIDATES FOR A DEGREE—30.

Bell, Mary E. D. (B. A. '05, M. A. '06), Minnesota .....St. Paul
English.
Brendal, John (B. A. '06), ...Minneapolis
English, Comparative Philology, Scandinavian.
Brooke, Helen L. (B. S. '98), Nebraska; (M. A. '06), Minnesota..Minneapolis
Comparative Philology, German.
Brousseau, Kate (Ph. D. '94), Paris .....Minneapolis
French.
Carlton, E. C. (B. A. '98, M. A. '00), Augustina College .....St .Peter
Greek, French, Scandinavian.
Christianson, Theodore (B. A. '06), Minnesota.....Robbinsdale
Politics, History, Education.
Cook, Louis J. (B. S. '01), Minnesota.....Minneapolis
Chemistry, English, Geology.
Dayton, Caroline W. (B. A. '05), Wellesley College.....Minneapolis
English.
Dutton, Charlotte R. (Ph. B. '05), Chicago University.....Minneapolis
Political Science.
Fairchild, Kate K. (B. A. '05), Smith College .....Minneapolis
English.
Gillette, Adelaide Robbins (B. A. '02), Minnesota .....Minneapolis
English.
Goldman, Sara M. (B. A. '06), Minnesota.....St. Paul
English.
Griffith, Helen (B. A. '05), Bryn Mawr College.....Minneapolis
Philosophy.
Harter, Mina (B. A. '04), Northwestern University .....Hudson, Wis.
Education, German.
Hovda, O. (B. A. '04), Minnesota .....Minneapolis
Physics.
Hunt, Ruth (B. A. '02), Mt. Holyoke College .....Fort Snelling
History, English.
Hunter, Mildred (B. A. '05), Minnesota.....Minneapolis
Physics, Botany, English, Geology.
Hyser, Maude (B. A. '04), Minnesota.....Minneapolis
English.
Johnson, Florence E. (B. A. '05), Smith College .....Minneapolis
English.
Lindley, Anna G.....Minneapolis
Italian.
Marlow, Cora E. (B. A. '00), Minnesota.....Minneapolis
English.
Muir, Margaret P. (B. L.), Smith College .....St. Paul
English.
Osgood, Alice F. (B. A. '91), Smith College .....Minneapolis
English.
Parsons, Arthur L. (B. A. '96), New York University .....Minneapolis
Chemistry.
Random, Gilbert R. (B. S. '99), Wisconsin.....Minneapolis
Astronomy, Mathematics, Physics.
Rodgers, Walter S. (B. S. '01), Minnesota.....Farmington
Latin, German, Mathematics, Education.

Ryder, Wm. H. (B. A. '02), Western Reserve University .....Minneapolis
Philosophy, Economics.
Shellenberger, Mrs. E. (Ph. B. '01), University of Iowa.....St. Anthony Park
English, French.
Thomas, Mabel H. (M. S. '00), Minnesota .....Minneapolis
French.
Valentine, Blanche M. (B. A. '05), Smith College .....Minneapolis
English.

Summary of Students

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

	Men	Women	Total	
Senior class	69	152	221	
Junior class	84	168	252	
Sophomore class	109	198	307	
Freshman class	172	308	480	
Unclassed students	31	53	84	
	465	879	1344	1344

SIX-YEAR MEDICAL COURSE.

	Men	Women	Total	
Sophomore class	24	2	26	
Freshman class	47	1	48	
	71	3	74	74

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS.

Senior Class—

	Men	Women	Total	
Civil Engineering section	12		12	
Mechanical Engineering	16		16	
Electrical Engineering section	17		17	
Municipal Engineering section	5		5	
	50		50	50

Junior Class—

	Men	Women	Total	
Civil Engineering section	31		31	
Mechanical Engineering section	22		22	
Electrical Engineering section	28		28	
Municipal Engineering section	4		4	
Science and Technology	2		2	
	87		87	87

Sophomore Class—

	Men	Women	Total	
Civil Engineering section	37		37	
Mechanical Engineering section	39		39	
Electrical Engineering section	58		58	
Municipal Engineering section	3		3	
Science and Technology	2		2	
	139		139	139

Freshman Class—

	Men	Women	Total	
Civil Engineering section	57		57	
Mechanical Engineering section	33		33	
Electrical Engineering section	75		75	
Science and Technology	2		2	
	167		167	167

	Men	Women	Total	
Unclassed students	14		14	
Graduate students	1		1	
	15		15	15
			458	458

THE DEPARTMENT OF AGRICULTURE.

The College of Agriculture—

	Men	Women	Total	
Senior class	9	1	10	
Junior class	6	1	7	
Sophomore class	13	1	14	
Freshman class	26	14	40	
Specials	1	1	2	
	55	18	73	73

The School of Agriculture—

	Men	Women	Total	
Intermediate Year Students	10	1	11	
Class A	60	31	91	
Class B	102	44	146	
Class C	217	99	316	
Farmers' Short Course	78	4	82	
The Dairy School	106	...	106	
	573	179	752	752
			825	825

THE COLLEGE OF LAW.

	Men	Women	Total	
Graduate Students for Doctor of Civil Law	6		6	
Graduate Students for Master of Laws	9		9	
Senior class	93	1	94	
Middle class	103	1	104	
Junior class	192		192	
Special Students	93		93	
	496	2	498	498

THE DEPARTMENT OF MEDICINE.

The College of Medicine and Surgery—

	Men	Women	Total	
Senior class	40	1	41	
Junior class	35	1	36	
Sophomore class	55	2	57	
Freshman class	48	4	52	
Graduate class	3	1	4	
	181	9	190	190

The College of Homeopathic Medicine and Surgery—

	Men	Women	Total	
Senior class	6		6	
Junior class	4		4	
Sophomore class	2		2	
Freshman class	2		2	
	14		14	14

THE COLLEGE OF DENTISTRY.

	Men	Women	Total	
Senior class	31		31	
Junior class	53		53	
Freshman class	69	1	70	
Special Students	8		8	
	161	1	162	162

THE COLLEGE OF PHARMACY.

	Men	Women	Total	
Senior class	28	2	30	
Junior class	40	5	45	
Special Students	1		1	
	69	7	76	76

THE SCHOOL OF MINES.

	Men	Women	Total	
Senior class	19		19	
Junior class	20		20	
Sophomore class	24		24	
Freshman class	75		75	
	138		138	138

THE SCHOOL OF ANALYTICAL AND APPLIED CHEMISTRY.

	Men	Women	Total	
Senior class	10	3	13	
Junior class	5		5	
Sophomore class	15	4	19	
Freshman class	20		20	
Unclassed Students	1	2	3	
	51	9	60	60

THE COLLEGE OF EDUCATION.

	Men	Women	Total	
Senior class	2	1	3	
Junior class	2	12	14	
	4	13	17	17

THE GRADUATE SCHOOL.

	Men	Women	Total
Graduate Students	60	35	95

THE UNIVERSITY SUMMER SCHOOL.

	Men	Women	Total
University section	85	171	256

SUMMARY OF TOTALS.

	Men	Women	Total	
The College of Science, Literature and the Arts...	465	879	1344	
Six-Year Medical Course	71	3	74	
The College of Engineering and the Mechanic Arts..	458		458	
The Department of Agriculture (less duplicates)..	628	197	825	
The College of Law (less duplicates)	496	2	498	
The Department of Medicine	425	17	442	
The School of Mines	138		138	
The School of Analytical and Applied Chemistry ...	51	9	60	
The College of Education	4	13	17	
The Graduate School	60	35	95	
The Summer School, Univ. sec., less duplicates....	85	171	256	
	2881	1326	4207	4207
Less duplicates	...	....	62	62
			4145	4145

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