

THE UNIVERSITY OF MINNESOTA

CATALOGUE

FOR THE YEAR

1893-'94

AND

ANNOUNCEMENTS

FOR THE YEAR

1894-'95



BY THE UNIVERSITY

MINNEAPOLIS

1894

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

The Catalogue will be sent gratuitously, postage paid, to all persons who apply for it.

CALENDAR FOR 1894-'95.

1894.

1895.

JULY.

S.	M.	T.	W.	T.	F.	S.
1	2	3	4	5	6	7
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AUGUST.

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SEPTEMBER.

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NOVEMBER.

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JANUARY.

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FEBRUARY.

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MAY.

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JUNE.

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JANUARY	1	T	NEW YEAR'S DAY.	
	8	T	Work resumed in all departments.	
	12	S	4 W
	19	S	5 W
	26	S	6 W
FEBRUARY	2	S	.....	7 W
	9	S	.....	8 W
	16	S	.....	9 W
	18	M	University Charter, 1868. Gen. Sibley died, 1891.	
	22	F	WASHINGTON'S BIRTHDAY.	
	23	S	.....	10 W
	2	S	.....	11 W
MARCH	4	M	Term Examinations; registration for third term begins.	
	5	T	" " " "	
	6	W	" " " "	
	7	T	Examinations for conditioned students,	
	8	F	" " " "	
	9	S	" " " "	12 W

THIRD TERM.

MARCH	11	M	Registration for third term.	
	12	T	Classes called for regular work.	
	16	S	.....	1 W
	23	S	.....	2 W
	29	F	School of Agriculture closes.	
	30	S	.....	3 W
APRIL	6	S	.....	4 W
	13	S	.....	5 W
	20	S	.....	6 W
	27	S	.....	7 W
MAY	4	S	.....	8 W
	11	S	.....	9 W
	16	T	Examinations in the Medical Department begin.	
	18	S	.....	10 W
	21	T	Senior Examinations begin.	
	25	S	.....	11 W
	28	T	Senior Examinations in the Law Department.	
	30	T	Term Examinations.	
	31	F	" " " "	
JUNE	1	S	" " " "	12 W

COMMENCEMENT WEEK, 1894-95.

SUNDAY	JUNE	2	BACCALAUREATE SERVICE,	3:00 P. M.
MONDAY	JUNE	3	FIELD DAY SPORTS	2:00 P. M.
			ORATORICAL CONTEST,	8:00 P. M.
TUESDAY	JUNE	4	SENIOR CLASS EXERCISES,	9:00 A. M.
WEDNESDAY	JUNE	5	ALUMNI DAY—Meeting of Alumni,	2:00 P. M.
THURSDAY	JUNE	6	COMMENCEMENT DAY.	
			Graduating Exercises	9:00 A. M.
			President's Reception,	8:00 P. M.
FRIDAY	JUNE	7	SUMMER VACATION BEGINS,	13 W

The year 1895-96 will begin September 3d, 1895.

PROGRAM OF EXAMINATIONS, SEPTEMBER, 1894.

The numbers placed after the subjects, when given, indicate the room in which the examination will be held. When no number is given, the examination will be held in room 55 on the third floor of the main building.

DAY.	HOUR	Subjects for admission to the Freshman Class.	For students conditioned in the work of first term Freshman and Sophomore years.
TUESDAY,	8:00-10:30	English, Grammar and Essay.	
SEPT.	10:45- 1:15	Composition.....	
4	2:30- 5:00	Elementary Algebra	
WEDNESDAY	8:00-10:30	Higher Algebra.....	{ Freshman Algebra.....38 Sophomore Physics.....38
SEPT.	10:45- 1:15	U. S. History.....	{ Sophomore Chemistry.....38 Freshman Latin.....43
5	2:30- 5:00	Plane Geometry.....	{ Freshman English.....37 Sophomore Rhetoric.....27
THURSDAY	8:00-10:30	Solid Geometry.....	{ Sophomore French.....43 Sophomore German.....35
SEPT.	10:45- 1:15	History of Greece and Rome.....	{ Freshman Greek.....36 Freshman German B.....35
6	2:30- 5:00	Natural Philosophy.....	{ Freshman French B.....43 Sophomore English.....37
FRIDAY	8:00-10:30	Physiology.....	Sophomore Mathematics.....38
SEPT.	10:45- 1:15	{ Greek.....36 German.....35	Sophomore Latin.....49
7	2:30- 5:00	Latin Grammar.....	Sophomore Greek.....36
SATURDAY	8:00-10:30	Cæsar.....	49
SEPT.	10:45- 1:15	Cicero.....	49 Sophomore History.....45
8	2:30- 5:00	{ Virgil.....49 { English.....37	{ Sophomore Botany.....‡ { Sophomore Zoology.....‡
MONDAY	8:00-10:30	Botany.....	‡
SEPT.	10:45- 1:15	Chemistry.....	§
10	2:30- 5:00	{ French.....43 { Shakspeare.....37 { Physical Geography... ‡	

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

‡ In Pillsbury Hall.

§ In Chemical and Physical Laboratory building.

History, Organization and Government.

The first official mention of the University of Minnesota is in the second message of Governor Ramsey to the territorial legislature of 1851. He refers to the matter in the following words. After speaking of the school lands, he adds, "As the endowment of a University will also naturally, in this connection, attract your attention, it might be proper to further memorialize Congress for a grant of one hundred thousand acres of land, applicable and available, at a future day, for this most desirable object. The propriety of urging, at this time, the request, arises from the importance of making an early selection, with a view to secure a fair proportion of choice lands."

The memorial above proposed was passed by the legislature on the 10th day of February, and, on the 19th of the same month, Congress passed an act, granting two townships (about 46,000 acres) "for the use and support of a university in said territory and for no other use and purpose whatever."

To Col. John W. North, more than to any other one man, belongs the credit of starting the movement which resulted in the establishment of the University of Minnesota. He it was, as chairman of the legislative committee on education, who framed the following act which was adopted by the legislature February 13th, 1851, as the charter of the University.

ORGANIZATION OF 1851.

Be it enacted by the Legislature of the State of Minnesota:

[Chapter 28, Revised Statutes.]

SECTION 1. There shall be established in this Territory an institution, under the name and style of the University of Minnesota.

SEC. 2. The proceeds of all lands that may hereafter be granted by the United States to the Territory for the support of a University, shall be and remain a perpetual fund, to be called the "University Fund," the interest of which shall be appropriated to the support of a University; and no sectarian instruction shall be allowed in said University.

SEC. 3. The object of the University shall be to provide the inhabitants of this Territory with the means of acquiring a thorough knowledge of the various branches of literature, science and the arts.

SEC. 4. The government of the University shall be vested in a Board of twelve Regents who shall be elected by the Legislature as hereinafter provided.

SEC. 5. The members of the Board of Regents shall be elected at the present session of the Legislature, and shall be divided into classes, numbered one, two and three; class numbered one shall hold their offices for two years; class numbered two, for four years, and class numbered three, for six years, from the first Monday in February, one thousand, eight hundred and fifty-one; biennially thereafter there shall be elected in joint convention of both branches of the Legislature, four members to supply the vacancies made by the provisions of this section, and who shall hold their offices for six years respectively.

SEC. 6. Whenever there shall be a vacancy in the office of Regents of the University, from any cause whatever, it shall be the duty of the Governor to fill such office by appointment, and the person or persons so appointed, shall continue in office until the close of the session of the Legislature, then next thereafter, and until others are elected in their stead.

SEC. 7. The Regents of the University and their successors in office, shall constitute a body corporate, with the name and style of the "Regents of the University of Minnesota," with the rights as such, of suing and being sued, of contracting and being contracted with, of making and using a common seal, and altering the same at pleasure.

SEC. 8. The Regents shall appoint a Secretary, a Treasurer and a Librarian, who shall hold their respective offices during the pleasure of the Board. It shall be the duty of the Secretary to record all the proceedings of the Board, and carefully to preserve all its books and papers; the Treasurer shall keep a true and faithful account of all moneys received and paid out by him, and shall give such bonds for the faithful performance of the duties of his office as the Regents may require.

SEC. 9. The Regents shall have power, and it shall be their duty to enact laws for the government of the University; to elect a Chancellor, who shall be ex-officio, President of the Board of Regents or when absent or previous to the election of such Chancellor, the Board may elect one of their own number President *pro tem*. They may also appoint the requisite number of Professors and Tutors, and such other officers as they may deem expedient; also to determine the amount of their respective salaries; *provided* that the salaries thus determined, shall be submitted to the Legislature for their approval or dissent.

SEC. 10. The University shall consist of five departments: the department of Science, Literature and the Arts; the department of Law; the department of Medicine; the department of the theory and practice of elementary instruction; the department of Agriculture. The immediate government of the several departments shall be entrusted to their respective faculties; but the Regents shall have power to regulate the course of instruction, and prescribe, under the advice of the professorships, the books and authorities to be used in the several departments, and also to confer such degrees and grant such diplomas as are usually conferred and granted by other Universities.

SEC. 11. The Regents shall have power to remove any officer connected with the institution, when in their judgment the interest of the University requires it.

SEC. 12. The admission fee to the University and the charges for tuition in the several departments thereof, shall be regulated and prescribed by the Board of Regents; and as soon as in their opinion, the income of the University fund will permit, tuition in all of the departments shall be without charge to all students in the same, who are residents of the Territory.

SEC. 13. The University of Minnesota shall be located at or near the Falls of St. Anthony; and the Regents, as soon as they may deem expedient, shall procure a suitable site for the erection of the University buildings, and they may proceed to the erection of the same as soon as funds may be provided for that purpose, after such plan or plans as may be approved by a majority of said Board.

SEC. 14. The Regents shall have the power, and it shall be their duty as soon as the requisite funds shall have been secured for that purpose, to establish a preparatory department of said University, and employ teachers for the same who shall be qualified to give instruction in all the branches of learning usually taught in academies; which preparatory department may be discontinued whenever the Regents may think proper, after the other departments of said University shall have been established.

SEC. 15. The Regents are authorized to expend such portions of the fund, which by the provisions of this chapter may come under their control, as they may deem expedient for the erection of suitable buildings, and the purchase of apparatus, a library and a cabinet of natural history; and the selection, management and control of all lands, which may hereafter be granted by Congress for the endowment of said University, is hereby vested in the Board of Regents.

SEC. 16. The Regents shall make a report annually, to the Legislature at its regular session, exhibiting the state and progress of the University in its several departments, the course of study, the number of professors and students, the amount of expenditures, and such other information as they may deem proper, or may from time to time be required of them.

SEC. 17. Meetings of the Board may be called by any seven members thereof, at such time and place as they may deem expedient, and a majority of said Board shall constitute a quorum for the transaction of business, but a smaller number may adjourn from time to time.

SEC. 18. The Regents, if they shall deem it expedient, may receive into connection with the University, any college within the Territory, upon application of the Board of Trustees; and such college so received, shall become a branch of the University, and be subject to the visitation of the Regents.

SEC. 19. No religious tenets or opinions shall be required to entitle any person to be admitted as a student in said University; and no such tenets or opinions shall be required as a qualification for any professor, tutor, or officer of said University.

SEC. 20. The legislative assembly may at any time alter, amend, modify, or repeal this chapter.

The Board of Regents, provided for in the above act, was elected by the legislature in joint session, on the 4th of March of the same year.

The Board consisted of the following: Isaac Atwater, J. W. Furber, William R. Marshall, B. B. Meeker, Socrates Nelson, Henry M. Rice, Alexander Ramsey, Henry H. Sibley, C. K. Smith, Franklin Steele, N. C. D. Taylor, and Abram Van Vorhees.

The University, as thus organized, continued until 1860. Among the things accomplished by the Regents during this organization was the erection of a building and the carrying on of a preparatory school for four years; the purchase of a new site; the erection of a part of the present main building; the location of about thirty-five thousand acres of the Congressional grant of land.

The State Constitution, adopted by the people of the State, October 13, 1857, refers to the University in the following language:

“The location of the University of Minnesota as established by existing laws, is hereby confirmed, and said institution is hereby declared to be the University of the State of Minnesota. All the rights, immunities, franchises and endowments heretofore granted or conferred are hereby perpetuated unto the said University, and all lands which may be granted hereafter by Congress, or other donation for said University purposes, shall vest in the institution referred to in this section.”

When the Legislature of 1860 met, it was found that the affairs of the University, owing principally to the financial depression of the preceding years, were in such condition that to settle them a new organization of the University, giving the Regents greater powers, was necessary. Accordingly, on the 14th day of February, 1860, the Legislature passed the following act, reorganizing the University:

RE-ORGANIZATION OF 1860.

Be it enacted by the Legislature of the State of Minnesota:

SECTION 1. That the object of the State University, established by the Constitution of the State, at or near the Falls of St. Anthony, shall be to provide the best and most efficient means of imparting to the youth of the State an education more advanced than that given in the public schools, and a thorough knowledge of the branches of literature, the arts and sciences, with their various applications.

SEC. 2. There shall be attached to the University a Collegiate Department, in which, as soon as may be deemed expedient by the Board of Regents, hereinafter provided, regular College Classes shall be formed and a Chancellor and the necessary Professors, Tutors and other officers elected.

SEC. 3. There shall also be a department for the training of Teachers for the Common Schools of the State, in which shall be taught the theory and practice of teaching, and everything that will tend to perfect the elementary and other public schools of the State.

SEC. 4. The University shall be governed and managed by a Board of Regents, consisting of the Governor, Lieutenant-Governor, Chancellor, and five electors of the State to be appointed by the Governor, by and with the advice and consent of the Senate, immediately after the passage of this act, and such other persons as may be appointed in accordance with a subsequent provision. Two of the five persons thus appointed shall hold their office for two years, and three for four years. At the expiration of their terms, successors shall be appointed in the same way for a period of four years. Whenever a vacancy occurs by death, resignation, or removal from the State, or otherwise, it shall be the duty of the Governor to fill the vacancy, subject to the confirmation of the Senate.

SEC. 5. Any person or persons contributing a sum not less than fifteen thousand (15,000) 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. Said person or persons shall have the right to nominate Trustees for the care of the endowment, also an in-

dividual to fill the Professorship, and a Regent who shall have the same rights and privileges as those appointed in behalf of the State.

SEC. 6. The University shall never be under the control of any religious denomination.

SEC. 7. The Chancellor's term of office shall be the same in duration as that of District Judge, and his compensation for the performance of his duties as Chancellor shall be such as the Legislature may designate from time to time.

SEC. 8. The Board of Regents shall appoint a Secretary and Treasurer who shall hold their respective offices during the pleasure of the Board of Regents. It shall be the duty of the Secretary to record all the proceedings of the Board and carefully preserve all its books and papers, and before entering on the duties of the same he shall take and subscribe an oath to perform his duties honestly and faithfully.

It shall be the duty of the Treasurer to keep an exact and faithful account of all moneys received and paid out by him, and before entering upon the duties of his office, he shall take and subscribe an oath that he will faithfully perform the duties of Treasurer, and he shall also give a bond in the penalty of twenty-five thousand (25,000) dollars conditioned for the faithful discharge of his duties as Treasurer, and that he will at all times keep and render a true account of all moneys received by him as such Treasurer, and of the disposition he has made of the same, and that he will at all times be ready to discharge himself of the trust and to pay over when required, which bond shall have two good sureties and shall be approved as to its form and the sufficiency of its sureties by the Board of Regents and also the Auditor and Secretary of State, and shall be filed in the office of the latter. The compensation of the Treasurer shall be the same as may be from time to time designated by the Legislature.

SEC. 9. In all cases where specimens of natural history, and geological and mineralogical specimens, which may be hereafter collected by any one appointed by the state to investigate its natural history and physical resources, they shall belong to, and be the property of the State University. There shall also be deposited in the Library of the University a copy of all the laws, reports, Journals of the Legislature, and other documents published at the expense of the State.

SEC. 10. The University shall consist of such departments as the Board of Regents shall determine, subject to the provisions of this act, and the same may be altered or changed as they may prescribe. The immediate government of the several departments shall be intrusted to the Chancellor and Faculty. The method and course of instruction in each department shall be prescribed by the Board of Regents, who shall also confer such degrees, and grant such diplomas as are usually conferred by Universities, or such others as they may deem proper.

SEC. 11. The Board of Regents shall have power, and it shall be their duty to make laws for the government of the University, to elect a Chancellor, also the requisite number of Professors and Tutors, and such other officers as they may deem expedient, and to determine the amount of their respective salaries, except the salary of the Chancellor. They shall have the power to remove any officer connected with the institution, when the good of the institution demands.

SEC. 12. The Board of Regents are authorized to expend such portion of the University Fund as they may deem expedient in the purchase of apparatus, library and cabinet of natural history, in providing suitable means to keep and preserve the same, and in the procurement of all other means and facilities for giving instruction.

SEC. 13. The first meeting of the Board of Regents shall be called by the present Chancellor on or before the first Thursday in April, in the year one thousand eight hundred and sixty, at the Capitol; the annual meeting of the Board shall be held on the last Tuesday of June, at the City of St. Anthony, unless otherwise ordered by a majority of said Board of five Regents. The Chancellor may call special meetings of the Board when he deems it expedient. A majority of said Board shall constitute a quorum to do business.

SEC. 14. The Treasurer of the University shall have a suitable set of books in which he shall keep an accurate account of all transactions relative to the sale and disposition of the University lands, and the management of the fund arising therefrom; which books shall exhibit what parts and portions of land have been sold, at what prices, and to whom, and how the proceeds have been invested, and on what securities, and what land remains unsold, where situated, and of what value respectively.

SEC. 15. No sales of land belonging to the University shall take place unless the same be decided upon at a regular meeting of the Board of Regents, or at one called for that purpose, and then only in the manner upon the notice and on the terms which the board shall prescribe, and which is authorized by the Constitution, and no member of the Board shall be directly or indirectly interested in any such purchase of such lands upon sale, and it shall be the duty of the Board to invest any such surplus income arising therefrom, which is not immediately required for the purpose of instruction, in United States, or in other well established, interest paying State Stocks, as a perpetual fund for the purpose of securing an income to defray the necessary current expenses as said Board of Regents may deem expedient.

SEC. 16. The Board of Regents shall make an annual report through the Secretary which shall exhibit the state, condition and progress of the University, in its several departments, the different courses of study pursued therein, the branches taught, the means and method of instruction adopted, the number of Professors and Students, with their names, ages, studies and residences, the situation and condition of the University Fund, the income derived therefrom, a specific statement of the amount of expenditures, and such other

matters as said Board of Regents may deem proper to communicate, said report shall be completed and deposited in the office of Secretary of State, one month previous to the annual State election, and shall be transmitted by the Governor to the Legislature when the same shall convene.

SEC. 17. Chapter twenty-eight (28) of the Revised Statutes of the Territory of Minnesota, on pages one hundred and forty-two and forty-three and one hundred and forty-four, relating to the University of Minnesota, and containing twenty (20) sections, is hereby repealed, except so much of Section thirteen (13) as is referred to in Article nine (9) Section eight (8) of the Constitution, provided also that the Regents of said University hereafter appointed shall continue as a body corporate in accordance with Section seven (7) of said Chapter twenty-eight (28).

SEC. 18. This act shall be in force from and after its passage.

This organization continued in force for four years and the Regents were principally concerned with the righting of the tangled affairs of the University. They also began the agitation of the matter of a new land grant from Congress for the use of a *State University*, maintaining that the lands granted to the Territorial University had been used in paying off the debts of that institution, and that the State University had received none of the benefits of the grant. This was not finally settled until 1870, in which year, July 8th, Congress passed an act authorizing the Commissioner of the General Land Office to allow the claim of the State of Minnesota.

THE BOARD OF THREE REGENTS.

On March 4th, 1864, the following act was passed:

Be it enacted by the Legislature of the State of Minnesota:

SECTION 1. Section four of chapter eighty of the session laws of 1860, being an act entitled "An act providing for the government and regulation of the University of Minnesota," approved February 14th, 1860, is hereby amended so as to read as follows:

SEC. 4. O. C. Merriman, John S. Pillsbury and John Nicols, are hereby appointed sole Regents of the University of Minnesota, for the term of two years from the day of the passage of this act. Before entering upon the duties of this office, each of said Regents shall give a bond to the State of Minnesota, executed by himself, and not less than two sureties, to be approved by the State Auditor, in the sum of twenty-five thousand dollars, conditioned for the faithful and honest performance of his duties as Regent. Said bond shall be filed in the office of Secretary of State.

SEC. 2. Said Regents shall hold an annual meeting in the month of March in each year, and such special meetings as may be called by the President or by any two Regents.

SEC. 3. Said Regents shall elect one of their own number President, and a majority shall constitute a quorum.

SEC. 4. Said Regents are hereby fully authorized and empowered, in their discretion, to arrange, compromise, settle and pay any and all claims and demands of whatever nature against the University of Minnesota, or the Regents thereof, and to that end said Regents are hereby fully authorized and empowered to sell at public or private sale, and convey in satisfaction of any of said claims or demands, or for cash, or on credit, in whole or part, any of the lands donated to the State of Minnesota by the United States, by an act of Congress, entitled "An act donating to the States of Minnesota and Oregon certain lands reserved by Congress for the Territories of Minnesota and Oregon, for University purposes," approved March 2d, 1861. *Provided, however,* That the whole amount of lands so sold and conveyed, shall not exceed twelve thousand acres, and all conveyances of land after that amount shall have been conveyed, shall be absolutely void. No one of said Regents shall be interested directly or indirectly in the purchase of any lands conveyed under the provision of this act. Said Regents may, in their discretion, authorize the State Auditor to sell at public sale the lands hereby authorized to be sold, or any part thereof. And *Provided further,* That if any person or persons shall purchase any of the lands mentioned in this act, upon which other parties have made improvements, they shall be required to pay the owner of said improvements their appraised value, such value to be appraised by one of the Regents and the County Treasurer and Chairman of the Board of Supervisors of the county where the land may be situated, and one-half of such appraised value shall be paid at the time of sale and the balance within six months thereafter, with interest at seven per cent. per annum, with proper security, to be approved by said County Treasurer. *Provided,* That in appraising improvements upon any of the lands aforesaid, the appraisers shall take into consideration and shall deduct from the value of any such improvements, any waste or damage to said lands by the parties making the improvements or occupying the lands.

SEC. 5. Conveyances of land under the provisions of this act, shall be executed by the President and Treasurer of the Board of Regents, in the name of and under the seal of the University of Minnesota, and such conveyances shall pass all the right, title and interest of said University, as well as the State of Minnesota, in and to the lands conveyed.

SEC. 6. Nothing in this act contained shall be held or taken as an admission of the legal validity of any of the claims or demands aforesaid, or of any obligation to provide for the payment thereof.

SEC. 7. All personal property of every nature and description, including notes, accounts, stocks, bonds, claims and demands, belonging to said University, or the Regents thereof, as well as the proceeds of all sales of lands sold or conveyed under the provisions of this act, while the same are in the hands of, or under the control of the said University or the Regents thereof, or of any one of them, or of any person for them, or either of them, or for said University, or of any State officer, shall be exempt from attachment, garnishee process, proceedings, supplementary to execution and levy or sale on execution, or any other process issuing out of any court, until otherwise provided by law.

SEC. 8. The present Regents of the University and their Secretary, Treasurer, Chancellor and any and every other officer appointed by said Regents, as well as the Auditor of State, are hereby required to turn over to the regents herein appointed, on demand, all books, records, papers, claims, notes, bonds, stocks and personal property of every description belonging to said University or the Regents thereof, and the care of all lands belonging to the University and of the University buildings and grounds, and the leasing of the same and collecting of rent, as well as the adjusting and collecting of all claims of every nature, due or to become due to the University or the Regents thereof, as well as claims for trespasses committed, are hereby committed to the Regents herein appointed and their successors.

SEC. 9. Said Regents are hereby authorized to open or cause to be opened, a school in said University building; *Provided*, that no part of the funds of the University shall be expended for the support of the same.

SEC. 10. The operation of sections two, three, seven, ten, eleven, twelve, thirteen and fifteen of chapter eighty of the session laws of 1860, entitled as hereinbefore recited, is hereby suspended until otherwise provided by law.

SEC. 11. This act shall take effect and be in force from and after its passage, and may at any time be altered, amended or repeated by the Legislature.

Approved March 4, 1864.

The Regents above named were employed, during the following four years, in carrying out the provisions of this act. On the 23d day of December, 1867, this Board made their final report to the Legislature, in which it appeared that they had settled all of the indebtedness of the University save about \$6,000, and had left of the land entrusted to them for the purpose of settling the debts of the University, eight hundred and ninety acres. Beside this they had repaired the building on the Campus and organized a course of instruction which had been attended by about fifty students during the year.

The work of this Board having been satisfactorily completed and the purpose for which it was created accomplished, the following act was passed, reorganizing the University:

THE RE-ORGANIZATION, 1868.

AN ACT to reorganize and provide for the Government and Regulation of the University of Minnesota, and to establish an Agricultural College therein.

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

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

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

SEC. 2. There shall be established in the University of Minnesota, five or more colleges or departments, that is to say, a College of Science, Literature and the Arts, a College of Agriculture, including "military tactics," a College of the Mechanic Arts, a College or Department of Law, and also a College or Department of Medicine. The department of Elementary Instruction may be dispensed with at such 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-officiis*, and the remaining seven members thereof shall be appointed by the Governor, by and with the advice and consent of the Senate. Whenever a vacancy occurs therein, for any cause, the same shall be filled for the unexpired term in the same manner. Of the Regents thus appointed, two shall be commissioned and hold their offices for one year, and two for two years, and three for three years. Their successors shall be appointed in like manner, and shall hold their offices for the full term of three years from the first Wednesday of March succeeding their appointments, and until their successors are appointed and qualified. The President of the University shall have the same rights, powers and privileges as other members, except the right of voting, and he shall be, *ex officio*, the corresponding secretary of the Board of Regents.

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

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

SEC. 6. The Board of Regents shall have the power, and it shall be their duty, to enact by-laws for the government of the University of Minnesota in all its departments; to elect a President of the University, and, in their discretion, a Vice-President, and the requisite number of professors, instructors, officers and employes, and to fix their salaries, [and] also the term of office of each, and to determine the moral and educational qualifications of applicants for admission, and in the appointment of professors, instructors and other officers, and assistants of the University, and in prescribing the studies and exercises thereof; and in all the management and government thereof, no partiality or preference shall be shown to one sect or religious denomination over another, nor shall anything sectarian be taught therein. And the Board of Regents shall have power to regulate the courses of instruction, and [to] prescribe the books and authorities to be used, and also to confer such degrees and grant such diplomas as is usual, in their discretion. It shall be the duty of the Recording Secretary to record all the proceedings of the Board, and carefully preserve all its books and papers; and before entering upon the duties of his office he shall take and subscribe an oath to perform his duties honestly and faithfully as such officer. It shall be the duty of the Treasurer to keep an exact and faithful account of all moneys, bills receivable and evidence of indebtedness, and all securities of property received or paid out by him, and before entering upon his duties shall take and subscribe an oath that he will well and faithfully perform the duties of Treasurer thereof. It shall be the duty of the President to preside at the meetings of the Board; and in case of his inability to preside, the Board may appoint a President *pro tempore*.

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

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

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

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

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

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

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

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

By virtue of the above act, the land which had been appropriated to the Agricultural College, in McLeod county, became vested in the Board of Regents of the University.

By act of the Legislature of 1858, an Agricultural College was established in McLeod county, on "so much of section 16, township 115, range 28, as may be purchased by the State of Minnesota, and on all lands adjacent that may be donated," the donation to be not less than three hundred and twenty acres, and the same placed under control of the officers of the State Agricultural Society. Subsequently three hundred and twenty acres, adjacent to section 16, was donated to the State by the citizens of McLeod County for that purpose. By an act of the Legislature, March 12, 1861, all the swamp lands in McLeod County were reserved and set aside for the use and benefit of the Agricultural College. By the act of Congress, July 2, 1862, donating public lands to such States and Territories as should establish and provide Agricultural Colleges within five years, from that date, the State of Minnesota was entitled to one hundred and twenty thousand acres of land. The Legislature accepted this grant for the Agricultural College and the

lands were selected and certified to the State. Some of the lands were entered at double the minimum price and so the amount selected and certified was reduced somewhat below one hundred thousand acres. No experiments were ever carried on, nor was any attempt made to give any instruction, by the Agricultural Board who had charge of this College.

The act of Congress, referred to above, is herewith given, in full:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

That there be granted to the several States, for the purposes hereinafter mentioned, an amount of public land, to be apportioned to each State a quantity equal to thirty thousand acres for each Senator and Representative in Congress to which the States are respectively entitled by the apportionment under the census of eighteen hundred and sixty: *Provided* that no mineral lands shall be selected or purchased under the provisions of this act.

SEC. 2. *And be it further enacted*, That the land aforesaid, after being surveyed, shall be apportioned to the several States in sections or subdivisions of sections, not less than one-quarter of a section; and whenever there are public lands in a state subject to sale at private entry at one dollar and twenty-five cents per acre, the quantity to which said State shall be entitled shall be selected from such lands within the limits of such State, and the Secretary of the Interior is hereby directed to issue to each of the States in which there is not the quantity of public lands subject to sale at private entry at one dollar and twenty-five cents per acre, to which said State may be entitled under the provisions of this act, land script to the amount in acres for the deficiency of its distributive share: said script to be sold by said States, and the proceeds thereof applied to the uses and purposes prescribed in this act, and for no other use or purpose whatever: *Provided*, That in no case shall any State to which said land script may thus be issued be allowed to locate the same within the limits of any other State, or of any Territory of the United States, but their assignees may thus locate said land script upon any of the unappropriated land of the United States subject to the sale at private entry at one dollar and twenty-five cents, or less, per acre: *And provided further*, That not more than one million acres shall be located by such assignees in any one of the States: *And provided further*, That no such location shall be made before one year from the passage of this act.

SEC. 3. *And be it further enacted*, That all the expenses of management, superintendence, and taxes from the date of selection of said lands, previous to their sales, and all expenses incurred in the management and disbursement of the moneys which may be received therefrom, shall be paid by the States to which they may belong, out of the treasury of said States, so that the entire proceeds of the sale of said lands shall be applied without any diminution whatever to the purposes hereinafter mentioned.

SEC. 4. *And be it further enacted*, That all moneys derived from the sale of the lands aforesaid by the States to which the lands are apportioned, and from the sale of land script hereinafter provided for, shall be invested in stocks of the United States, or of the States, or some other safe stocks, yielding not less than five per centum upon the par value of said stocks; and that the money so invested shall constitute a perpetual fund, the capital of which shall remain forever undiminished (except so far as may be provided in section fifth of this act), and the interest of which shall be inviolably appropriated, by each State which may take and claim the benefit of this act, to the endowment, support and maintenance of at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the Legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.

SEC. 5. *And be it further enacted*, That the grant of land and land script hereby authorized shall be made on the following conditions, to which, as well as to the provisions hereinbefore contained, the previous assent of the several States shall be signified by legislative acts:

First. If any portion of the fund invested as provided by the foregoing section, or any portion of the interest thereon, shall, by any action or contingency, be diminished or lost, it shall be replaced by the State to which it belongs, so that the capital of the fund shall remain forever undiminished; and the annual interest shall be regularly applied, without diminution, to the purposes mentioned in the fourth section of this act, except that a sum not exceeding ten per centum upon the amount received by any State, under the provisions of this act, may be expended for the purchase of lands for sites or experimental farms whenever authorized by the respective Legislatures of said States.

Second. No portion of said fund nor the interest thereon, shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings.

Third. Any State which may take and claim the benefit of the provisions of this act, shall provide, within five years, at least, not less than one college, as described in the fourth section of this act, or the grant to such State shall cease, and said State shall be bound to pay the United States the amount received of any lands previously sold, and that the title to purchasers under the State shall be void.

Fourth. An annual report shall be made regarding the progress of each college, recording any improvements and experiments made, with their cost and results, and such other matters, including State industrial and economical statistics, as may be supposed useful; one copy of which shall be transmitted by mail free, by each to all other colleges which may be endowed under the provisions of this act, and also one copy to the Secretary of the Interior.

Fifth. When lands shall be selected from those that have been raised to double the minimum price, in consequence of railroad grants, they shall be computed to the State at the maximum price, and the number of acres proportionately diminished.

Sixth. No State while in condition of rebellion or insurrection against the government of the United States shall be entitled to the benefit of this act.

Seventh. No State shall be entitled to the benefits of this act unless it shall express its acceptance thereof by its Legislature within two years from the date of its approval by the President.

SEC. 6. And be it further enacted. That land script issued under the provisions of this act shall not be subject to location until after the first day of January, one thousand eight hundred and sixty three.

SEC. 7. And be it further enacted. That the land officers shall receive the same fees for locating land script issued under the provisions of this act as is now allowed for the location of military bounty land warrants under existing laws; *Provided,* Their maximum compensation shall not be thereby increased.

SEC. 8. And be it further enacted. That the Governors of the several States to which script shall be issued under this act, shall be required to report annually to Congress all sales made of such script until the whole shall be disposed of, the amount received for the same, and what appropriation has been made of the proceeds.

THE ACTUAL BEGINNING.

The University dates its actual beginning from the act of February 18th, 1868. One of the first acts of the Regents under this new organization was the purchase of a farm for the Agricultural College. In September, 1868, a purchase of ninety-six acres was made. This land was situated southeast of the campus and only one-fourth of a mile from it.

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

The year of 1869 marks the organization of the University proper; the election of William W. Fowell as President; the selection of a faculty; the beginning of University instruction (September 15th, 1869,) and the enlargement of the University farm by the purchase of thirty acres of land. There were in attendance, during this year, thirteen students in the Collegiate Department and two hundred and seventeen in the Latin or Preparatory School.

ORGANIZATION OF DEPARTMENTS.

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

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

The College of Agriculture and the Mechanic Arts was organized in two divisions, (1) that of Agriculture, (2) that of Mechanic Arts.

The Department of Elementary Instruction was represented by the Collegiate Department and the so called Latin School, introductory to it.

By an Act of the Legislature of 1872, the President of the University was constituted an *ex-officio* member of the Board of Regents. The Regents were also empowered to dispense with the Elementary Department of the University at their discretion.

THE GEOLOGICAL AND NATURAL HISTORY SURVEY.

The same Legislature, March 1, 1872, also passed the following act providing for a Geological and Natural History Survey, which was entrusted to the Regents of the University:

Be it enacted by the Legislature of the State of Minnesota:

SECTION 1. It shall be the duty of the Board of Regents of the University of Minnesota to cause to be begun as soon as may be practicable, and to carry on a thorough Geological and Natural History Survey of the State.

SEC. 2. The Geological Survey shall be carried on with a view to a complete account of the Mineral Kingdom as represented in the State, including the number, order, dip and magnitude of the several Geological strata, their richness in ores, corals, clays, peats, salines and mineral waters, marls, cements, building stones and other useful materials, the value of said substances for economical purposes and their accessibility; also an accurate chemical analysis of the various rocks, soils, ores, clays, peats, marls and other mineral substances, of which complete and exact records shall be made.

SEC. 3. The Natural History Survey shall include, first, an examination of the vegetable productions of the State, embracing all trees, shrubs, herbs and grasses native or naturalized in the State; second, a complete and scientific account of the Animal Kingdom as properly represented in the State, including all mammalia, fishes, reptiles, birds and insects.

SEC. 4. The said surveys and examinations shall be made in the manner and order following: First, the Geological survey proper, together with the necessary and applied mineralogical investigations, all of which shall be undertaken as soon as may be practicable, and be carried forward with such expedition as may be consistent with economy and thoroughness; second, the botanical examination; third, zoological investigations, *provided*, however, that whenever the said Board of Regents may find it most economical to prosecute different portions of the surveys in conjunction, or that the public interest demands it, they may in their discretion, depart from the above prescribed order. And in the employment of assistants in the said surveys the said Board of Regents shall at all times give the preference to the students and graduates of the University of Minnesota, *provided* the same be well qualified for the duties.

SEC. 5. The said Board of Regents shall also cause to be collected and tabulated such meteorological statistics as may be needed to account for the varieties of climate in the different parts of the State; also cause to be ascertained [by] barometrical observation or other appropriate means the relation, elevation and depression of the different parts of the State; and also on or before the completion of the said surveys, to cause to be compiled from such actual surveys and measurements as may be necessary, an accurate map of the State, which map, when approved by the Governor, shall be the official map of the State.

SEC. 6. It shall be the duty of said Board of Regents to cause proper specimens, skillfully prepared, secured and labelled of all rocks, soils, ores, coals, fossils, cements, building stones, plants, woods, skins and skeletons of animals, birds, insects and fishes, and other mineral, vegetable and animal substances and organisms discovered or examined in the course of said surveys, to be preserved for public inspection free of cost, in the University of Minnesota, in rooms convenient of access and properly warmed, lighted, ventilated and furnished, and in charge of a proper scientific curator; and they shall also, whenever the same may be practicable, cause duplicates in reasonable numbers and quantities of the above named specimens, to be collected and preserved for the purpose of exchanges with other State Universities and other scientific institutions, of which latter the Smithsonian Institute at Washington shall have the preference.

SEC. 7. Said Board of Regents shall cause a Geological map of the State to be made, as soon as may be practicable, upon which, by colors and other appropriate means and devices, the various Geological formations shall be presented.

SEC. 8. It shall be the duty of the said Board of Regents, through their President, to make, on or before the second Tuesday in December in each and every year, a report showing the progress of the said surveys, accompanied by such maps, drawings and specifications as may be necessary and proper to exemplify the same to the Governor, who shall lay the same before the Legislature; and the said Board of Regents, upon the completion of any

separate portion of the said surveys, to cause to be prepared a memoir or final report, which shall embody in a convenient manner all useful and important information accumulated in the course of the investigation of the particular department or portion, which report or memoir shall likewise be communicated through the Governor to the Legislature.

SEC. 9. To carry out the provisions of this act the sum of one thousand dollars per annum is hereby appropriated, to be drawn and expended by the [said] Board of Regents of the University of Minnesota.

SEC. 10. This act shall take effect and be in force from and after its approval.
Approved March 1, 1872.

CAMPUS AND BUILDINGS.

The Legislature of 1873 appropriated \$50,000 for the erection of buildings on the Campus. Plans were immediately secured for main part of the structure which is now known as the "main" building, and also for the Agricultural building which was destroyed by fire some years ago. These buildings were completed ready for occupation in the fall of 1876.

The year 1873 was signalized by the graduation of the first class, which consisted of two young men who had completed the classical course.

Upon recommendation of the Board of Regents the Legislature made appropriations for the enlargement of the Campus as follows: In 1877, \$18,000; in 1879, \$20,000; in 1881, \$30,000. These appropriations enabled the Regents to buy about twenty acres of land, so that the Campus now comprises about forty-five acres.

Upon recommendation of the State Horticultural Society the Legislature appropriated, March 8, 1878, the sum of two thousand dollars for the purchase of one hundred and sixteen acres of land at Lake Minnetonka as an experimental farm for fruit culture. The act making this appropriation also provided that this farm should be under the control of the Board of Regents.

Upon application of the Board of Regents the Legislature of 1881 passed an act authorizing the sale of the old Experimental Farm and the investment of the proceeds in a new farm more suited to the carrying on of experiments. A sale was effected and the purchase made, netting the University a considerable sum besides giving it a farm better suited to its needs.

THE EXPERIMENT STATION.

The following act providing for an Agricultural Experiment Station was passed by the Legislature of 1885:

"SECTION 1. It shall be the duty of the Board of Regents of the University of Minnesota, as soon as practicable after the passage of this act, to establish at said University an Agricultural Experiment Station for the purpose of promoting agriculture in its various branches by scientific investigation and experiments; which station shall be under the control and supervision of the said Board of Regents."

SEC. 2. This act shall take effect and be in force from and after its passage.
Approved March 7, 1885.

THE HATCH BILL.

In the year 1887 the Congress of the United States passed an act, popularly known as the "Hatch Bill," of which the following are the essential sections:

AN ACT to establish Agricultural Experiment Stations in connection with the colleges established in the several States under the provisions of an act approved July second, eighteen hundred and sixty-two, and of the acts supplementary thereto.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That in order to aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and application of agricultural science, there shall be established, under the direction of the college or colleges or agricultural department of colleges in each State or Territory established, or which may hereafter be established, in accordance with the provisions of an act approved July second, eighteen hundred and sixty-two, entitled "An act donating public lands to the several States and Territories which may provide colleges for the benefit of agriculture and the mechanic arts," or any of the supplements to the said act, a department to be known and designated as an "Agricultural Experiment Station." *Provided,* That in any State or Territory in which two such colleges have been or may be so established the appropriation hereinafter made to such State or Territory shall be equally divided between such colleges, unless the Legislature of such State or Territory shall otherwise direct.

SEC. 3. That it shall be the object and duty of said Experiment Stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with the remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and waters; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses and forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic question involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable, having due regard to the varying conditions and needs of the respective States and Territories.

SEC. 4. That bulletins or reports of progress shall be published at said stations at least once in three months, one copy of which shall be sent to each newspaper in the States or Territories in which they are respectively located, and to such individuals actually engaged in farming as may request the same, and as far as the means of the station will permit. Such bulletins or reports and the annual reports of said stations shall be transmitted in the mails of the United States free of charge for postage, under such regulations as the Postmaster General may from time to time prescribe.

SEC. 5. That for the purpose of paying the necessary expenses of conducting investigations and experiments and printing and distributing the results as hereinbefore described, the sum of fifteen thousand dollars per annum is hereby appropriated to each state, to be specially provided for by Congress in the appropriations from year to year, and to each Territory entitled under the provisions of section eight of this act, out of any money in the Treasury proceeding from the sales of public lands, to be paid in equal quarterly payments, on the first day in January, April, July and October in each year, to the treasurer or other officer duly appointed by the governing boards of such colleges to receive the same, the first payment to be made on the first day of October, eighteen hundred and eighty-seven. *Provided, however,* That out of the first annual appropriation so received by any station an amount not exceeding one-fifth may be expended in the erection, enlargement, or repair of a building or buildings necessary for carrying on the work of such station; and thereafter an amount not exceeding five per centum of such annual appropriation may be so expended.

Approved March 2, 1887.

It will be noted that the act of Congress of 1862 was designed to promote Agricultural *Education*, while that of 1887 provides for Agricultural *Investigation*.

THE MORRILL BILL.

The following act, known as the "Morrill Bill," was approved August 30th, 1890:

AN ACT to apply a portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts established under the provisions of an act of Congress approved July second, eighteen hundred and sixty-two.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That there shall be, and hereby is, annually appropriated, out of any money in the Treasury not otherwise appropriated, arising from the sales of public lands, to be paid as hereinafter provided, to each State and Territory for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established, or which may be hereafter established, in accordance with an act of Congress approved July second, eighteen hundred and sixty-two, the sum of fifteen thousand dollars for the year ending June thirtieth, eighteen hundred and ninety, and an annual increase of the amount of such appropriation thereafter for ten years by an additional sum of one thousand dollars over the preceding year, and the annual amount to be paid thereafter to each State and Territory shall be twenty-five thousand dollars to be applied only to instruction in agriculture, the mechanic arts, the English language and the various branches of mathematical, physical, natural and economic science, with special reference to their applications in the industries of life, and to the facilities for such instruction: *Provided*, That no money shall be paid out under this act to any State or Territory for the support and maintenance of a college where a distinction of race or color is made in the admission of students, but the establishment and maintenance of such colleges separately for white and colored students shall be held to be a compliance with the provisions of this act if the funds received in such State or Territory be equitably divided as hereinafter set forth: *Provided*, That in any state in which there has been one college established in pursuance of the act of July second, eighteen hundred and sixty-two, and also in which an educational institution of like character has been established, or may be hereafter established, and is now aided by such State from its own revenue, for the education of colored students in agriculture and the mechanic arts, however named or styled, or whether or not it has received money heretofore under the act to which this act is an amendment, the Legislature of such State may propose and report to the Secretary of the Interior a just and equitable division of the fund to be received under this act between one college for white students and one institution for colored students established as aforesaid, which shall be divided into two parts and paid accordingly, and thereupon such institution for colored students shall be entitled to the benefits of this act and subject to its provisions, as much as it would have been if it had been included under the act of eighteen hundred and sixty-two, and the fulfillment of the foregoing provisions shall be taken as a compliance with the provision in reference to separate colleges for white and colored students.

SEC. 2. That the sums hereby appropriated to the States and Territories for the further endowment and support of colleges shall be annually paid on or before the thirty-first day of July of each year, by the Secretary of the Treasury, upon the warrant of the Secretary of the Interior, out of the Treasury of the United States, to the State or Territorial treasurer, or to such officer as shall be designated by the laws of such State or Territory to receive the same, who shall, upon the order of the trustees of the college, or the institution for colored students, immediately pay over said sums to the treasurers of the respective colleges or other institutions entitled to receive the same, and such treasurers shall be required to report to the Secretary of Agriculture and to the Secretary of the Interior on or before the first day of September of each year, a detailed statement of the amount so received and of its disbursement. The grants of moneys authorized by this act are made subject to the legislative assent of the several States and Territories to the purpose of said grants: *Provided*, That payments of such installments of the appropriation herein made as shall become due to any State before the adjournment of the regular session of legislature meeting next after the passage of this act shall be made upon the assent of the Governor thereof, duly certified to the Secretary of the Treasury.

SEC. 3. That if any portion of the moneys received by the designated officer of the State or Territory for the further and more complete endowment, support, and maintenance of colleges, or of institutions for colored students, as provided in this act, shall by any act or contingency, be diminished or lost, or be misapplied, it shall be replaced by the State or Territory to which it belongs, and until so replaced no subsequent appropriations shall be apportioned or paid to such State or Territory; and no portion of said moneys shall be applied, directly or indirectly, under any pretexts whatever, to the purchase, erection, preservation, or repair of any building or buildings. An annual report by the President of each of said colleges shall be made to the Secretary of Agriculture, as well as to the Secretary of the Interior, regarding the condition and progress of each college, including statistical information in relation to its receipts and expenditures, its library, the number of its students and professors, and also as to any improvements and experiments made under the direction of any experiment stations attached to said colleges, with their costs and results, and such other industrial and economical statistics as may be regarded as useful, one copy of which shall be transmitted by mail free to all other colleges further endowed under this act.

SEC. 4. That on or before the first day of July in each year, after the passage of this act, the Secretary of the Interior shall ascertain and certify to the Secretary of the Treasury as to each State and Territory whether it is entitled to receive its share of the annual appropriation for colleges, or of institutions for colored students, under this act, and the amount which thereupon each is entitled, respectively to receive. If the Secretary of the Interior shall withhold a certificate from any State or Territory of its appropriation the facts and reasons therefor shall be reported to the President, and the amount involved shall be kept separate in the Treasury until the close of the next Congress, in order that the State or Territory may, if it should so desire, appeal to Congress from the determination of the Secretary of the Interior. If the next Congress shall not direct such sum to be paid it shall be

covered into the Treasury. And the Secretary of the Interior is hereby charged with the proper administration of this law.

SEC. 5. That the Secretary of the Interior shall annually report to Congress the disbursements which have been made in all the States and Territories, and also whether the appropriation of any State or Territory has been withheld, and if so the reasons therefor.

SEC. 6. Congress may at any time amend, suspend or repeal any or all of the provisions of this act.

Approved, August 30, 1890.

APPROPRIATIONS OF MONEY.

The University receives from the State, by direct appropriation sixty-five thousand dollars annually, provided for in the following acts:

Be it enacted by the Legislature of the State of Minnesota:

That the sum of forty thousand dollars, or so much thereof as may be necessary, be and the same hereby is appropriated in addition to the incomes from the permanent University fund, from the general revenue fund, for the support of the State University for the fiscal year ending July thirty-one, one thousand eight hundred and eighty-one, and annually thereafter.

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

Approved March 8, 1887.

Be it enacted by the Legislature of the State of Minnesota:

For additional allowance for the general expenses for the support of the State University, twenty-five thousand dollars.

Approved April 24, 1889.

The Legislature of 1893 passed an act giving to the University a State tax of three-twentieths of a mill. This act goes into effect on and after the first day of August, 1894, and will take the place of the two appropriation acts as given above.

GOVERNMENT BY BOARD OF REGENTS.

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

The General Faculty of the University has control of all matters pertaining to the department of Elementary Instruction, and has power to direct and control all the general interests pertaining to the internal affairs of the University (subject to the revision of the Board of Regents, to whom the action of the Faculty upon all important matters shall from time to time be submitted), except so far as said interests may fall under the supervision of the Special Faculties.

The Special Faculties of the University have control and direction of the interests of their respective colleges or departments, except such matters as shall be relegated to the General Faculty by the by-laws or by the Board of Regents.

In the respective faculties a majority of the votes constitutes a quo-

rum, and upon call of any member the ayes and noes must be counted and entered upon the records.

The President of the University is the presiding officer of all the faculties, but in his absence the senior professor present presides.

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

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

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

Assistant Professors and other Instructors are responsible for the order and progress of their respective classes.

The order of the seniority of the professors and assistant professors is determined by the dates of their first elections.

Such general devotional exercises are held in the University as the General Faculty directs.

The punishments used in the University are warnings or reprimands in private, in the presence of the offender's class or section, or in public; suspension, indefinitely or for a stated time, by the President, or by

order of a faculty; expulsion by vote of the General Faculty; and reduction to the ranks, of officers and non-commissioned officers in the military corps. In case of suspension the student has the right of appeal to the General Faculty within twenty days after notice of suspension.

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The HON. CUSHMAN K. DAVIS, M. A., ST. PAUL,	1898
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The Governor of the State.	
The HON. W. W. PENDERGAST, M. A., HUTCHINSON.	<i>Ex-Officio</i>
The State Superintendent of Public Instruction.	
CYRUS NORTHROP, LL. D., MINNEAPOLIS,	<i>Ex-Officio</i>
The President of the University.	

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 The HON. DAVID L. KIEHLE, *Recording Secretary*.
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 HENRY F. NACHTRIEB, B. S., *Zoologist of the Geological and Natural History Survey.*
 CONWAY MACMILLAN, M. A., *Botanist of the Geological and Natural History Survey.*
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Committee on Quarterly Bulletin: Professors MacMillan, MacLean and Folwell.

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Zoological Survey—John A. Crecelius, Clark Barrows, Francis B. Sumner, Charles Topping, August Bothe, George D. Head, B. S., Frank Manson, Clarence L. Whitman, Dr. Thomas S. Roberts, Ornithologist of the Survey.
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HANNAH R. SEWELL, M. A., Assistant in Political Science and Rhetoric.	St. Anthony Park
H. L. STAPLES, A. M., M. D., Instructor in Medical and Pharmaceutical Latin.	Minneapolis
CHARLES ERDMAN, M. D., Demonstrator of Anatomy.	Minneapolis
FREDERICK B. KREMER, D. D. S., Clinical Instructor in Prosthetic Dentistry and Crown and Bridge Work.	Minneapolis
J. D. JEWETT, D. D. S., Lecturer on Anæsthesia and Chief of the Anæsthetic Clinic.	Minneapolis
FORREST HOY ORTON, D. D. S., Instructor in Cleft-Palate Appliances.	St. Paul
THOMAS B. HARTZELL, D. M. D., Instructor in Comparative Dental Anatomy and Physical Diagnosis and Assistant in the Oral Surgery Clinic.	Minneapolis
GEORGE S. MONSON, D. M. D., Instructor in Prosthetic Technics and Orthodontia.	Minneapolis
OSCAR A. WEISS, D. M. D., Assistant in Operative Technics.	Minneapolis
CAROLINE B. EDGAR, D. M. D., Assistant in Operative Clinic.	Minneapolis
MARY V. HARTZELL, D. M. D., Assistant in Operative Clinic.	Minneapolis

UNIVERSITY SCHOLARS.

GIVING INSTRUCTION AND ASSISTING IN LABORATORIES.

In Histology—George D. Head, B. S.

In Botany—Caswell A. Ballard, W. D. Frost, B. S., A. P. Anderson.

The University.

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

THE GRADUATE DEPARTMENT.

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

THE COLLEGE OF ENGINEERING, METALLURGY AND THE MECHANIC ARTS.

THE COLLEGE OF AGRICULTURE.

THE DEPARTMENT OF LAW.

THE DEPARTMENT OF MEDICINE, composed of Colleges as follows:

The College of Medicine and Surgery.

The College of Homeopathic Medicine and Surgery.

The College of Dentistry.

The College of Pharmacy.

The Regents of the University have also entrusted to their charge

THE EXPERIMENT STATION;

THE GEOLOGICAL AND NATURAL HISTORY SURVEY.

In the COLLEGE OF SCIENCE, LITERATURE AND THE ARTS there are three courses of study, the Classical, Scientific and Literary. The Classical course offers for its leading studies the Greek and Latin languages; the Scientific course, the natural and physical sciences; the Literary course, the modern languages. The regular courses are of four years' duration. The completion of the courses lead respectively to the degrees: Bachelor of Arts, Bachelor of Science and Bachelor of Literature.

THE COLLEGE OF ENGINEERING, METALLURGY AND THE MECHANIC ARTS offers courses of study of four years each, in Civil, Mechanical, Electrical Engineering; Mining, Chemistry, and Metallurgy, leading to the Bachelor's degrees in Civil, Mechanical, Electrical Engineering; Mining, Chemistry and Metallurgy.

THE SCHOOL OF DESIGN offers a three years' course in industrial art, embracing historic ornament and practical decoration.

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

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

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

THE COLLEGE OF MEDICINE AND SURGERY and THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY each offer a three years' course of study, of eight months each; upon completion of the prescribed course the degree of Doctor of Medicine is conferred.

THE COLLEGE OF DENTISTRY offers a three years' course of study of eight months each; upon completion of the prescribed course the degree of Doctor of Dental Medicine is conferred.

THE COLLEGE OF PHARMACY offers a two years' course of study, leading to the degree of Graduate in Pharmacy.

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

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

Material Equipment.

LANDS.

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

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

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

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

LIBRARIES.

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

MINNEAPOLIS.

The University Library	30,000 volumes
The Public Library	50,000 volumes
Minneapolis Bar Association Library	9,000 volumes
Guaranty Loan Law Library	9,000 volumes
N. Y. Life Insurance Law Library	8,000 volumes

ST. PAUL.

State Historical Library	53,000 volumes
State Library	20,000 volumes
Public Library	32,000 volumes

Total 211,000 volumes

The General Library of the University contains about thirty thousand bound volumes, beside many thousand volumes of pamphlets, magazines, reports, etc. About one hundred and twenty periodicals

are received regularly by the library, not inclusive of technical magazines and newspapers in English and other languages.

The library is open to students and the public from 8 a.m. to 9 p.m. every day of the University year, except Sundays and legal holidays. Books may be borrowed for home reading, to be kept seventeen days. Reference works and other rare and costly volumes are not allowed to be taken from the library, but may be consulted in the reading room.

Beside the General Library of the University, there are several special libraries, consisting mainly of books of reference and current periodicals relating to technical subjects in connection with several of the Departments in Engineering, Botany, Animal Biology, Law and Medicine.

The Law Library contains those English and American reports most frequently cited, digests, dictionaries, and a full and excellent selection of standard text books. Additions are being constantly made.

Further facilities are afforded the department by the generous action of the Bar Association of Minneapolis in granting to the students the free use of its extensive and ample library located in Temple Court. It contains all the American reports, state and national, and also the English text books and reports so necessary for the student in his study of fundamental principles of jurisprudence.

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

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

In the same building are to be found the Museum of the Minnesota Academy of Natural Sciences; the Art School of the Minneapolis Society of Fine Arts; the Art Gallery, containing many masterpieces of painting and a large number of casts from antique sculpture.

THE MUSEUMS.

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

(a) In Geology and Mineralogy: the Kunz collection of minerals purchased of Mr. George F. Kunz; several suites of crystalline rocks secured from various sources; the Ward collection of casts, contributed in part by citizens of Minneapolis; collections of the crystalline rocks

and economic products of Minnesota gathered by the Geological Survey of the State; a series of the paleozoic fossils of Minnesota and Wisconsin, gathered by the department of geology and mineralogy; a series of thin sections of typical rocks and minerals largely representing Minnesota localities; purchased material comprising crystals, economic minerals and the crystalline rocks.

(b) In Zoology: a United States Fish Commission collection; all the material collected by the State Zoologist; a collection of mounted Minnesota birds representing about one-half 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 molluscan shells, corals and other foreign material obtained by purchase, exchange and presentation.

Recently Dr. Thos. S. Roberts, of Minneapolis, has presented his collection of several thousand bird skins to the University to form the nucleus of a collection of special interest to all those interested in the Ornithology of the Northwest. The fishes of the State are also well represented. There is a good collection of the leeches of Minnesota. 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 90,000 specimens, and comprising the series of plants collected by the State Botanist; an alcoholic collection of material for dissection; a collection of woods of Minnesota; a limited series of Carboniferous and Cretaceous fossil plants including the Lesquereaux collection from the Minnesota River localities.

(d) The Museum of Technology: A cabinet of specimens illustrating the products and processes of applied chemistry is being collected by the professor of chemistry, as opportunity offers. The collection embraces fuel, ores, furnace products, textile materials, both raw and manufactured; dye-woods and other materials used in dyeing; specimens illustrating the bleaching and printing of cotton, linen and woolen goods, earthenware, pottery, etc.

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

and manuscripts; specimens of inscriptions and implements used in writing and in the arts.

(f) In English: A collection of illustrative material has been begun by the purchase made by the head of the department in his recent visit to Europe. A few fac-similes of manuscripts, plates that may serve for the purpose of archaeological instruction, publications of texts, reprints of black-letter books and of original editions, photographs and portraits have been gathered.

LABORATORIES.

ANIMAL BIOLOGY.

This department occupies rooms in Pillsbury Hall as follows: On the upper floor of the north wing: general laboratory, 47x46 feet; laboratory library, 8x11 feet; photographic rooms, 20x8 feet; apparatus room, 21x9 feet; preparation room, 20x13 feet; lecture room, 35x32 feet; professor's office, 12x11 feet. In the basement: store room 14x24 feet, and an aquarium room, 13x20 feet. The total floor space of these rooms is in round numbers, 4,700 square feet.

The general laboratory has table space around the wall for forty-two students. Each "table" is provided with a double wall locker, and of these thirty-seven are equipped with microscopes and all other necessary apparatus. Besides this table space there are tables in the middle of the room for microscopic and experimental work that will easily accommodate ten students. More secluded quarters in special rooms can be offered to three or four advanced students.

The department is equipped with thirty-one Zeiss microscopes, five Reichert microscopes, and one large Leitz microscope, dissecting microscopes, several camera lucidas, a large Zeiss micro-photographic outfit, various microscope accessories, four microtomes and accessories, Ziegler wax models, Auzoux papier mache models, skeletons from Ward and Fric, including the beautiful cartilaginous skeletons of Fric's series, several hundred of the Naples Zoological Station preparations, two Ludwig kymographs, three moist chambers, four Du Bois Reymond inductoriums, Kuhnes artificial eye, a phakoscope and a number of other pieces of apparatus and models pertaining to the eye and the ear, a Ludwig's stromuhr, a Fick's spring manometer, a Thomson's astatic galvanometer, an improved spring myograph, chronographs, Kronecker's interrupter, and a number of other pieces of apparatus in addition to a full line of glassware, reagents and dissecting instruments.

The illustrative material, including charts, is being added to continually.

The department library, including the professor's series of periodicals and books, contains about 1,500 volumes. Among the complete sets of periodicals may be mentioned the *Naples Mittheilungen*, *Zoologischer Anzeiger*, *Zoologischer Jahresbericht*, *Zoologische Jahrbucher*, *Anatomischer Anzeiger*, *Biologisches Centralblatt*, *Journal of Morphology*, *Archives de Biologie*, *Hoffman and Schwalbe's Jahresberichte*, *La Cellule*, *Archives Italiennes de Biologie*, *Archives fur Anatomie und Entwicklungsgeschichte*, *Tablettes Zoologiques*, *Leuckart's Bibliotheca Zoologica*, *Insect Life*, *Centralblatt fur Bakteriologie and Parasitenkunde*, and *Zeitschrift fur Wissenschaftliche Mikroskopie*.

BOTANY.

ROOMS. The Department of Botany occupies a suite of eight rooms in Pillsbury Hall, viz: (1) a lecture room 34x38 feet; (2) a herbarium and seminar room 33x18 feet; (3) a student's general laboratory 33x52 feet; (4) a physiological laboratory 33x18 feet; (5) a special laboratory and office 34x21 feet; a dark room 8x8 feet and a work room 21x34 feet, furnishing in all a floor space of 5,688 feet. In addition there is a plant house 20x40 feet.

FURNITURE. The furniture is antique oak throughout and especially designed for the rooms. The lecture room contains seats for seventy. The lecture desk is 18x3 feet with drawers, cupboards and pneumatic trough. Apparatus for displaying charts, models and lantern projections is provided. The herbarium and seminar room contains seventy-two oak plant cases, modeled somewhat after those in the British museum, together with large seminar tables, smaller work tables, book shelves, etc. The collection of plants number somewhat over 90,000. The general laboratory is furnished with slate-topped, iron-framed, truncated microscope tables, a slate-topped chemical desk to accommodate twenty students, apparatus cases, wall lockers, aquaria, etc. The physiological laboratory contains truncated and wall slate-topped microscope tables, evaporating hood, reagent and apparatus cases and wall-lockers. The special laboratory is provided with slate-topped wall tables, book shelves, periodical racks, desks, library tables and card catalogues. The work room is fitted with preparation apparatus, shelving, wall tables, pigeon hole cases and a safety vault. All the rooms but the museum are piped for gas and water.

SCIENTIFIC EQUIPMENT. The library contains about 1,500 volumes carefully selected in all lines of botanical investigation. The department receives regularly about sixty special periodicals and has full sets of several—as for example, *Botanisches Zeitung*, *Pringsheim's Jahrbuch*, *Linnaea*, *Flora*, *Cohn's Beitrage*, *Annales Jardin Builenzorg*, *Ann. Hort.*

Petropolitani, Annals of Botany, Revue Mycologique, Hedwigia, Grevillea, Revue Generale de Botanique, Berichte der Deutschen Botanischen Gesellschaft and many others. A set of the *Annales des Sciences Naturelles, Botanique* is accessible at the Public Library delivery station in the academic building. The herbarium is especially full in North American metaspermic plants and fungi. It subscribes for most of the leading *exsiccati*. The general laboratory is fitted with a full stock of best imported glassware, Leitz microscopes giving 50 to 600 diameters, 17 Beck microscopes giving from 70 to 480 diameters, four Bausch and Lomb microscopes giving from 50 to 600 diameters and five Leitz dissecting microscopes. The chemical desk is equipped with necessary glassware and reagents. The physiological laboratory contains glassware, Pfeffer's klinostat, Pfeffer's auxanometer, centrifugal wheels, batteries, mercury baths, Bonnier & Mangin's gasometer, heliostat, Kohl *transpiration-apparat* and other physiological apparatus, together with a full set of Lautenschlager's bacterioscopic and cultivation ovens, sterilizers, water baths, serum inspissators, etc. A Climax water motor furnishes power. The special laboratory contains a Becker balance, microtomes after Jung-Thoma, Minot and Schanze, a large Lietz microscope giving from 24 to 2,500 diameters, accessory apparatus, staining and imbedding apparatus, etc.

The plant house adjoins the steam-heating engine house and contains much carefully selected material for equipment in physiological lines and for anatomical work. It is connected by wire with the physiological laboratory.

CHEMISTRY.

The Chemical Department occupies the west half of the chemical and physical laboratory building. There are in all twenty rooms fitted as laboratories, lecture rooms and store rooms. The second floor consists of a laboratory 36x54, arranged for general chemistry and qualitative analysis, and a general lecture room with amphitheatre seats accommodating over one hundred students. Connected with the lecture room are preparation rooms and a technological collection for lecture work. Directly connected with the laboratory are three smaller rooms, two of which are used as store rooms, the third, a dark room, used for spectroscopic work. The first floor consists of a laboratory 36x54, arranged for general quantitative analysis, directly connected with which are two rooms 18x24, one used as a store room and the other as a library and balance room. There is also on this floor an organic lecture room 24x30, the professor's office and private laboratory and two smaller rooms, one used for water analysis and the other as assistant pro-

fessors' room. The basement consists of seven rooms, three of which are fitted for organic chemistry; a laboratory for gas analysis, connected with which is a good dark room; a laboratory for metallurgy, and two rooms used as general store rooms for chemicals and apparatus.

FURNITURE. The laboratories are all fitted with large laboratory tables and ventilating hoods. Each table is supplied with cupboards and drawers for storing apparatus, with water and gas and with a full set of reagents.

APPARATUS. The department is supplied with the necessary equipment for carrying on the work prescribed in the various courses, including general apparatus and chemicals, lecture apparatus, balances, spectrosopes, microscopes, polarisopes, barometers, charts, models and a supply of platinum, crucibles, dishes, retorts and other necessary apparatus; also with technical apparatus necessary in the various technical courses. Among the most important pieces of apparatus are furnaces for both metallurgy and combustion work, complete sets of Hempel's, Winckler's, Lunge's and Bunte's gas apparatus, a large new model Bunsen's photometer, gasometers and the necessary equipments, oil testers and the necessary apparatus and chemicals for technical organic work. The library is supplied with many of the standard works on general and technical chemistry and all the important periodicals, as for example, Liebig's *Annalen der Chemie*, *Annales de Chimie et de Physique*, *Berichte der Deutschen Chemischen Gesellschaft*, *Journal für Praktische Chemie*, *Jahrsberichte über die Fortschritte der Chemie und Technologie*, *Zeitschrift für Analytische Chemie*, *Zeitschrift für Angewandte Chemie*, *Journal of the Chemical Society*, *Journal of the Society of Chemical Industry*, *Chemical News*, *Chemischer Zeitung*, *American Chemical Journal* and others.

GEOLOGY AND MINERALOGY.

These laboratories occupy rooms on the first floor and basement of Pillsbury Hall. They are large and perfectly lighted, and the lecture room is well furnished for illustration.

The field work carried on under the department is bringing in large quantities of material—the minerals, rocks and fossils of Minnesota and the neighboring states. A system of exchanges is adding largely to the material from more distant localities, and a constantly increasing series of thin sections, both of rocks and fossils, is being prepared. The illustrative material is being arranged into study collections.

These study collections embrace the following:

1. A series of crystals illustrating the six crystal systems.

2. A collection of minerals of the native elements and of the sulphide group.
3. A general collection of the more common minerals.
4. A representative collection of the clastic and crystalline rocks.
5. A collection of Paleozoic fossils, particularly those of our own state and their allies. A good series of charts and other illustrative material accompanies the fossils.

The department possesses a very complete outfit of instruments for the study of physical mineralogy and lithology. The list embraces some of the finest instruments made for optical investigations and axial measurements. Determinative mineralogy is carried on through quantitative determination—assaying of gold, silver, lead, copper, etc.

The rooms occupied by the department measure about six thousand square feet of floor space and are very thoroughly equipped, not only for undergraduate students, but also for the advanced work and investigations of graduate students and specialists.

PHYSICS.

The Department of Physics occupies the east half of the chemical and physical laboratory building, and has nineteen rooms devoted to its use. The most important are: (1) Precision room with masonry piers for the support of sensitive instruments. (2) Cathetometer and pendulum room with masonry piers. (3) Precision room, masonry piers. (4) Engine, dynamo and motor room, with masonry beds for engines and machines. (5) Workshop, carpenter and vise benches, lathe, etc. (6) Batteries and accumulators. (7) General physical laboratory. (8) Apparatus room. (9) General lecture hall with amphitheatre seats, accommodating about one hundred students. (10) Coat room. (11) Recitation room. (12) Electrical laboratory. (13) Photometer room. (14 and 15) Professors' studies. (16) Spectrometer room. (17) Library and reading room.

All rooms in this department are wired for electric light, for time, experimental current and call bells. Gas, water and sinks are in every room. In the attic are a meteorological room and a photograph room, provided with exposed window, skylight, etc. The whole available space for the department, exclusive of halls and stairways and attic, is about thirteen thousand square feet. The department possesses a large collection of instruments for lecture room purposes and practical laboratory work.

Among the important pieces of apparatus are a Societe Genevoise cathetometer, a comparator with quick carriage, standard meter, standard decimeter, a Bianchi dividing engine, a spherometer, Atwood's ma-

chine, apparatus for illustrating all the laws of elementary mechanics, hydraulic press, U. S. signal service barometer, a complete set of thermometers, Breguet metallic thermometer, complete set of hygrometers and hydrometers, five chemical balances, one reversion pendulum, rotating table and attachments, three normal tuning forks, complete Lissajou's apparatus, Helmholtz resonance globes, compound pendulum, manometric flame apparatus with mirror, sonometer, two heliostats, Browning spectroscope, Fresnel's mirrors, and prisms, one Zeiss compound microscope, one Verdi chronograph, Duboscq optical bench and attachments, three spectrometers, two glass diffraction gratings, one Rowland reflecting grating, lantern polariscope, two students' polariscopes, projecting lantern with Clarke electric lamp, one Bunsen photometer, goniometer, Holtz, Toepler-Holtz and frictional electric machines, thirty storage cells, Thompson's quadrant electrometer, forty galvanometers of various types including eight tangent mirror galvanometers, eight potential, four D'Arsonval, three ballistic, three torsion with proper resistance boxes, two Thompson reflecting astatic and others, two electro dynamometers, twelve resistance boxes, three box bridges and testing sets, three standard ohms, six wire bridges, three magnetometers, five silver voltameters, three copper voltameters, eighteen reading telescopes, one standard condenser, six divided condensers. The dynamo room contains a Westinghouse engine, a number of dynamos, including one 300-light alternator, one 150-light Edison, one nine-light Thomson-Houston arc, a variety of motors, arc and incandescent lamps, a number of ammeters and voltameters of different types and full sets of instruments for each machine. The Howard chronometer in the physical laboratory transmits time to the various rooms as well as to the observatory.

OTHER LABORATORIES.

A statement concerning the laboratories of Medical Chemistry, Histology and Embryology, Pharmacy, Physiology and the Mechanical laboratories will be found in connection with the departments concerned.

General Information.

THE UNIVERSITY YEAR.

The University year embraces thirty-eight weeks, beginning on the Tuesday before the first Thursday in September, and is divided into three terms. The first term has thirteen, the second twelve, and the third thirteen weeks. Commencement day comes on the first Thursday in June. See calendar pages four and five.

STUDENTS' SOCIETIES.

RELIGIOUS.

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

The association owns a commodious building, which is used for various purposes; it provides a course of lectures and holds a prayer meeting once a week. The association has a committee to help students to find comfortable rooms and boarding places. Students will be more apt to secure rooms as they desire them if they send word to the committee before coming to the University telling them of the price they wish to pay. The association is meant to be the rallying point of all christians in college. All persons in sympathy with the object of the association are eligible to membership. Address inquiries in regard to boarding places to Mr. C. B. Miller, chairman of the S. C. A. boarding committee, care of the University.

The YOUNG MEN'S CHRISTIAN ASSOCIATION has as its object the promotion of "growth in grace and christian fellowship among its members and aggressive christian work, by and for students." The active membership is composed of members of good standing in evangelical churches; and any young man of good moral character may become an associate member.

On the first Saturday evening of the college year, the association, in union with the Young Women's Christian Association, holds a general reception for all students; on Washington's birthday a reception is given to the freshman class, and various other informal receptions are held during the year.

A *Students' Hand-book*, containing items of information, especially valuable for new students, is issued at the beginning of the college year. A copy will be sent free to any address. Apply to A. C. Weaver, president of the Young Men's Christian Association.

Religious meetings are held every Sunday afternoon; there are also devotional meetings during the week.

THE YOUNG WOMEN'S CHRISTIAN ASSOCIATION.—The object of this association is "the development of christian character in its members, and the prosecution of active christian work, among the young ladies of the University." The active membership consists of students and professors of the University, who are members of an evangelical church; and any other lady students or professors may become associate members.

The association holds regular weekly prayer-meetings; also has two organized Bible training classes, which meet one hour each week for Bible study.

The association unites with the Young Men's Christian Association in giving various receptions and in publishing a *Hand-Book* for new students. Copies of this hand-book will be furnished free to any person desiring the same. Address, Miss Mary Felton, president of the Young Women's Christian Association.

LITERARY, SCIENTIFIC AND PHILOSOPHICAL SOCIETIES.

The Hermean and Delta Sigma are two literary societies which meet every Monday evening during the school year; these societies furnish excellent opportunity for practice in extemporaneous speaking and parliamentary procedure. Beside these two societies, which are open to all students, several of the college classes have organized debating clubs of a similar nature.

The University Senate. This society is organized on the plan of the United States Senate, and meets every Saturday afternoon for the discussion of questions of the day. This society offers special advantages for debate, a knowledge of parliamentary procedure and information upon living political topics of the day.

The Philosophical Society. This society is organized for the purpose of psychological and philosophical investigation. The society meets once each month and is usually addressed by specialists in philosophy.

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

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

The Fortnightly Scientific Club is a society organized for the purpose of scientific investigation and discussion. The meetings are often addressed by specialists, the addresses being followed by discussions. Among the subjects considered during the past year are the following: "Hypnotism;" "Heredity;" "Geological and Natural History Survey Work in Minnesota;" the "Glacial Epoch," etc.

ATHLETICS.

THE ATHLETIC ASSOCIATION is an organization, having for its object the general physical culture for the students, and the encouragement of a proper spirit in favor of hearty, manly sports. The Monday before Commencement is the annual field day of the association.

ALUMNI SOCIETIES.

ALUMNI ASSOCIATION.

This association was organized in 1875. The graduates of the several colleges of the University are members; the members of the Board of Regents and the general faculty are honorary members. The annual meeting is on the day preceding commencement, at 2 o'clock p. m. The

Alumni dine together after the public exercises on Commencement day. Judge Stephen Mahoney, '77, is president of the association.

FELLOWSHIP ASSOCIATION.

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

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

SCHOLARSHIPS.

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

1. The appointments are made by the Executive Committee of the Board of Regents, upon the recommendation of the department in which the appointment is desired.
2. The Executive Committee has power to declare a scholarship vacant at any time; and may or may not elect a new appointee to the place made vacant.
3. Recipients of scholarships may be either graduate or undergraduate students.
4. The scholarships are not intended as gifts or benefactions from the State to the recipients, but as provisions under which services may be rendered the University.
5. The holder of a scholarship is expected to render such service as he may show a special aptitude for, and are contemplated at the time of his appointment. It is understood, however, that these services are of a nature which shall assist the holder of a scholarship to attain to a mastery of some line of work in the department to which he is appointed.
6. The scholarships may be suspended or increased in any department as the need for services and the amount of work may vary.

PRIZES.

THE PILLSBURY PRIZES.

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

THE '89 MEMORIAL PRIZE.

A prize of twenty-five dollars, known as the " '89 Memorial Prize," established by the class of 1889, is given for the best work done in the Historical department, as evidenced by a thesis.

THE MOSES MARSTON SCHOLARSHIP IN ENGLISH.

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

PRIZES IN ENGLISH.

During the coming year, friends of the institution offer two prizes of fifteen dollars each. One prize will be awarded for the best English poem, and one for the best specimen of English prose.

THE GILLETTE-HERZOG PRIZES.

The Gillette-Herzog Manufacturing Company offer for competition, by the students of the college of Engineering, Metallurgy and the Mechanic Arts, two annual prizes, viz:

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

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

The subjects admitted to competition are:

1. Mechanical Engineering.
2. Architecture and Structural Engineering.
3. Civil Engineering.
4. Electrical Engineering.

HONORS.

AWARDED AT COMMENCEMENT 1893.

AWARDED UPON THE BASIS OF SCHOLARSHIP.

COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

Elizabeth Alma Peters,	-	Valedictorian
Albert Cornelius Knudson,	-	Salutatorian

PHILOSOPHICAL ORATIONS.

Charles Elon Young; Clara N. Kellogg; Emily Ruth Harris; Jessie Paine Smith; Mary Elizabeth Bassett; Albert Fuller Pratt; Leila Pamela Johnson.

ORATIONS.

Thomas Freeman Wallace; Minnie Arabella Perkins; Benjamin Chandler Taylor; Franc Murray Potter.

"*The '89 Memorial Prize*," was awarded to Hubert C. Carel for his thesis "Municipal Government in Minnesota."

"*The Paige Prize*," of \$40, (Law Department) was awarded to John Cochrane Sweet for his thesis "Railroad Crossings."

"*The Gillette-Herzog Prizes*," (College of Engineering, Metallurgy and the Mechanic Arts.) The first prize was awarded to Delos Cuyler Washburn for a Design for the Steel Frame of a Machine Shop or an Iron Foundry. The second prize was awarded to Frank Erven Reidhead, for a Design for a Series Motor.

"*The Moses Marston Fellowship in English*," was awarded to Clarence Ellithorpe.

PUBLICATIONS.

THE QUARTERLY BULLETIN.

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

THE ARIEL.

The Ariel association is an association formed by the students of the University. A board of editors is elected annually, who publish a weekly paper called the Ariel. This paper holds a very high rank among similar papers published in the colleges of the country.

THE JUNIOR ANNUAL.

The Junior Annual is a book published annually by the junior class of the University. The book represents the students' side of college life. Copies may be had by addressing the Business Manager of the Junior Annual, care of the University.

THE YEAR BOOK OF THE SOCIETY OF ENGINEERS.

This book is published yearly by the society of engineering students. It is devoted to the publication of articles upon engineering subjects by professors and students in the college of Engineering, Metallurgy and the Mechanic Arts.

EXPENSES.

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

STUDENT ONE had all his expenses paid by his parents; the following is a statement of his expenses:

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

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

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

STUDENT TWO earned everything that he spent during the year. He began school in the fall with fifty dollars in the bank; at the end of the year he had ten dollars in the bank. He earned his money by work as printer. The following is a statement of his expenses:

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

Total for the year..... \$305.00

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

Board, 38 weeks.....	\$142.50
Room.....	34.68
Laundry.....	10.49
Books.....	18.39
Railroad fare and express.....	8.53
Street car fare.....	8.45
Clothing.....	26.29
Sundries.....	19.50

Total for the year..... \$268.83

Received from parents..... 96.33

Earned himself..... \$172.50

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

Board, room, laundry and fraternity dues (39 weeks).....	\$208.75
Clothing.....	74.25
Class dues.....	8.25
Books.....	29.10
Stamps.....	3.41
Church, donations and amusements.....	24.90
Railroad fare.....	16.25
Street car fare.....	4.95
Paid the barber.....	14.20
Incidentals.....	13.03

Total..... \$397.09

Of this amount he earned all but \$125 by working in an office. This student roomed and boarded at a fraternity house, and his statement concerning board and room, etc., cannot very well be divided up with accuracy, so they are given in a lump. This statement includes all expenses incident to graduation and commencement week.

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

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

Student number two is a skillful printer and thus easily found work at more remunerative wages than the ordinary student can obtain. The student who learns some trade before coming to the University has a great advantage over the student who has to earn his money by ordinary manual labor.

Students have earned their whole expenses while attending the University by taking care of lawns, furnaces, horses, etc., and have made good records at the same time. Other students have done so much of this work that they have not been able to keep up with their studies, and have thus missed the one thing for which they were attending the University.

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

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

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

EXPENSES OF YOUNG WOMEN.

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

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

Total expenses..... \$240.05

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

Board.....	\$138.00
Room for nine months (four with room mate).....	58.00
Railroad fare.....	30.22
Street car fare.....	6.00
Text books.....	16.12
Clothing (besides that brought from home) and laundry.....	67.59
Fraternity and class dues, Christian association and other religious organizations... ..	20.10
Sundries.....	19.48

Total for the year..... \$356.30

CARE OF NEGLIGENT STUDENTS.

1. The following provisions are intended to interfere in no way with the practice of instructors to encourage and warn privately poor students, or those apparently negligent. When these means have shown that a student is really negligent the instructors must make use of the following regulations. Instructors are cautioned to discriminate between incapable and negligent students.

2. One shall be classed as a negligent student (1) who is absent a week without giving his instructor a satisfactory explanation, or (2) a student who is continuously poorly prepared in his work.

3. In case of students negligent through absences, the instructor shall promptly report the absence to that student's adviser.

4. Whenever an instructor is convinced that a student's poor preparation of lessons is due to neglect, the instructor shall at once report the standing of the student to the adviser.

5. At the beginning of the second week of each term the registrar shall submit to each instructor full lists of students registered for his work, and the instructor shall report, forthwith, to the adviser students who have not appeared, and also those who are attending work without registration.

6. The President shall appoint, each year, four or more professors to be advisers respectively of classical, literary, scientific and engineering sections of the freshman class, and one professor as adviser of all unclassified students entering the University. These advisers shall hold their positions for two years.

It shall be the duty of an adviser to make the personal acquaintance of each student in his section. To this end, upon registration, the student shall fill out a blank containing a brief statement of his life and preparation, and present it, in person, to his adviser.

At such time as the adviser shall see fit, he shall have an office hour at which the students may come to him for counsel. The adviser shall promptly cite before him students who have been reported negligent, and when necessary shall communicate with their parents or guardians or further report cases to the president or faculty.

The Graduate Department.

This department affords an extension of the work of the College of Science, Literature and Arts, the College of Engineering, Metallurgy and the Mechanic Arts, and the Department of Law. It meets the threefold purpose of extending general culture, for which Masters' degrees are offered; of encouraging the mastery of a specialty, for which the degree of Doctor of Philosophy is given; of providing for those who desire a more thorough acquaintance with particular subjects than is offered in undergraduate work, but are not candidates for degrees.

REGISTRATION.

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

THE MASTER'S DEGREE.

COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

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

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

Applicants for graduate work shall be referred, with the necessary

credentials, to the committee on graduate studies and degrees, who shall examine said applicant and report accordingly to the general faculty. The Registrar shall notify professors of the lines selected by the applicant in their department. Professors shall report to the general faculty early in the third term of each year, the names and work of the graduate students actively at work in their departments.

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

III. Table of studies offered to candidates:

DIVISIONS.	GROUPS.	LINES.
A. Classical Philology.	1. Greek.	Epic Poetry.
		Lyric Poetry.
		Dramatic Poetry.
		Oratory.
		History.
		Epigraphy.
		Neo-Hellenic.
	2. Latin.	
	3. Sanskrit.	
B. Modern Philology.	1. English.	
	2. French.	
	3. German.	
	4. Scandinavian Languages.	
C. Biological Sciences.	1. Botany.	a Morphology.
		b Physiology.
		c Taxonomy.
	2. Zoology.	a Morphology.
		b Physiology.
	3. Paleontology.	
D. Physical Sciences.	1. Lithological Geology.	
	2. Chemistry.	
	3. Physics.	
	4. Mineralogy.	
E. Mathematical Sciences.	Mathematics.	1. Co-ordinate Geometry.
		2. Calculus.
		3. Quaternions.
Astronomy.		
	History.	1. Medieval Institutions of Europe.
		2. Constitutional History of England.
		3. Political History of the United States.
		4. Modern European Politics.
		5. The Philosophy of History.
F. Philosophical Sciences.	Economics and Political Science.	1. Private Economy.
		2. Public Economy.
		3. Science of Government.
		4. International Law.
Philosophy.		1. Logic.
		2. General Psychology.
		3. Experimental Psychology.
		4. Ethics.
		5. History of Philosophy.
		6. Philosophy of Religion.

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

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

V. METHOD OF SELECTING WORK:

1. The candidate shall select from the table in III, three lines of study.

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

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

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

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

a. For the degree of Master of Arts at least one of the three lines selected shall be from Division A.

b. For the degree of Master of Science at least one of the three lines selected shall be from Divisions C, D, E, F.

c. For the degree of Master of Literature at least one of the three lines shall be selected from Division B.

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

VII. All examinations shall be held at the University, at such time and in such manner as may be directed by the faculty.

THE COLLEGE OF ENGINEERING, METALLURGY AND THE MECHANIC ARTS.

All regulations governing candidates for the Masters' degree shall apply to the candidates for second degrees in the College of Engineering, Metallurgy and the Mechanic Arts, particularly as to the amount of work done, the method of selecting work, degree of proficiency expected and the time and manner of conducting the examinations.

Graduate work is offered, leading to the following second degrees :

Civil Engineer.

Mechanical Engineer.

Electrical Engineer.

Mining Engineer.

Chemical Engineer.

Metallurgical Engineer.

A detailed statement of the work offered and the subjects required

for each of the above degrees, may be found under the title Graduate Work and Degrees in the College of Engineering, Metallurgy and the Mechanic Arts.

DEPARTMENT OF LAW.

For the benefit of those students who wish to pursue their legal studies further than they are able to do in the undergraduate course, a graduate course of one year is offered. Among the subjects considered are :

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

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

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

Those who spend the entire year in the work prescribed for this course, and pass a satisfactory examination upon the subjects pursued, will be entitled to the degree of Master of Laws.

The terms of tuition and the diploma fee are the same in this as in the other courses offered, but students who have graduated from the Law Department of the University will not be required to pay any matriculation fee.

DEGREE OF DOCTOR OF PHILOSOPHY.

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

I. The candidate shall elect work in three distinct departments—a major subject in one department, and two minor subjects in other departments, and within the major subject he shall choose a special field.

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

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

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

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

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

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

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

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

X. Each examination for the degree of Doctor of Philosophy shall be held in the presence of the general faculty, and shall be conducted as the faculty may direct. A quorum for such examination shall be five.

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

Courses of Instruction.

- I. *Animal Biology.* (a) *Research.* Any line of original investigation in
 1. Invertebrate Embryology and Morphology.
 2. Vertebrate Embryology and Morphology.
 (b) *Advanced Studies.* Corroborative work in any branch of Animal Embryology and Morphology.
 (c) Under certain conditions some undergraduate work may be pursued by those who have not completed the work as undergraduates.
- II. *Astronomy.* (a) *A Course in Practical Astronomy.*
 (b) *A course in Orbit work.*
- III. *Botany* (a) *Courses VII-IX* of the work offered to undergraduates, in this department, are open also to graduate students.
 (b) *Comparative Gametophytic Anatomy and Embryology;* laboratory and reference work. Open to those who have completed six terms of botanical work. *First term.*
 (c) *Comparative Sporophytic Anatomy and Embryology;* laboratory and reference work. Open to those who have completed the work of the course (b) as above. *Second and third terms.*
 (d) *Phytodynamics and Oecology;* lectures and reference work. Open to those who have completed five terms of botanical work. *First term.*
 (e) *Phytocytology, Structural and Dynamic;* laboratory and reference work. Open to those who have completed seven terms of botanical work. *Second and third terms.*
 (f) *Experimental Embryology Organogeny;* laboratory and reference work. Open to a limited number who may present the requisite evidence of fitness for original research. *Throughout the year.*
 (g) *Special Research work in some selected line.* Open to all graduate students whose preparation may be deemed sufficient. *Throughout the year.*
- IV. *Chemistry.* (a) *Special Inorganic Preparations.*
 (b) *Research work in Electro-Chemistry.*
 (c) *Research work in general Organic Chemistry.*
 (d) *The Plant Alkaloids.*
 (e) *Stereochemistry and the Optical Activity of Organic and Inorganic Compounds.*
 (f) *Special Research work in general Analytic Chemistry.*
- V. *English.* (a) (1) *Advanced work in Old and Middle English.*
 (2) *Interpretation of Beowulf.*
 (b) *Gothic* in its relation to Teutonic Philology, and especially to Old English. Dr. Joseph Wright's Primer of Gothic is made the basis for the study.
 (c) *Old Saxon,* grammar and reading of the Heliand.
 (d) *A Review of the Schools of Criticism.*
 (e) (1) *Critical Studies in the Literature of the Eighteenth Century.*
 (2) *The Rise of the Romantic Movement.*
 (f) *English Lyrics in Palgrave's Golden Treasury.*
 (g) *Typical Victorian Poets. e. g.,* Matthew Arnold, Tennyson, Browning, William Morris.
 (h) *The Evolution of the English Press.*
 (i) *Comparative Literature* studied in its bearing upon English Literature.
 (j) *Research or Special Studies* in some line selected by individual students will be guided by the department.

In 1894-95, classes will be formed, in any term, in not more than four of the specially graduate courses. It will be noticed that some of the undergraduate advanced courses are open, under certain conditions, to those who have not previously pursued them.

VI. *Engineering:*

- (1) *Civil Engineering.* (a) Experimental Mechanics.
 (b) Structural work, as applied to bridges and iron buildings.
 (c) Geodesy, along lines in the national Topographical Surveys.
 (d) Railroads and Highways,—the economics of construction and maintenance.
- (2) *Electrical Engineering.* (a) Arc and incandescent lamp investigations.
 (b) Problems in the design and operation of generators and motors.
 (c) Alternating current investigations.
 (d) Design and testing of electric light and power plants.
 (e) Experimental problems in electric railway work.
- (3) *Mechanical Engineering.* (a) Machine Design.
 (b) Experimental Investigations: special field selected on consultation.
- (4) *Mining and Metallurgy.* The Mesabi iron ores and their treatment.

VII. *Geology.* (a) The granitic rocks of Central Minnesota.

- (b) The Pre-Cambrian eruptives of Northern Minnesota.
- (c) Basic intrusives and their contact phenomena.
- (d) The Lower Paleozoic of Southeastern Minnesota. Special field to be selected on consultation.

VIII. *German.* (a) *Paul's "Mittel-Hoch Deutsche Grammatik."* Selections from the "Nibelungen Lied"; Gudrun; Wolfram; Walter von der Vogelweid; translations into modern German; political and literary history of the period.

- (b) *Braune's "Alt-Hoch-Deutsche Grammatik und Lesebuch."* Müllenhoff and Scherer's "Denkmäler." History of the period, based upon Arnold's "Deutsche Geschichte." References: Blummer's "Laocoon," Overbeck's "History of Ancient Art"; Dubois' "Reflections, Critiques sur la poesie et la peinture"; Winckelmann's "Imitations of the Ancients in Painting and Statuary"; Taine's "Lectures on Art" (part I, chaps. 2 and 3, and part II, chap. 5); Huntington's "Manual of Fine Arts" (pp 15-75); Life and Works of Lessing, by Danzel and Guhrauer, Erich Schmidt, Adolph Stahr, Düntzer, Sime, and Zimmern.
- (c) *German Lyrical Poetry from Luther to Goethe;* outlines of the history of German literature since the Reformation. The Thirty years war; Grimmelhausens's "Simpli- cissimus." Spener and the Pietists; Sprachgesellschaften; Martin Opitz; Paul Gerhardt; religious poetry. Imitation of French and English (Leipscic and Zurich school). Klopstock's "Messias," Odes, and Dramas; Wieland; Lessing's early dramas. "Laocoon," "Dramaturgie," dramatic masterpieces, religious controversies. Herder and the "Sturm und Drang" period. Voss and the "Hainbund." Goethe; Lyrics. "Goetz and Werther," "Egmont," "Iphigenia," "Herman and Dorothea," "Wil- helm Meister," "Autobiography," "Faust." Schiller, "Räuber," historical and æsthetic writings. "Wallenstein," "Jungfrau von Orleans," "Wilhelm Tell." Jean Paul Richter; the Romantic School; Patriotic Poets; Heine; prose writers. "Das Junge Deutschland."

IX. *Greek.* (a) *Greek Poetry.* Epic, lyric, dramatic, bucolic, with the critical reading of authors.

- (b) *Greek Oratory,* with the critical reading of authors.

X. *History.* (a) *Medieval Institutions of Europe.*

- (b) *Constitutional History of England.*
- (c) *Political History of the United States.*
- (d) *Modern European Politics.*
- (e) *The Philosophy of History.*

Under certain conditions, graduate students who have not already completed the work will be permitted to pursue courses III, IV, V and VI with the undergraduate classes.

XI. *Latin.* *Roman Drama.*

XII. *Mathematics.* (a) i. *An advanced course in Co-ordinate Geometry.*

2. *An advanced course in Differential Calculus.*
3. *An advanced course in Integral Calculus.*
4. *Quaternions.*

The following subjects are offered to those who do not elect them in their undergraduate course:

- (b) 1. *Analytical Geometry.*
 2. *Differential Calculus.*
 3. *Integral Calculus.*
 4. *Co-ordinate Geometry of Three Dimensions.*
- XIII. *Mineralogy.* Original problems on particular groups of minerals; the group to be selected on consultation.
- XIV. *Romance Languages.* (a) *Old French.* Morceaux Choisis des Auteurs Francaise du Moyen Age, par L. Cledat. Some of the oldest monuments of the French language, such as *Les Serments de Strasbourg*; *La Chanson de Roland*; *La Vie de Saint Alexis*; *Le Roman du Renard*; *Le Roman de la Rose* (selections) translated into modern French and the laws of the phonetic changes studied. This course is especially valuable to students who wish to make a scientific study of the French element in English.
- (b) A systematic study of some special topic, as: The philosophy of the nineteenth century; the literature of the eighteenth century.
- XV. *Philosophy.* (a) *The Philosophy of Kant.* Systematic study of the relation of Kant to the development of modern philosophy. The most important parts of the *Critique of Pure Reason* will be read and discussed. Special courses of collateral reading will be followed and reported upon by each individual. *First term.*
- (b) *Advanced Logic.* Study of principles; systematic individual investigation, with reports. Bradley's *Principles of Logic* and Bosanquet's *Logic* will be taken as the basis of work. *Second term.*
- (bb) *The Philosophy of Kant.* Continuation of course (a) with study of the *Critique of Judgment.* *Second term.*
- (c) *Ultimate Psychological Problems.* Application of metaphysical principles; each student will make special study of one problem; theses. *Third term.*
- In these courses there will be one two-hour session each week, the work to count as a full term.

The graduate courses are intended for those who have made a special study of philosophy in the undergraduate years, and have acquired considerable power for independent work. They are not open to undergraduates, save in cases of very exceptional proficiency, and by special permission.

- XVI. *Physics—advanced work in Physics* for those who have completed the undergraduate work up to the junior year and who have also completed the undergraduate course in Calculus.
- XVII. *Political Science and Economics.* The work of graduate students in this department is conducted on the seminar plan; the particular subjects of investigation are selected by individuals or groups after consultation with the professor.
- XVIII. *Sanskrit.* Grammar and Reader; Story of Nala; selections from Rig-Veda.

THE COLLEGE OF
SCIENCE,
LITERATURE AND
THE ARTS

The College of Science, Literature and the Arts.

THE FACULTY.

- CYRUS NORTHROP, LL. D., *President.*
WILLIAM W. FOLWELL, LL. D., *Professor of Political Science.*
JABEZ BROOKS, D. D., *Professor of Greek.*
CHARLES N. HEWITT, M. D., *Professor of Sanitary Science.*
JOHN G. MOORE, B. A., *Professor of German.*
CHRISTOPHER W. HALL, M. A., *Professor of Geology and Mineralogy.*
JOHN C. HUTCHINSON, B. A., *Associate Professor of Greek.*
JOHN S. CLARK, B. A., *Professor of Latin.*
MARIA L. SANFORD, *Professor of Rhetoric and Elocution*
JOHN F. DOWNEY, M. A., C. E., *Professor of Mathematics and Astronomy.*
CHARLES W. BENTON, B. A., *Professor of French and Semitic.*
O. J. BREDA, *Professor of Scandinavian.*
HENRY F. NACHTRIEB, B. S., *Professor of Animal Biology.*
GEORGE EDWIN MACLEAN, Ph. D., *Professor of English.*
FREDERICK S. JONES, B. A., *Professor of Physics.*
CONWAY MACMILLAN, M. A., *Professor of Botany.*
WILLISTON S. HOUGH, Ph. M., *Professor of Philosophy.*
GEORGE H. MORGAN, Lieut. U. S. A., *Professor of Military Science and Tactics.*
DAVID L. KIEHLE, LL. D., *Professor of Pedagogy.*
GEORGE B. FRANKFORTER, M. A., Ph. D., *Professor of Chemistry.*
MATILDA J. WILKIN, M. L., *Assistant Professor of English and German.*
CHARLES F. SIDENER, B. S., *Assistant Professor of Chemistry.*
WILLIS M. WEST, M. A., *Assistant Professor of History.*
FRANCIS P. LEAVENWORTH, M. A., *Assistant Professor of Astronomy.*
ARTHUR EDWIN HAYNES, M. S., M. Ph., *Assistant Professor of Mathematics.*
SAMUEL G. SMITH, D. D., *Lecturer on Sociology.*
HENRY T. ARDLEY, *Instructor in Freehand Drawing.*
KENDRICK C. BABCOCK, B. L., *Instructor in Latin.*
JOSEPH BROWN PIKE, M. A., *Instructor in Latin.*
E. EUGENE McDERMOTT, B. S., *Instructor in Elocution.*
AMELIA I. BURGESS, *Instructor in Freehand Drawing.*
A. D. MEEDS, B. S., *Instructor in Chemistry.*
MARIE SCHÖN, *Instructor in German.*
EMMA BERTIN, *Instructor in French.*
JOHN ZELENY, B. S., *Instructor in Physics.*
LOUISE G. KIEHLE, *Instructor in Physical Culture.*
JAMES R. ANGELL, M. A., *Instructor in Philosophy.*
FREDERICK KLAEBER, Ph. D., *Instructor in English.*

D. T. MACDOUGAL, M. S., *Instructor in Botany.*
 ASA J. HAMMOND, B. A., *Instructor in Chemistry.*
 OSCAR W. OESTLUND, M. A., *Assistant in Animal Biology.*
 OSCAR W. FIRKINS, B. A., *Assistant in Rhetoric.*
 HANNAH R. SEWALL, M. A., *Assistant in Political Science and Rhetoric.*
 FREDERICK SARDESON, M. S., *Instructor in Geology.*
 CHARLES P. BERKEY, M. S., *Instructor in Mineralogy.*

SCHOLARS

GIVING INSTRUCTION AND ASSISTING IN LABORATORIES.

FRANCIS B. SUMNER, *in Animal Biology.*
 CASWELL A. BALLARD, *in Botany.*
 WILLIAM D. FROST, B. S., *in Botany.*
 ALEXANDER P. ANDERSON, *in Botany.*
 CARL VANCLEVE, *in Chemistry.*
 HATTIE L. ANDREWS, B. A., *in English.*
 CHARLES M. ANDRIST, *in French.*
 FRANK M. ANDERSON, *in History.*

ADMISSION.

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

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

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

ADMISSION ON DIPLOMA.

By a resolution of the Board of Regents, graduates of St. Paul and Minneapolis high schools are admitted to the freshman class upon presentation of their diplomas. The State High School Board has inspected and classified the schools under its supervision, and the graduates of the schools of the first rank are admitted to the freshman class upon presentation of their diplomas. At present the following schools are in this rank: Albert Lea, Alexandria, Anoka, Austin, Crookston, Duluth, Faribault, Fergus Falls, Hastings, Henderson, Lake City, Litchfield, Mankato, Northfield, Owatonna, Red Wing, Rochester, Sauk Center, Spring Valley, Stillwater, Worthington.

It has been found that students who present diplomas of first-class high schools and are therefore entitled to admission, have, in some cases, omitted very important studies in their course, and substitute

studies have been accepted in place of those omitted. To remedy this evil, principals are requested to furnish each of their pupils who come to the University a certified list of the studies actually covered by the diploma. The diploma will be accepted by the University for all that it really represents of work done. If important subjects required for admission to the University have been omitted by the student in his preparatory work, he will be required to make it up, notwithstanding his diploma. Candidates holding diplomas from high schools of the first rank should, therefore, present their diplomas (at the time of making their application for admission) accompanied by a certificate of the principal of the school granting such diploma, showing the studies covered by the diploma. Blanks for this purpose may be had by applying to the Registrar of the University. Candidates holding certificates of the High School Board should present their credentials on making application.

CREENTIALS FROM OTHER INSTITUTIONS.

Those coming from other schools or from normal schools should present their credentials upon making application, and then take such examination as they are prepared for. The result of the examinations will be considered together with the credentials; each case will be passed upon by a committee and proper credit will be given.

As a rule, the records of graduates of normal schools, or schools which admit to the freshman class of other reputable universities, without examination, will be accepted for entrance to the University. But the Faculty reserves the right to require a student to take supplementary examinations, if he does not sustain himself creditably in his course.

ADVANCED STANDING.

The University is accustomed to accept records from all reputable colleges for credits to advanced standing. Such records are accepted just so far as they cover, or are an equivalent to, the work done in the University. In bringing records from other institutions, the certificates should show :

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

CHOOSING OF COURSES.

The courses of this college are open, free of all charges for instruction, to all persons over fourteen years of age, whether residents of the State or not.

Applicants are free to select their courses of study on admission, but cannot thereafter change them, except as allowed by vote of the general faculty.

DAILY ROUTINE.

As a general rule each student has sixteen exercises a week, besides rhetorical work, which comes but once in the week.

Monday is taken as a holiday and the morning session begins at 8 o'clock. A general assembly of students and faculty is held each day at 10 o'clock, at which there brief and simple religious exercises.

EXAMINATIONS.

At the close of each term examinations are held in the studies of the term. In order to be "passed" the student must obtain seventy-five per cent.

In determining the standing of a student in any subject the result of his daily work on that subject is combined with the result of the final examination in the ratio of two to one.

Any student who has earned a term mark of eighty-five per cent. is excused from the final examination.

Students who unsuccessfully pursue a subject are reported by the professor as "incomplete," "conditioned," or as having "failed." "Incomplete" work may be made up at the convenience of the professor concerned; "conditions" may be made up within two terms; "failures" must be taken over in class. The examinations for conditioned students are held at the beginning of the fall term, in the work of the fall term; at the beginning of the winter term, in the work of the winter term; and at the beginning of the spring term, in the work of the spring term. Conditions that are not made up before the subject is again offered become failures and must be taken over in class.

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

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

REGULATIONS REGARDING SEMINARS AND HONORS.

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

1. The student must have attained in his course at the close of the second term senior year, a general average of not less than ninety per cent.

2. He must have attained not less than ninety per cent. in the department selected.

3. He must have taken at least three (3) terms of electives in the department selected.

4. He must have completed, in the department selected, seminar or individual work of high grade, equivalent in amount to one full term of regular work in one subject.

5. No student is allowed to enter upon this seminar work without a general standing of at least eighty-five per cent. at the time when he begins the work.

6. Double honors may be secured by taking seminar work in two departments.

Seminar work does not count in a course for a degree.

GRADUATION.

Students completing courses of study to the satisfaction of the faculty of the college, are entitled to receive the appropriate baccalaureate degrees.

Any person may undergo, at suitable times, examination in any subject; and if such person pass in all the studies and exercises of a course, he is entitled to the appropriate degree.

REQUIREMENTS FOR ADMISSION TO THE FRESHMAN CLASS.

Candidates are required to show proficiency in the following:

CLASSICAL COURSE.

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

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

English Composition.—The candidate should have such knowledge of form, penmanship, orthography, punctuation, syntax and construction as will enable him to write with ease and elegance any letter of business or friendship; to draft resolutions and petitions; to prepare, for the press, reports of meetings and brief reports of current events. Accu-

racy upon these fundamental points will cover three-fourths of the examination. In addition to this some knowledge of English composition as a fine art is expected; of the power and beauty gained by the right use of rhetorical figures; of what is meant by purity, precision, brevity and harmony and style; and this not merely by committing to memory definitions and rules, but by studying the English classics and learning to appreciate the life and vigor of the great masters of English poetry and prose.

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

Elementary Algebra—The Elementary Algebra of any one of the following authors will furnish the necessary preparation: Ray, Greenleaf, Wells, Senenig, Thompson and Quincy, Wentworth (school). If Olney's Complete Algebra or Wentworth's Elements of Algebra be used, selections may be made equivalent to the above.

Higher Algebra—Factoring, highest common divisor, lowest common multiple, fractions, involution, evolution, theory of exponents and radicals, (including imaginaries).

Plane Geometry—Olney's text book, or equivalent, including the unsolved problems.

Solid Geometry—Olney's text book, or equivalent, including the exercises.

History of the United States—For grammar school grades the text book of Montgomery or Scudder is recommended. But if, as is much better, this subject is systematically studied in the high school, with elementary work in lower grade, the book of Alexander Johnston will be found valuable. In either case it is suggested that much more time be given to the development of the United States since the revolutionary war than to the story of the colonial period. The main features of the constitution should be clearly understood, and its practical working as interpreted by the Supreme court, and seen in operation in the growth of the nation. The chief object of this study should be that the student may understand the institutions of the republic, by learning how they came to be as they are. It should be noted that a definite portion of the examination will be devoted to geography.

History of Greece and Rome—The history of Greece and Rome should be made a study of the evolution of Greek and Roman institutions. Events should be considered in their bearing on that evolution. Any good outline history will answer as a text-book; but it should be supplemented by other material. Allen's Short History of the Roman People, and the Greece in Myer's Ancient Nations and Greece are suggested as indicating the amount of knowledge expected. It should be noted that a definite portion of the examination will be devoted to geography.

Physiology—The candidate should be thoroughly familiar with as much anatomy, histology and physiology of the human body as is given in Martin's "Human Body," briefer course. As much knowledge of hygiene and the effect of stimulants and narcotics on the human body as can be gained from both the general text and the special chapter on narcotics and stimulants in the briefer course of the "Human Body," is also required.

Natural Philosophy—As much as is contained in Appleton's School Physics, Avery's Natural Philosophy, Gage's Physics or any equivalent text-book. If laboratory work is offered, as much as is contained in Hall & Bergen's Elements of Physics, or its equivalent, if accompanied by student's original note book signed "approved" by instructor, will be accepted.

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

Cesar—First three books of the Gallic war. Special attention should be paid to the translation of passages of the text into correct and idiomatic English; grammatical questions connected with the text, more especially on the subjunctive mood, indirect discourse and the sequence of tenses. The pupil should be able to rewrite in the *oratio recta* all the

passages of *oratio obliqua* that occur in these books. The student is expected to be familiar with the life of Cæsar and an account of his wars, especially those carried on in Gaul, with the geography of that country, and the location of the different tribes mentioned in the text; the organization of the Roman army; the method of reckoning time, distance, etc.

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

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

Greek Grammar—Brooks' Attic Greek or other grammar.

Xenophon's Anabasis—Three books.

SCIENTIFIC COURSE.

English Grammar,
English Composition,
Essay.

Elementary Algebra.

Higher Algebra.

Plane Geometry.

Solid Geometry.

U. S. History.

History of Greece and Rome.

Physiology.

Natural Philosophy.

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

Geometrical Drawing. Two terms. Applicants must present the following neatly inked and lettered, with the name of the draughtsman, name of the place and date of completion, as well as the scale used, if one is required:

Two plates of geometrical problems, with fifteen problems on a sheet, three rows of five each.

One plate of projections of geometrical solids, each solid to be shown in three positions, twelve figures in a plate.

Two drawings showing plan and elevation, or front and side elevations, or sections of some object, as a roof truss, and stub end of a connecting rod, to be drawn to scale.

One plate containing at least two projections, drawn to scale, of some instrument or machine. This plate is to be drawn from sketches and measurements taken from the object itself, and must be accompanied by the original sketches showing the measurements.

The last four plates are to have heavy shade lines, the light being supposed to come at an angle of forty-five degrees, over the left shoulder.

OR

Freehand Drawing. Two terms. An examination is required in freehand sketching of lines at various angles, circular, elliptical and spiral forms, and such plain elementary drawing as will prove the applicant prepared to commence the drawing of simple objects in outline, prior to the study of light and shade and freehand perspective.

The following named books will cover the work required; Professor Thompson's "Elementary Freehand Series" up to book seven, or Prang's "Grammar Course," revised edition, up to book number seven. If White or other books are used, selections can be made which will be equivalent to the amount indicated.

Physical Geography may be offered in lieu of Drawing, but only in cases of students who come from schools where drawing is not taught.

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

Botany. Phanerogamic, Gray's Lessons and Manual.

Latin. As in the classical course.

OR

**English.* Latin Elements of English and History of English Literature.

**German.* Meissner's German Grammar, [Parts I, II, III.] Boisen's German Prose, and Buchheim's German Poetry for Beginners.

OR

**English.* Latin Elements of English and History of English Literature.

**French.* Chardenal's Course, first two books of Telemaque.

*Beginning with the school year 1895-96, two years work, in each of these subjects will be required.

LITERARY COURSE.

English Grammar.

English Composition.

Essay.

Elementary Algebra.

Higher Algebra.

Plane Geometry.

Solid Geometry.

U. S. History.

History of Greece and Rome.

Physiology.

Natural Philosophy.

Latin. As in the classical course.

**German or *French.* As in the scientific course. OR

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

**English.* Latin Elements of English and History of English Literature.

**German.* Joynes-Meissner's German Grammar [Parts I, II, III.] Boisen's "German Prose," and Buchheim's "German Poetry for Beginners."

**French.* Chardenal's Course, first two books of Telemaque.

*Beginning with the year 1895-96, two years work, in each of these subjects will be required.

Courses of Study.

FRESHMAN YEAR—FIRST TERM.

CLASSICAL.	SCIENTIFIC.	LITERARY.
<i>Higher Algebra</i> , 5.	<i>Higher Algebra</i> , 5.	<i>Higher Algebra</i> , 5.
<i>Greck</i> , 5.	<i>Freehand Drawing</i> , 5.	
* (a) Herodotus or (b) Homer's Iliad; history; composition; sight reading.		
<i>Latin</i> , 5.	<i>Latin</i> , 5.	<i>Latin</i> , 5.
Livy; sight reading; composition; history.	Livy; sight reading; composition; history,	Livy; sight reading; composition; history,
	or	or
	<i>English</i> , 5.	<i>English</i> , 5.
	Old English—Anglo-Saxon; grammar and prose masterpieces,	Old English—Anglo-Saxon; grammar and prose masterpieces.
	or	
	<i>German</i> , 5.	<i>German</i> , 5.
	Schiller's <i>Jungfrau von Orleans</i> , or <i>Maria Stuart</i> ,	Schiller's <i>Jungfrau von Orleans</i> , or <i>Maria Stuart</i> .
	or	or
	<i>French</i> , 5.	<i>French</i> , 5.
	Advanced grammar; composition; translation.	Advanced grammar; composition; translation.
† <i>Military Drill</i> , 3.	† <i>Military Drill</i> , 3.	† <i>Military Drill</i> , 3.
‡ <i>Physical Culture</i> , 3.	‡ <i>Physical Culture</i> , 3.	‡ <i>Physical Culture</i> , 3.
Delsarte method,	Delsarte method.	Delsarte method.
<i>Rhetorical Work</i> , 1.	<i>Rhetorical Work</i> , 1.	<i>Rhetorical Work</i> , 1.
Composition.	Composition.	Composition.
<i>Sanitary Science</i> , 1.	<i>Sanitary Science</i> , 1.	<i>Sanitary Science</i> , 1.
Personal hygiene.	Personal hygiene.	Personal hygiene.
‡ <i>English</i> , 5.	‡ <i>English</i> , 5.	‡ <i>English</i> , 5.
Applied etymology.	Applied etymology.	Applied etymology.

* (a) For those who have completed the Homer.

(b) For those who have not read Homer.

† Required of men.

‡ Required of women.

‡ This subject is not required of anyone, but is provided as an optional for foreign-speaking students.

FRESHMAN YEAR—SECOND TERM.

CLASSICAL.	SCIENTIFIC.	LITERARY.
<i>Plane and Spherical Trigonometry, 5.</i>	<i>Plane and Spherical Trigonometry, 5.</i>	<i>Plane and Spherical Trigonometry, 5.</i>
<i>Greek, 5.</i>	<i>German B, 5.</i>	
(a) Memorabilia or (b) Xenophon's Symposium; composition; sight reading.	Meissner's German Grammar; Boisen's German Prose.	
	or	
	<i>French B, 5.</i>	
	Whitney's French Grammar; Blouet's French Composition; translation.	
<i>Latin, 5.</i>	<i>Latin, 5.</i>	<i>Latin, 5.</i>
Livy; sight reading; composition; history.	Livy; sight reading; composition; history.	Livy; sight reading; composition; history.
	or	or
	<i>English, 5.</i>	<i>English, 5.</i>
	Old and Middle English poetry,	Old and Middle English poetry.
	or	
	<i>German A, 5.</i>	<i>German A, 5.</i>
	Goethe's Herman and Dorothea, or Egmont,	Goethe's Herman and Dorothea, or Egmont,
	or	or
	<i>French A, 5.</i>	<i>French A, 5.</i>
	Advanced grammar; composition; translation.	Advanced grammar; composition; translation.
<i>Physical Culture, 3.</i>	<i>Physical Culture, 3.</i>	<i>Physical Culture, 3.</i>
Delsarte method.	Delsarte method.	Delsarte method.
<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>
Reading or composition.	Reading or composition.	Reading or composition.
<i>Philosophy, 1.</i>	<i>Philosophy, 1.</i>	<i>Philosophy, 1.</i>
Elements of logic.	Elements of logic.	Elements of logic.
* <i>English, 5.</i>	* <i>English, 5.</i>	* <i>English, 5.</i>
Applied syntax.	Applied syntax.	Applied syntax.

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

FRESHMAN YEAR—THIRD TERM.

CLASSICAL.	SCIENTIFIC.	LITERARY.
<p><i>Chemistry, 4.</i> The non-metallic elements; lectures; some labora- tory work,</p>	<p><i>Chemistry, 4.</i> The non-metallic elements; lectures and laboratory work,</p>	<p><i>Chemistry, 4.</i> The non-metallic elements; lectures; some labora- tory work,</p>
<p>or <i>Physics, 4.</i> Elementary physics; reci- tations and experi- mental lectures on sol- ids, liquids, gases and sound.</p>	<p>or <i>Physics, 4.</i> Mechanics of solids, liquids and gases.</p>	<p>or <i>Physics, 4.</i> Elementary physics; reci- tations and experi- mental lectures on sol- ids, liquids, gases and sound.</p>
<p><i>Greek, 4.</i> (a) Demosthenes or (b) Lysias; history; sight reading.</p>	<p><i>German B, 4.</i> Boisen's German Prose; Buchheim's German Poetry,</p>	
	<p>or <i>French B, 4.</i> Whitney's French Course; Blouet's French Com- position; translation.</p>	
<p><i>History, 4.</i> Institutions of the Middle Ages in Europe.</p>	<p><i>Botany, 4.</i> General plant morphology; lectures; laboratory work; collateral read- ing.</p>	<p><i>History, 4.</i> Institutions of the Middle Ages in Europe.</p>
	<p>or <i>Zoology, 4.</i> General animal biology; lectures, laboratory and field work,</p>	
<p><i>Latin, 4.</i> Plautus and Terrence; study of the early Latin; language and literature; development of the drama; composition.</p>	<p>or <i>Latin, 4.</i> Horace; a study of his times, style and works; outline history of Ro- man literature,</p>	<p><i>Latin, 4.</i> Plautus and Terrence; study of the early Latin; language and literature; development of the drama; composition,</p>
	<p>or <i>English, 4.</i> History of Old and Middle English literature,</p>	<p>or <i>English, 4.</i> History of Old and Middle English literature.</p>
	<p>or <i>German A, 4.</i> Heine's Harzreise und Buch der Leider,</p>	<p>or <i>German A, 4.</i> Heine's Harzreise und Buch der Lieder,</p>
	<p>or <i>French A, 4.</i> Advanced grammar com- position, translation.</p>	<p>or <i>French A, 4.</i> Advanced grammar com- position; translation.</p>
<p><i>Military Drill, 3.</i></p>	<p><i>Military Drill, 3.</i></p>	<p><i>Military Drill, 3.</i></p>
<p><i>Physical Culture, 3.</i> Delsarte method.</p>	<p><i>Physical Culture, 3.</i> Delsarte method.</p>	<p><i>Physical Culture, 3.</i> Delsarte method.</p>
<p><i>Rhetorical Work, 1.</i> Composition.</p>	<p><i>Rhetorical Work, 1.</i> Composition.</p>	<p><i>Rhetorical Work, 1.</i> Composition.</p>

SOPHOMORE YEAR—FIRST TERM.

CLASSICAL.	SCIENTIFIC.	LITERARY.
<i>German B, 4.</i>	<i>German B, 4.</i>	<i>German B, 4.</i>
Meissner's German Grammar; Boisen's German Prose,	Gore's Scientific Prose Selections,	Meissner's German Grammar; Boisen's German Prose,
or	or	or
<i>French B, 4.</i>	<i>French B, 4.</i>	<i>French B, 4.</i>
Whitney's French Course; or Brachet's Historical Grammar; composition; translation.	Whitney's French Course; Blouet's French Composition; translation.	Whitney's French Course; or Brachet's Historical Grammar; composition; translation.
<i>Chemistry, 4.</i>	<i>Chemistry, 4.</i>	<i>Chemistry, 4.</i>
The metallic elements; lectures; laboratory work.	The metallic elements; lectures and laboratory work,	The metallic elements; lectures; laboratory work.
or	or	or
<i>Physics, 4.</i>	<i>Physics, 4.</i>	<i>Physics, 4.</i>
Recitations and experimental lectures on heat, light and electricity.	Sound and Electro-statics, with experimental lectures.	Recitations and experimental lectures on heat, light and electricity.
<i>Greek, 4.</i>	<i>History, 4.</i>	<i>French A, 4.</i>
Plato; Apology and Crito; theses; sight reading.	Institutions of the Middle Ages in Europe.	Advanced grammar; composition; translation.
		or
		<i>German A, 4.</i>
		Rapid reading from Schiilet, Mueller, Sybel and Becker.
<i>Latin, 4.</i>	<i>Botany, 4.</i>	<i>Latin, 4.</i>
Horace; study of the Latin language and literature.	General plant morphology; a continuation of the previous term.	Horace; study of the Latin language and literature,
	or	or
	<i>Zoology, 4.</i>	<i>English, 4.</i>
	Animal biology begun with the Protozoa.	History of the English language.
<i>Military Drill, 3.</i>	<i>Military Drill, 3.</i>	<i>Military Drill, 3.</i>
<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>
Composition.	Composition.	Composition.
<i>Philosophy, 1.</i>	<i>Philosophy, 1.</i>	<i>Philosophy, 1.</i>
Introduction to Psychology	Introduction to Psychology	Introduction to Psychology

SOPHOMORE YEAR—SECOND TERM.

CLASSICAL.	SCIENTIFIC.	LITERARY.
<i>English, 4.</i>	<i>English, 4.</i>	<i>English, 4.</i>
Old English (Anglo-Saxon), elements and outline history of the English language.	(a) Chaucer and his Age, or (b) as in the classical section.	(a) Chaucer and his Age, or (b) as in the classical section.
<i>Latin, 4.</i>	<i>History, 4.</i>	<i>*History, 4.</i>
Tacitus and Pliny; social life of the Romans in the late republic and early empire.	Institutions of England in the Middle Ages.	Institutions of the Middle Ages in Europe.
<i>Botany, 4.</i>	<i>Botany, 4.</i>	<i>Botany, 4.</i>
General botany, lectures; demonstrations; laboratory work; collateral reading.	General plant morphology; a continuation of the work of the previous term.	General botany; lectures; laboratory work; demonstrations; collateral reading.
or	or	or
<i>Zoology, 4.</i>	<i>Zoology, 4.</i>	<i>Zoology, 4.</i>
General zoology; lectures; demonstrations.	Animal biology continued.	General zoology; lectures; demonstrations.
<i>German B, 4.</i>	<i>Chemistry, 4.</i>	<i>German B, 4.</i>
Boisen's German Prose; Buchheim's German Poetry.	Qualitative analysis.	Narrative prose and poetry.
or	or	or
<i>French B, 4.</i>	<i>Physics, 4.</i>	<i>French B, 4.</i>
Whitney's French Course, and Blouet's Composition; translation.	Magnetism, electro-kinetics with experimental lectures.	Whitney's French Course; Blouet's Composition; translation.
<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>
Voice building; interpretation.	Voice building; interpretation.	Voice building; interpretation.
<i>Philosophy, 1.</i>	<i>Philosophy, 1.</i>	<i>Philosophy, 1.</i>
Philosophy of Nature.	Philosophy of Nature.	Philosophy of Nature.
<i>Sanitary Science, 1.</i>	<i>Sanitary Science, 1.</i>	<i>Sanitary Science, 1.</i>
Family hygiene.	Family hygiene.	Family hygiene.

*After the year 1894-95 this topic will be Institutions of England in the Middle Ages.

SOPHOMORE YEAR—THIRD TERM.

CLASSICAL.	SCIENTIFIC.	LITERARY.
<i>English, 4.</i>	<i>English, 4.</i>	<i>English, 4.</i>
General introduction to the history of modern English literature.	General introduction to the history of modern English literature.	General introduction to the history of modern English literature.
<i>Botany, 4.</i>	<i>Botany, 4.</i>	<i>Botany, 4.</i>
General botany; a continuation of the work of the previous term,	General plant morphology; a continuation of the work of the previous term.	General botany; a continuation of the work of the previous term.
or	or	or
<i>Zoology, 4.</i>	<i>Zoology, 4.</i>	<i>Zoology, 4.</i>
General zoology; lectures; demonstrations.	Animal biology; concluded with the embryology of the chick.	General zoology, lectures; demonstrations.
<i>Greek, 4.</i>	<i>Chemistry, 4.</i>	<i>German A, 4.</i>
Tragedy—Sophocles' <i>Antigone</i> , or one play of the other dramatists; history; theses; sight reading.	Qualitative analysis.	Rapid reading from Schiller, Mueller, Sybel and Becker.
	or	
	<i>Physics, 4.</i>	<i>French A, 4.</i>
	Heat and light, with experimental lectures.	Advanced grammar; translation.
		or
		<i>Latin, 4.</i>
		Tacitus and Pliny; social life of the Romans in late republic and early empire.
<i>History, 4.</i>	<i>Mathematics, 4.</i>	<i>*History, 4.</i>
Institutions of England in the Middle Ages.	Analytical Geometry.	Institutions of England in the Middle Ages.
<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>	<i>Rhetorical Work, 1.</i>
Speeches, toasts, etc.	Speeches, toasts, etc.	Speeches, toasts, etc.
<i>Philosophy, 1.</i>	<i>Philosophy, 1.</i>	<i>Philosophy, 1.</i>
Introduction to Ethics.	Introduction to Ethics.	Introduction to Ethics.

* After the year 1894-95 the literary sophomores will pursue German or French (b) in place of History in this term.

JUNIOR YEAR—FIRST TERM.

- Animal Biology* [4] (a). Animal Histology. Lectures and laboratory work on the cell and tissues, methods and technique. Open to those who have completed the course in Zoology.
- (b) Comparative anatomy of vertebrates. Must be preceded by the course in Zoology (and junior course (a), if it is intended to pay special attention to microscopic anatomy).
- Botany* [4]—(a). General Plant Physiology.
- (b) Elements of Archegoniate and Metaspermic Taxonomy.
- (c) General Algology.
- (d) General Mycology.
- Chemistry* [4]—(a). Quantitative Analysis.
- (b) Theoretical Chemistry.
- Elocution* [1]—Interpretation and Expression.
- English* [4]—Elizabethan Lyrics and selections from Spenser's *Faerie Queene* (3); the English Bible and Elizabethan Prose (1).
- French* [4]—MacMillan's Composition; translations from various authors; lectures on the history of the French language and medieval literature.
- German* [4]—Goethe, life and works; Egmont.
- Greek* [4]—Archæology of Greek Art; open to students of all courses.
- History* [4]—England since the Renaissance; the English constitution traced to the end of the Napoleonic wars. Open to those who have completed the history of the sophomore year.
- Latin* [4]—Cicero—*De Natura Deorum*; selections from Lucretius; religion of the Romans.
- Mathematics* [4]—Analytical Geometry.
- Mineralogy* [4]—(a). Elements of Mineralogy; the physical characters of common minerals.
- (b) General Mineralogy; crystallography and the physical characters of minerals with a study of the rock-forming species.
- Philosophy* [4]—General Psychology (3); Anatomy and Physiology of the Nervous System (1).
- Physics* [4]—(a). Practical Physics; laboratory work for those who have completed the scientific Physics of the freshman and sophomore years.
- (b) Laboratory practice for those who have completed the Physics of the classical and literary courses.
- Political Science* [4]—The Elements of Private Economics.
- Rhetoric* [4]—Literary Criticism. Open to those who have completed the rhetorical work of the freshman and sophomore years.
- Scandinavian* [4]—Smith's Grammar; Bennett's Phrase-Book.

JUNIOR YEAR—SECOND TERM.

- Animal Biology* [4]—(a). Animal Histology. A continuation of the work of the previous term.
- (b) Animal Physiology and Histology. Martin's *The Human Body*; lectures and demonstrations. This course is intended for those who do not wish to pursue morphological studies and yet desire more than is provided for in course (b) of the previous term.
- (c) Comparative anatomy of Vertebrates. A continuation of the work of the previous term.

Botany [4]—(a). General Plant Physiology.

(b) Elements of Archegoniate and Metaspermic Taxonomy.

(c) General Algology.

(d) General Mycology.

A continuation of the work of the previous term.

Chemistry [4]—(a) Quantitative Analysis.

(b) History of Chemistry.

Elocution [1]—Interpretation and Expression.

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

French [4]—Translations from English into French; translations from various authors; lectures on the Renaissance Period and the literature of the XVII Century or the Classical School.

German [4]—Lessing; life and works; Nathan der Weise.

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

History [4]—The political and constitutional history of the United States, to the adoption of the constitution. Open to those who have completed the courses in history of the sophomore year.

Mathematics [4] | Differential Calculus.

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

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

Physics [4]—(a and b). A continuation of the work of the previous term.

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

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

Scandinavian [4]—Grammar and Phrase-Book reviewed; stories and poems committed to memory; Eriksen's *Norske og Danske Forfattere II*.

JUNIOR YEAR—THIRD TERM.

Animal Biology [4]—(a). Animal Histology, continued.

(b) Animal Physiology and Histology, continued.

(c) Comparative Anatomy of Vertebrates, continued.

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

Botany [4]—(a). General Plant Physiology.

(b) Elements of Archegoniate and Metaspermic Taxonomy.

(c) General Algology.

(d) General Mycology.

A continuation of the work of the previous term.

Chemistry [4]—(a). Quantitative Analysis, (volumetric).

(b) Organic Chemistry. (c) Industrial Chemistry.

Drawing [4]—Freehand. Open to students who have completed as much freehand drawing as is required for entrance to the freshman class, scientific course.

Elocution [1]—Shakspeare; dramatic recitation or oratory.

English [4]—The Epic and Milton's *Paradise Lost* (3); the English Bible and Elizabethan Prose (1)—continued.

- German* [4]—Balladen und Romanzen; rapid sight reading of narrative prose.
- Greek* [4]—Lyric and Bucolic Poets; collateral reading; theses.
- History* [4]—(a) Political and constitutional history of the United States since 1789. A continuation of the work of the previous term.
- Latin* [4]—Outlines of Roman Law.
- Mathematics* [4]—(a) Integral Calculus.
(b) Descriptive Geometry.
- Mineralogy* [4]—(a) Quantitative Mineralogy; the assay of gold and silver ores.
(b) Physical Mineralogy; investigations with the goniometer and stauroscope.
- Philosophy* [4]—(a) Greek and Christian Ethics.
(b) Experimental Psychology. Lectures and laboratory work.
Open to those who have completed the course in General Psychology.
- Physics* [4]—(a and b). A continuation of the work of the previous term.
- Political Science* [4]—The Law and the Constitution.
- Rhetoric* [4]—Essays upon art subjects. Open to those who have completed the rhetorical work of the freshman and sophomore years.
- Sanitary Science* [1]—Open to both juniors and seniors. The subject will be changed alternate years.
- Scandinavian* [4]—Eriksen's Norske og Danske Forfattere, II.

SENIOR YEAR—FIRST TERM.

- Animal Biology* [4]—(a). Comparative anatomy of Invertebrates.
(b) Embryology of Invertebrates.
(c) Embryology of Vertebrates.
Courses (a) (b) (c) are open only to those who have completed the course in Zoology and junior course (a).
- (d) Taxonomy: Ornithology, Ichthyology and Entomology.
Open to those who have the necessary preparation.
- Astronomy* [4]—Practical Astronomy. Open to those who have completed the junior Astronomy and Mathematics.
- Botany* [4]—(a) Special Problems in Plant Physiology.
(b) Special Taxonomy.
(c) Special Plant Morphology and Embryology.
- Chemistry* [4]—Organic Chemistry; lectures and laboratory work.
(b) Water analysis.
(c) Special problems.
- Elocution* [1]—Oratory or dramatic recitation. Open to students who have completed junior elocution.
- English* [4]—Literature at the opening of the nineteenth century.
- Geology* [4]—Elements of Geology; physiographic, structural and dynamic.
- Greek* [4]—Lectures on Greek Poetry, with select readings.
- History* [4]—Modern European Politics. Open to students who have completed the history of the Sophomore year.
- Mathematics* [4]—Mechanics.

Pedagogy [4]—Education defined. The order of development of the physical, intellectual and moral natures of the child; their interdependence, and the office of the teacher in directing the same to a harmonious development.

Philosophy [4]—Ethics; the principles of morality with special reference to modern theories; theses and discussions, after the seminar method. Open to those who have completed junior Ethics.

(b) Logic; principles of deductive and inductive inference: lectures. Open to those who have completed Psychology.

Physics [4]—Mechanics of solids, liquids and gases. Open to those who have completed Calculus and the course in junior Physics.

Political Science [4]—Economic History.

Sanskrit [4]—Grammar and Reader.

Scandinavian [4]—(a) Lectures (2) History of the Scandinavian Languages and Archaeology; Norse Mythology; the Viking Age; History of Old Scandinavian Literatures. (2) Critical reading of H. Ibsen: Peer Gynt; essays.

(b) Sweet's Icelandic Primer.

SENIOR YEAR—SECOND TERM.

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

(b) Embryology of Invertebrates.

(c) Embryology of Vertebrates.

(d) Taxonomy: Ornithology, Ichthyology and Entomology.

A continuation of the work of the previous term.

Botany [4] (a) Special Problems in Plant-Physiology.

(b) Special Taxonomy.

(c) Special Plant Morphology and Embryology.

A continuation of the work of the previous term.

Chemistry [4]—(a) Gas analysis.

(b) Chemistry of Carbohydrates.

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

English [4]—Lectures on Oratory (1); literature in the United States in the nineteenth century (3).

French [4]—Howell's farce, *The Elevator*, translated into French; translations from various authors; lectures on the literature of the XVIII century with a view to the causes of the French revolution. Not offered for the year 1894-95.

Geology [4]—(a) Stratigraphic and Historical Geology, (2); (b) Introduction to Paleontology, (2). Open to those who have completed course I.

(b) Introduction to Petrology. Open to those who have completed course I in Geology and course II in Mineralogy.

German [4]—Goethe's *Faust*.

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

History [4]—Modern European Politics. A continuation of the work of the previous term.

Latin [4]—Seneca; his shorter essays; his ethical teachings.

Mathematics [4]—(a) Method of Least Squares.

(b) Mechanics.

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

Pedagogy [4]—The support and administration in systems of states and counties.

Philosophy [4]—(a) History of Modern Philosophy. Open to those who have completed the Ethics of the junior year.

(b) Aesthetics (4) Brown's The Fine Arts, with lectures. Open to those who have completed Psychology.

Physics [4]—Advanced Physics; Electricity.

Political Science [4]—Public International Law.

Sanskrit [4]—Story of Nala.

Scandinavian [4]—(a) Lectures (2); History of Danish and Norwegian literature; (2) Eriksen's Norske og Danske Forfattere I: essays.

(b) Icelandic: Nygaard's Udvalg af den Norroene Literatur.

SENIOR YEAR—THIRD TERM.

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

(b) Embryology of Invertebrates.

(c) Embryology of Vertebrates.

(d) Taxonomy: Ornithology, Ichthyology and Entomology.

A continuation of the work of the previous term.

Astronomy [4]—Practical Astronomy. A continuation of the work of the first term.

Botany [4]—(a). Special Problems in Plant Physiology.

(b) Special Taxonomy.

(c) Special Plant Morphology and Embryology.

Chemistry [4]—(a). Domestic Chemistry.

(b) Photographic Chemistry.

Elocution [1]—Oratory: open to seniors preparing for commencement.

English [3 or 4]—Philosophy of English and American literature (3); lectures on Shakespeare (1).

French [4]—Howell's A Letter of Introduction, translated into French; translations from various authors; lectures on the modern schools in literature; Romantic; Realistic; Impressionist, etc. Not offered for the year 1894-95.

Geology [4]—(a). Palaeontological studies. Open to those who have completed courses I. and III.

(b) Petrological studies. A continuation of the work of the previous term.

(c) Applied Geology. Open to those who have completed the Geology of the first term.

German [4]—Lessing's Laocoon.

Greek [4]—Neo-Hellenic: reading; conversation exercises; theses.

History [4]—Philosophy of History. Open to those who have completed four terms work in history.

Latin [4]—Roman satire: elements and development of satire; comparison of Roman authors of satire.

Mathematics [4]—(a). Co-ordinate Geometry of three dimensions.

(b) Mechanics.

Pedagogy [2]—Educational history and theories.

Philosophy [4]—(a). Philosophy of Religion; or

(b) History of Philosophy in the Nineteenth Century.

Physics [4]—Advanced Physics: Optics.

Political Science [4]—American Public Economy.

Sanskrit [4]—Selections from Rig-Veda.

Scandinavian [4]—(a) Lectures (2) History of Swedish Literature; (2) reading of master-pieces of Swedish literature; essays.

(b) Icelandic; Nygaard's Udvalg af den Norroene Literatur.

Social Science [3]—History, principles and elements of Sociology.

Courses of Instruction.

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

ANIMAL BIOLOGY.

FOR UNDERGRADUATES.

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

FOR GRADUATES.

Research. Advanced studies and certain undergraduate courses. See page 64.

THE JOURNAL CLUB.

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

THE READING CLUB.

Winter evenings one hour a week. Open to all advanced students in the department. Reading and discussion of biological writings.

ASTRONOMY.

FOR UNDERGRADUATES.

Course I. General Astronomy. The text-book work is supplemented by lectures, especially on the history of the science, and on recent astronomical discoveries and theories.

Junior III. Open to those who have completed courses I and II of Mathematics.

Course II. Practical Astronomy. The theory of instruments, the use of the Ephemeris and Nautical Almanac, the various methods of determining time, latitude, longitude, parallax and the position of celestial bodies; observatory practice. *Seniors I and II.* Open to those who have completed course I and courses I to V of Mathematics.

FOR GRADUATES.

Course III. (a) Practical Astronomy.

(b) Orbit work.

BOTANY.

FOR UNDERGRADUATES.

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

Course II. General Botany. Lectures, demonstrations, laboratory work and collateral reading. The course presents an outline of special morphology and physiology, but particular emphasis is laid upon morphology. *Sophomore II and III, Cl. and Lit.* Open as an elective to those who have pursued the long or short course in general zoology.

Course III. General Plant Physiology. Lectures with collateral reading and experimentation. *Junior or Senior, I, II and III.*

Course IV. Elements of Archegoniate and Metaspermic Taxonomy. Lectures, reference reading, herbarium work. *Junior or Senior, I, II and III.*

Course V. General Algology. Laboratory and reference work. The course includes a study of both marine and fresh-water forms, and bears toward comparative morphology rather than toward taxonomy. *Junior or Senior, I, II and III.*

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

FOR UNDERGRADUATES AND GRADUATES.

Course VII. Special Problems in Plant Physiology. Laboratory and reference work. Particular attention will be devoted to methods of setting up apparatus and a thesis will be required at the completion of the course. Open to those who have pursued the long course either in botany or zoology, or course III in botany. *Senior I, II and III.*

Course VIII. Special Taxonomy. Herbarium and reference work. Open to those who have pursued Course I in botany or course II, followed by course IV. *Senior I, II and III.*

Course IX. Special Plant Morphology and Embryology. Lectures, laboratory work and collateral reading. Open to those who have completed five terms of work in the department of botany.

FOR GRADUATES.

Course X. Comparative Gametophytic Anatomy and Embryology. Laboratory and reference work. *Term I.* Open to those who have pursued six terms of botanical work.

Course XI. Comparative Sporophytic Anatomy and Embryology. Laboratory and reference work. Open only to those who have completed course X. *Terms I and II.*

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

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

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

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

JOURNAL CLUB AND SEMINAR.

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

THE BIOLOGICAL CLUB.

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

READING CLUB.

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

CHEMISTRY.

FOR UNDERGRADUATES.

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

Course II. The Metallic Elements. Lectures and laboratory work. The course embraces the general group reactions according to the Periodic Law, with a special study of the individual members of the groups. Open to those who have completed course I.

- Course III. Qualitative Analysis.* Lectures and laboratory work. The course includes the general reactions of the metals and their qualitative separation. Open to those who have completed course II.
- Course IV. Qualitative Analysis.* Lectures and laboratory work. Reactions and the separation of the acids. Open to those who have completed course III.
- Course V. Quantitative Analysis.* Lectures and laboratory work. An introduction to gravimetric analysis and a quantitative separation of the metals. Open to those who have completed course IV.
- Course VI. Quantitative Analysis.* Continuation of course V. A completion of gravimetric analysis and an introduction to volumetric analysis.
- Course VII. Volumetric Analysis.* Lectures and laboratory work. A continuation of course VI. Open to those who have completed course VI.
- Course VIII. Theoretical Chemistry.* Lectures and reading. A discussion of the general chemical laws. Open to those who have completed course VI.
- Course IX. The History of Chemistry.* Lectures and reading. The course includes a discussion of chemistry and the chemical theories from the beginning down to the present time. Open to those who have completed course III.
- Course X. Organic Chemistry.* Lectures and laboratory work. An introduction to organic chemistry, a discussion of the Aliphatic Series and a preparation of the more important compounds of the series. Open to those who have completed course VI.
- Course XI. Organic Chemistry.* Lectures and laboratory work. A discussion of the Aromatic series and the preparation of the more important compounds. Open to those who have completed course XI.
- Course XII. Water Analysis.* Lectures and laboratory work. The course includes the chemistry and an exhaustive analysis of the natural waters. Open to those who have completed course VII.
- Course XIII. Gas Analysis.* Lectures and laboratory work. The course includes an introduction to the analysis of gases, as air, illuminating gases, gases in water, with Hempel's, Winkler's and Lunge's apparatus. Open to those who have completed course VII.
- Course XIV. The Chemistry of the Carbohydrates.* Lectures and laboratory work. This course includes the determination of Hydroxyl groups in sugar, the reactions with Phenylhydrazine and Hydroxylamine with a quantitative determination with Fehling's solution and with the polariscope. Open to those who have completed course XII.
- Course XV. Iron and Steel Analysis.* Lectures and laboratory work. The course includes the rapid determination of iron of both gravimetric and volumetric methods and a comparison of the methods given in Blair's "Chemical analysis of Iron." Open to those who have completed course VII.
- Course XVI. Domestic Chemistry.* Lectures and laboratory work. The course includes a chemical and domestic study of meat, milk and butter, the fats and oils, fermentation and alcohol, flour, bread, soda, vinegar, sugar, honey, tea, coffee, chocolate, the spices, the etherial oils, fruit ethers and the perfumeries. Open to those who have completed course III.
- Course XVII. Photographic Chemistry.* Lectures. The course includes the chemistry of the wet and dry plates, developers, fixers, paper and toning. Open to those who have finished course VI.

FOR GRADUATES.

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

- (a) *Special Inorganic Preparations.*
- (b) *Research work in Electro-chemistry.*
- (c) *Research work in general Organic Chemistry.*
- (d) *The Plant Alkaloids.*
- (e) *Stereo-chemistry and the Optical Activity of Organic and Inorganic Compounds.*
- (f) *Special research work in general Analytical Chemistry.*

ELOCUTION.

Course I. Reading. Freshman III.

Course II. Voice-Building and Interpretation. Sophomore II.

Course III. Interpretation, Expression and Classification of Literature, Elements of Gesture. Junior Class.

Course IV. Applied Gesture, Oratory and Shakspeare. Senior Class.

ENGLISH.

FOR UNDERGRADUATES.

Course I. (a) Old English (Anglo-Saxon) grammar and prose masterpieces. Freshman I. Sc. and Lt. Open as an elective to the juniors and seniors who did not take it as freshmen.

(b) *Old and Middle English Poetry Freshman II, Sc. and Lt.* Open to those who have completed course I (a).

(c) *History of Old and Middle English Literature, with printed syllabi and topical work. Freshman III, Sc. and Lt.* Open to those who have completed Course I (a and b).

(d) *History of the English Language.* Lectures with illustrative specimens. *Sophomore I, Lt.* Open to those who have completed course I, (a to c).

(e) *Chaucer, with textual and critical studies in the Canterbury Tales. Sophomore II, Lt. and Sc.* Open to those who have completed course I (a to d).

Course II. (a) Old English (Anglo-Saxon) elements and outline history of the English language. Sophomore II, Cl., Sc. and Lt. This course (a and b) constitutes the short course in English required of all students not in the long course I (a to e). One must have either the short or long course as a foundation for the English electives in the upper classes.

(b) *General Introduction to the History and Criticism of Modern English Literature. Sophomore III, Cl., Sc. and Lt.* Open to those who have completed course I (a to e) or course II (a).

Course III. (a) Applied English Etymology. Agricultural freshmen and foreign-speaking students I.

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

Course IV. (a) Elizabethan Lyrics and Selections from Spenser's Faerie Queene. This term's work is the beginning of a sequence of studies, extending through the year, in Elizabethan literature and experimentations successively in lyrical, dramatic and epic poetry. *Junior or Senior I.* Open to those who have completed course II.

(b) *Shakspeare. The Tempest, with general introduction to the comedies. Junior or Senior II.* Open to those who have completed course II.

(c) *Milton. The Epic and Studies in Paradise Lost. Junior or Senior III.* Open to those who have completed course II.

Course V. The English Bible and Elizabethan Prose. This study comes once a week throughout the year and accompanies course IV. Open to Juniors and Seniors who have completed course II.

Course VI. (a) Literature in the Nineteenth Century. Critical studies of the literary movements and of the authors at the opening of the nineteenth century. This is the beginning of a sequence of two terms of advanced laboratory and reference work with experimental theses. *Senior I.* Open to those who have completed course II.

(b) Literature in the United States in the Nineteenth Century. The correlating of the periods in American literature with those in the English will be followed by the critical study of literary movements and typical specimens of literature (3). *Senior II.* Open to those who have completed courses II and VI (a).

Course VII. Lectures on Oratory by the President (1). This course accompanies course VI (b). Open to all seniors and graduates.

Course VIII. Lectures on Shakspeare by the President (1). These lectures accompany course XII. *Senior III.* Open to all seniors and graduates.

Course IX. Historical Syntax of the English Language. *Senior I.* Open to juniors and seniors or graduates who have completed course II.

Course X. Foreign Elements in the English Language (2). *Senior III.* Open to juniors, seniors and graduates.

Course XI. English Archaeology (2). *Senior III.* Open to juniors, seniors and graduates.

Course XII. Philosophy of English and "American Literature," from their rise to the present time (3). *Senior III.* Open to all seniors.

Course XIII. Seminar for Special Research in the literature of the Nineteenth Century, designed to be work parallel to that of course VI. Research is proposed in the letters of Scott, Motley and Lowell. The Seminar of 1893-94 will be able to make some valuable contributions to knowledge in a critical edition of *Hiawatha* prepared by them. The Seminar meets weekly throughout the year. Open to seniors and graduates.

FOR GRADUATES.

Course XIV. (a) Advanced work in Old and Middle English.

(b) Interpretation of Beowulf.

Course XV. Gothic in its relation to Teutonic Philology, especially to Old English. Dr. Joseph Wright's *Primer of Gothic* is made the basis for the study.

Course XVI. Old Saxon. Grammar and reading of the *Heliand*.

Course XVII. A Review of the Schools of Criticism.

Course XVIII. (a) Critical Studies in the Literature of the Eighteenth Century.

(b) The Rise of the Romantic Movement.

Course XIX. English Lyrics in Palgrave's Golden Treasury.

Course XX. Typical Victorian Poets. e. g., Matthew Arnold, Tennyson, Browning, William Morris.

Course XXI. The Evolution of the English Press.

Course XXII. Comparative Literature studied in its bearing upon English literature.

Course XXIII. Research or Special Studies in some line selected by individual students will be guided by the department.

In 1894-95, classes will be formed, in any term, in not more than four of the specifically graduate courses. It will be noticed that some of the undergraduate advanced courses are open, under certain conditions, to those who have not previously pursued them.

THE KNIGHTS OF ENGLISH LEARNING.

This is the name of a society auxiliary to the department. Its privileges may be inferred from its description. See page 48.

THE PHILOLOGICAL SOCIETY OF THE UNIVERSITY.

It is believed that the graduate students in the English department will not be behind those in other linguistic departments in their interest in this general society. See page 48.

JOURNALS.

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

SCHOLARSHIPS AND PRIZES.

For announcements of these see pages 49-51.

TEACHERS' AND UNIVERSITY EXTENSION COURSES.

Teachers entering the undergraduate "teachers' course" should consult the head of the department as to what courses to select to form sequences adapted to their needs. During the past year many teachers have availed themselves of the University Extension classes for studies in Spenser, Shakspeare, Bacon, and Milton, meeting weekly at the Public Library.

FREEHAND DRAWING.

Course I. Elementary Drawing from the Cast in Crayon and Charcoal., embracing the study of light and shade and perspective.

Course II. Advanced Drawing from the Cast, embracing the study of the antique in crayon and charcoal. Students who pursue this course must have completed course I.

Course III. Sepia and Water Color Painting from Casts of Historic Ornament and Natural Objects. Students who pursue this course must have completed courses I and II.

Course IV. Outdoor Landscape Sketching and Architectural details in "Black and White," Sepia and Water Colors. Students who pursue this course must have completed courses I and II.

Course V. A Thorough Course in Ornamental and Historical Design and Decorative Art, for students who have completed courses I and II. *Freshman I and Junior III.* In order to take the work of the junior third term one must have completed at least as much drawing as is required of the scientific freshmen.

FRENCH.

FOR UNDERGRADUATES.

Course I. Advanced Grammar and Composition. Various authors will be read: Racine, Corneille, Pascal, Feuillet, Daudet, Greville, Sand, etc. *Freshman I, II and III and Sophomore I and III.* Open to Sc. and Lt. freshmen who have completed the French required for entrance.

Course II. French Begun. Whitney's French Course. Blouet's French Composition; Mme. Foa's Petit Robinson de Paris; Muller's Les Grandes Decouvertes Modernes; Fontaine's Histoires Modernes. *Freshman III and Sophomore I and II, Lt.*

Course III. French Begun. Whitney's French Course; Blouet's Composition; Luquien's French Prose of Popular Science; Octave Feuillet; Lacombe's Petite Histoire de France; articles from recent scientific journals. *Freshman II and III and Sophomore I, Sc.*

Course IV. French Begun. Whitney's "Practical Course of French" or Brachet's "Historical French Grammar;" some of the writers of the French classical school: Pascal, Corneille, Montiesquieu, etc. *Sophomore I and II, Cl.*

Course V. (a) Composition, Translation, Literature. McMillan's Composition La Fontaine's Fables; Em. Souvestre's Un Philosophe Sous les Toits; Marcillac's Histoire de la Littérature Française; lectures on the history of the French language and Medieval literature. *Junior I.*

(b) *Historic Anecdotes Translated from English into French.* Moliere, Corneille, Merimee; Gautier's "Scenes of Travel;" lectures on the Renaissance period and the literature of the seventeenth century or the classical school. *Junior II.*

(c) *Howell's Farce, "The Elevator," Translated into French.* Taine's Philosophie de l'Art en Italie et en Grece; lectures on the literature of the eighteenth century, with a view to the causes of the French Revolution. *Senior II.* Not offered for the year 1884-95.

d) *Tableaux de la Revolution Francaise:* Guizot's Civilization en Europe; Howell's "A Letter of Introduction" translated into French; Lectures on the Modern Schools in Literature; romantic, realistic, impressionists, etc. *Senior III.* Not offered for the year 1894-95.

Seminar work will be engaged in during the senior year in connection with the regular work of the class for the discussion of questions in the philosophy of French literature.

FOR GRADUATES.

Course VI. Romance Languages: (a) Old French. Morceaux Choises des Auteurs Francaise du Moyen Age, par L. Cledat. Some of the oldest monuments of the French language, such as Les Serments de Strasbourg; La Chanson de Roland; La Vie de Saint Alexis; Le Roman du Renard; Le Roman de la Rose (selection) translated into modern French and the laws of the phonetic changes studied. This course is especially valuable to students who wish to make a scientific study of the French element in English.

(b) A systematic study of some special topic, as: The Philosophy of the Nineteenth Century; the literature of the Eighteenth Century.

GEOLOGY.

FOR UNDERGRADUATES.

Course I. Elements of Geology, physiographic, structural and dynamic. Text-book and lectures, *Senior I.*

Course II. Stratigraphic and Historical Geology. Lectures and text-book. Twice a week. *Senior II.*

Course III. Introduction to Paleontology. The classification of fossils with examination of some invertebrates. Lectures and laboratory. Twice a week. *Senior II.* Open to those who have completed course I.

Course IV. Introduction to Petrology. Preliminary studies in the crystalline rocks. Lectures and laboratory. Twice a week. *Senior II.* Open to those who have had course I, Geology, and course II, Mineralogy.

Course V. Paleontological Studies. Laboratory, reading, field work and lectures on the evolution of geologic faunas and floras. *Senior III.* Open to those who have completed courses I and II.

Course VI. Petrological Studies. Investigations in the crystalline rocks. *Senior III.* A continuation of course IV.

Course VII. Applied Geology. An outline of the economic relations of geology. Text-book, lectures and reading. *Senior III.* Open to those who have completed course I.

Course VIII. An Outline of General Geology, with practice in the identification of rocks. Lectures. *Senior I.* Once a week.

NOTE.—Course IV is not open to those taking course III: One course only can be selected of courses V, VI and VII.

FOR GRADUATES.

- Course IX. 1. *The Granitic Rocks of Central Minnesota.*
 2. *The Pre-Cambrian Eruptives of Northeastern Minnesota.*
 3. *Basic Intrusives and their Contact Phenomena.*
 4. *The Lower Paleozoic of Southeastern Minnesota.* Special field to be selected on consultation.

GERMAN.

FOR UNDERGRADUATES.

Course I. *Critical Studies in German Classics.*

- (a) *Schiller*.—Outline of his life and works, with a critical reading of one drama (Jungfrau von Orleans, or Maria Stuart); writing from dictation and memorizing of selections from his shorter poems: oral and written exercises based on the text read; review of German grammar (inflection).
 (b) *Goethe*.—Brief sketch of life and works; critical reading of "Hermann and Dorothea," or "Egmont;" dictation of his lyric poems: oral and written exercises based on text; review of grammar (practical syntax), continued from (a).
 (c) *Heine*.—Sketch of life and works; "Harzreise" and "Buch der Lieder." German grammar (derivation and composition): original letters, notes and short essays by the class. *Freshman Sc. and Lt., I, II and III.* Open to those who have completed the German required for entrance.

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

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

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

(c) *Scientific Prose Selections* (Gore); exercises based on words of the text. Special attention given to the acquisition of a vocabulary of scientific terms. Objects of this course are: 1st, to enable the students to read the language as soon as possible. 2d, to give a scientific vocabulary for use in other departments. *Freshman Sc. II and III, Sophomore Sc. I.* Open to those who have not completed entrance German.

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

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

(b) German grammar and reader, continued. Structure of the German sentence; translation from English into German; sight reading of easy stories and poems.

(c) *Narrative Prose and Poetry*. German prose composition; letters, essays; reading at sight. The aim of this course is to give facility not only in reading but also in speaking the language; instruction given wholly in German. *Sophomore Cl. and Lt., I, II, and III.* Open to those who have not completed entrance German.

Course V. *Intermediate*.—(Parallel with course I).

(a) *Goethe*.—His life and works; "Egmont." Shorter poems dictated and committed to memory; advanced grammar; syntax; derivation and composition.

- (b) *Lessing*.—Life and works; "Nathan der Weise." Exercises in dictation and composition; essays.
- (c) *Balladen und Romanzen* (Buchheim). Rapid sight reading of narrative prose; practice in writing and speaking German.
- Junior I II and III*, for those who have completed course III, IV or entrance German.

Course VI. Advanced subjects in literature and criticism.

- (a) *Goethe's Faust*; history of its composition. Faust Legend; its treatment in literature before and since Goethe's time; the plan of Goethe's Faust; changes in order of the scenes; solution of Faust problem in Part II; lectures; essays by the class upon related topics. References: Grimm's "Goethe"; Boyesen's "Goethe and Schiller"; Lemis's "Life of Goethe"; Von Loeper's "Faust"; Düntzer's "Erläuterungen" Kuno Fischer's "Faust"; Vischer's "Faust."
- (b) *Lessing's "Laocoon"* (25 chapters) and selections from his "Dramaturgie." French classicism; Lessing's study of Sophocles, Aristotle and Shakespeare; application of his conclusions in the dramas "Philotas," "Minna von Barnehelm" and "Emilia Galotti." Nathan der Weise; its ethical significance; theological writings; lectures; and theses by the class.

Course VII. Seminar. German History and Literature in the age of the Reformation: Councils of Constance and Basle; Humanism; classical languages and antiquities; Erasmus; Educational Reforms; Mysticism. Moralizing and Satirical literature (Sebastian Brant's "Narrenschiffs"; Murner's "Narrenbeschwörung"). Political and social conditions at the close of the sixteenth century. Martin Luther; translation of the Bible; New High German language: his controversial writings, sermons and hymns. Holbein, Dürer; Hans Sachs and the Meistersänger. The drama, lyrical, allegorical and didactic literature. Sebastian Frank and the prose writers. Autobiographies of Goetz von Berlichingen and Hans von Schweingen. Theological disputations; Catholicism, Lutheranism and Calvinism; Witch Trials; Foreign imitations; Fischart's "Gargantua." Jesuits; Catholic counter reformation. Open to seniors and graduates.

Course VIII. For Graduates.

- (a) Paul's "Mittel-Hoch-Deutsche Grammatik." Selections from the "Nibelungen Lied"; Gudrun; Wolfram; Walter von der Vogelweide. Translations into modern German; political and literary history of the period.
- (b) Braune's "Alt-Hoch-Deutsche Grammatik und Lesebuch." Müllenhoff and Scherer's "Denkmaler." History of the period, based upon Arnold's "Deutsche Geschichte" References: Blümner's "Laocoon," Overbeck's "History of Ancient Art;" Dubos' "Reflexions Critiques sur la poessie et la peinture;" Winckelmann's "Imitation of the Ancients in Painting and Statuary;" Taine's "Lectures on Art;" (Part 1, chap. 2 and 3, and part 2, chap. 5); Huntington's "Manual of Fine Arts" (pp.15-75); Life and Works of Lessing by Danzel and Guhrauer, Erich Schmidt, Adolph Stahr, Düntzer, Sime and Zimmermann.
- (c) German Lyrical Poetry from Luther to Goethe; outline of the history of German literature since the Reformation. The thirty years' war; Gimmelhausen's Simplicissimus. Spener and the Pietists; Sprachgesellschaften; Martin Opitz; Paul Gerhardt; religious poetry. Imitation of French and English (Leipsic and Zurich school), Klopstock's "Messias" Odes and Dramas. Wieland-Lessing; early dramas, "Laocoon," "Dramaturgie," dramatic masterpieces, religious controversies. Herder and the " Sturm und Drang" Period. Voss and the "Hainbund." Goethe; Lyrics, "Goetz and Werther," Egmont, "Iphigenia," "Herman and Dorothea," "Wilhelm Meister;" Autobiography, "Faust." Schiller, "Raubers;" historical æsthetic writings, "Wallenstein," "Jungfrau von Orleans," "Wilhelm Tell." Jean Paul Richter. The Romantic School; Patriotic Poets; Heine; Prose Writers. Das junge Deutschland.

References: History of German Literature by Gervinus, Goedeke, Koberstein, Kurz, Roquette, Scherer, Vilmar, Warkernagel, Hosmer, Taylor, Hillebrand, Julian Schmidt, Hettner, and Gottschall. *Juniors and Seniors I, II, III.*

GREEK.

FOR UNDERGRADUATES.

- Course I. Homer's Iliad.* 3 books. Smith's history of Greece, introduction and books I and II; collateral reading in Grote's history of Greece, Part I; Greek composition; reading at sight. *Freshman I, and II three weeks.*
- Course II. Xenophon's Symposium.* Smith's history, book IV. Collateral reading in Grote's history, chapters 47 to 68; Greek prose composition; reading at sight. *Freshman II, nine weeks.*
- Course III. Lysias.* Smith's history, books V and VI; collateral reading in Grote's history, chapters 78 to 90; Greek prose composition; reading at sight. *Freshman III.*
- Course IV. Herodotus.* Smith's history, books II and III; collateral reading in Grote's history, Part II, chapters 1 to 47; Greek prose composition; reading at sight. *Freshman I.*
- Course V. Xenophon's Memorabilia.* Smith's history, book IV; collateral reading in Grote's history, chapters 47 to 68; Greek prose composition; reading at sight. *Freshman II.*
- Course VI. Demosthenes.* Smith's history, book VI; collateral reading in Grote's history, chapters 78 to 90; Greek prose composition; reading at sight. *Freshman III.*

Those candidates who have read Homer take the advanced courses, IV, V, VI; all others take courses I, II, III.

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

- Course VII. Plato—Apology and Crito.* Greek history; collateral reading; theses; reading at sight. *Sophomore I.*
- Course VIII. Tragedy—Sophocles' Antigone,* or one play of the other dramatists; Greek history; collateral reading; theses; reading at sight. *Sophomore III.*
- Course IX. Archeology of Greek Art.* Collateral reading; theses. *Junior I and II.*
- Course X. Lyric and Bucolic Poets.* Collateral reading; theses. *Junior III.*
- Course XI. Lectures on Greek Poetry,* with select readings from the poets. *Senior I.*
- Course XII. Neo-Hellenic.* Collateral reading; theses. *Senior II and III.*
- Course XIII. Seminar in Greek Poetry.* One hour per week. *Senior I, II and III.*
- Course XIV. The Political Institutions, the Antiquities and the Private and Public Life of the Greeks.*

This course is given in short lectures distributed through the above courses, supplemented by collateral reading.

FOR GRADUATES.

- Course XV. (a) Greek Poetry,* epic, lyric, dramatic, bucolic, with the critical reading of authors.
(b) *Greek Oratory,* with the critical reading of authors.

HISTORY.

FOR UNDERGRADUATES.

- Course I. (a) Institutions of the Middle Ages in Europe.* Lectures and assigned reading. The study of events is made subordinate to the study of institutions, especially such as

have influenced modern life. Required of all students. *Freshman Cl. and Lt. III, and Sophomore Sc. I.* For the year 1894-95, literary sophomores who have not pursued the study will take it the second term sophomore, as in previous years.

(b) *Institutions of England in the Middle Ages*, from the Roman Conquest to Henry VII. Topical research and lectures. The main study is directed to the evolution of the English constitution. Open to those who have completed I (a). *Sophomore Sc. and Lt. III, and Sophomore Cl. III.* For the year 1894-95, literary sophomores who take course I(a) the second term will take (b) the third term with the classical.

Course II. England Since the Renaissance. Topical research, essays, and lectures. The English constitution is traced to the end of the Napoleonic wars. Open to all who have completed Course I (a) and (b). *Junior I.*

Course III. (a) The Political and Constitutional History of the United States, through the adoption of the Constitution. Lectures and topics involving original research. Open to all who have completed course I (a) and (b). *Junior II.*

(b) *Political and Constitutional History of the United States*, under the constitution. Investigation of selected topics. A continuation of course III (a). *Junior III.*

Course IV. (a) Modern European Politics. The work is introduced by lectures on the state of Europe before the French Revolution and the changes wrought by that movement. Then, grouping the studies so far as possible about the successive French revolutions, the four great central states are taken up in detail, by topics, with special attention to the reconstructions since 1848, to constitutions, and to present political questions. Careful study is made of the constitutions of Switzerland and of the Scandinavian countries; and the other smaller states are passed over briefly in lectures. Students will have Wilson's *The State*, and are advised to have Müller, but the work will be done mainly in the library and largely with periodicals, year books, annual encyclopedias and the like. Open to all who have had course I (a) and (b). *Senior I.*

(b) *Modern European Politics* continued. The Eastern Question, Russia, the state of the Balkan peninsula, the Turk, England and her colonies, and the European colonies in general. *Senior II.*

Course V. Philosophy of History. Lectures and readings. Open to all who have completed four terms of history. *Senior III.*

Course VI. Seminar in American History. One hour a week through the year. Open to all who have taken course III (a) and (b).

FOR GRADUATES.

Course VII. (a) Medieval Institutions of Europe.

(b) *Constitutional History of England.*

(c) *Political History of the United States.*

(d) *Modern European Politics.*

(e) *The Philosophy of History.*

Under certain conditions graduate students, who have not already taken the work, will be permitted to pursue courses III, IV, V, and VI, with undergraduate classes.

LATIN.

FOR UNDERGRADUATES.

Course I. Livy Books I and XXI with sight reading from other writers of history; construction of the Latin sentence; composition of words, with special attention to laws of phonetic change; Latin composition based on the text; rise and development of Roman institutions. *Freshman I and II.*

Course II. Plautus and Terrence. Study of early Latin, language and literature; development of the drama; Latin composition. *Freshman III Cl. and Lt.*

Course III. Horace. Study of his times, style and works; outline of the history of Roman literature. *Freshman III, Se.*

Course IV. Horace. Study of Latin language and literature commenced in course II, continued. *Sophomore I, Cl. and Lt.*

Course V. Tacitus and Pliny. Social life of the Romans in the late Republic and early Empire. *Sophomore II Cl and III Lt.*

Course VI. Cicero "De Natura Deorum," with selections from Lucretius; religion of the Romans. *Junior I.*

Course VII. Outlines of Roman Law. Lectures with translations, at sight, of texts illustrating the subject. *Junior III.*

Course VIII. Seneca. His ethical teachings; reading of his shorter essays. *Senior III.*

Course IX. Roman Satire, embracing a study of the elements and development of satire with a comparison of the Roman writers in this field of literature. *Senior III.*

Course X. Early Latin. Seminar once a week throughout the junior year.

Course XI. (a) Sanskrit. Grammar and Reader; story of Nala; selections from Rig-Veda.

FOR GRADUATES.

Course XII. Roman Drama.

MATHEMATICS.

FOR UNDERGRADUATES.

Course I. Higher Algebra: simple equations, proportion, progression, variation, quadratic equations, simultaneous equations of the second degree, inequalities, binomial theorem, indeterminate co-efficients, and higher equations. *Freshman I.*

Course II. Logarithms and Plane and Spherical Trigonometry, with numerous applications. *Freshman II.*

Course III. Analytical Geometry: the conic sections, both by rectilinear and polar coordinates, 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. *Sophomore III, Se. Junior I.*

Course IV. Differential Calculus: differentiation of algebraic and transcendental functions, development of functions, maxima and minima, treatment of tangents, subtangents, normals, subnormals, asymptotes, direction and rate of curvature, evolutes and envelopes. The text book is based on the infinitesimal method, but the fluxionary method is given orally and the system fully developed. *Junior II.*

Course V. Integral Calculus: integration of the various forms, rectification of curves, quadrature of plane and curved surfaces, cubature of volumes, equations of loci by means of the calculus. *Junior III.*

Course VI. Method of Least Squares: a study of the combination and adjustment of observations and the discussion of their precision as applied especially to engineering, physics and astronomy. *Senior II.*

Course VII. Co-ordinate Geometry of Three Dimensions: the plane, the straight line in space, quadric surfaces, applications. *Senior III.*

Each of these courses requires all the preceding courses, except in the case of the last, which requires only courses I, II and III.

Course VIII. Descriptive Geometry. Problems relating to points, lines, planes, solids, surfaces of revolution and warped surfaces. Recitations, lectures and problems. *Junior III.* Open to those who have completed courses I and II.

Course IX. Applied Mechanics. Statics; dynamics; strength and elastic properties of the ordinary materials of construction, hydro-mechanics (study of the laws of pressure and the flow of liquids). Recitations and lectures. *Senior I, II, III.* Open to those who have completed the first five courses.

FOR GRADUATES.

Course X. (a) 1. *Advanced Work in Co-ordinate Geometry.*
2. *Advanced Work in Differential Calculus.*
3. *Advanced Work in Integral Calculus.*
4. *Quaternions.*

The following subjects are offered to those who do not elect them in their undergraduate years:

(b) 1. *Analytical Geometry.*
2. *Differential Calculus.*
3. *Integral Calculus.*
4. *Co-ordinate Geometry of Three Dimensions.*

MILITARY SCIENCE AND TACTICS.

(a) For instruction in military tactics and administration the students are organized into a corps of cadets, consisting of a battalion of infantry.

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

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

Drill is required of all men in the freshman class, I and III (3); sophomore I (3) and III (1).

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

Officers are selected by the Commandant of Cadets, and upon confirmation receive commissions signed by the President of the University and bearing the official seal. In general they are taken from the senior and junior classes, are required to be good students in the other departments; of soldier-like bearing and force of character, and able to pass a creditable examination in Drill Regulations.

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

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

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

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

MINERALOGY.

FOR UNDERGRADUATES.

- Course I. Elements of Mineralogy.* Physical characters of common minerals, with determinative work; lectures and laboratory. *Junior I.*
- Course II. General Mineralogy.* Crystallography and the physical characters of minerals with a study of the rock-forming species; blowpipe analysis; lectures and laboratory. *Junior I.*
- Course III. General Mineralogy, continued.* Ores and economic minerals; determinations of species; lectures and laboratory. *Junior II.*
- Course IV. Quantitative Mineralogy.* Assaying gold and silver ores; lectures and laboratory. *Junior III.*
- Course V. Physical Mineralogy.* Investigations with goniometer, stauroscope, etc. *Junior III.* Not open to those who elect course IV.
- Course VI. An Outline of Mineralogy.* Identification of minerals; once a week throughout the year.

FOR GRADUATES.

- Course VII. Original Problems* on particular groups of minerals; the group to be selected on consultation.

MUSIC.

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

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

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

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

PEDAGOGY.

- Course I. Education Defined.* The order of development of the physical, intellectual and moral natures of the child; their interdependence, and the office of the teacher in directing the same to a harmonious development. The application of pedagogical principles in teaching the several branches of our common courses of study. *Senior I.*
- Course II. The Support and Administration in Systems of States and Counties;* in schools of the district and in the classes of the school. Principal attention will be given to our own State and the United States, including a general view of European systems. This will include methods of financial support and supervision; the heating, ventilation, and general sanitation of school buildings; the care of pupils in general health, eyesight and hearing. *Senior II.*
- Course III. Educational History and Theories* as presented in the history of nations and in the philosophy and biographies of representative men of the time. *Senior III.*

Instruction will be conducted by lectures and text-books, and by systematic observation of representative schools of all grades from the kindergarten to the high school, followed by detailed reports and discussions in the class-room.

This course is offered by the University in the belief that the representatives of higher education, in their capacities of superintendent, principal and teacher, should be familiar with the principles of psychology applied to school organization and instruction as recognized by the advance thought of the time.

PHILOSOPHY.

FOR UNDERGRADUATES.

- Course I. Elements of Logic* [1]. Lectures. *Freshman II.*
- Course II. Introduction to Psychology* [1]. Lectures. *Sophomore I.*
- Course III. Philosophy of Nature* [1]. Lectures. *Sophomore II.*
- Course IV. Introduction to Ethics* [1]. Lectures. *Sophomore III.*
- Course V. General Psychology* [3]. James' Psychology, Briefer Course, and Hoetfding's Psychology will be used as hand-books, supplemented by lectures and assigned reading. *Junior I.* Must be accompanied by course VI.
- Course VI. Anatomy and Physiology of the Nervous System* [1]. Lectures, with demonstrations by charts, models and clinics. *Junior I.*
- Course VII. General Psychology.* Continuation of course V. *Junior II.*
- Course VIII. Greek and Christian Ethics with a Sketch of Greek and Medieval Philosophy.* Lectures, with collateral reading; and the critical study of Selected Dialogues of Plato and Books I-IV of Aristotle's Ethics. *Junior III.* Open to those who have completed course VII.
- Course IX. Experimental Psychology.* Lectures and laboratory work. This course is intended to furnish a practical foundation for experimental research. *Junior III.* Open to those who have completed the courses in general psychology.
- Course X. Ethics; the Principles of Morality, with Special Reference to Modern Theories.* Seminar method; theses and discussions. *Senior I.* Open to those who have completed course VIII.
- Course XI. Logic; Systematic Study of the principles of deductive and inductive inference.* Lectures. *Senior I.* Open to those who have completed course VII.
- Course XII. Experimental Psychology; Advanced Laboratory Course.* Students will be assigned individual problems for original investigation. The course is designed for those who evinced special proficiency in the work of course IX. Twice a week through the Senior year, to count as 1½ terms.
- Course XIII. The History of Modern Philosophy.* Lectures, with collateral reading. *Senior I.* Open to those who have completed course VIII.
- Course XIV. Aesthetics.* Brown's The Fine Arts, with lectures and assigned reading, and visits to art collections. *Senior II.* Open to those who have completed course VII.
- Course XV. The Philosophy of Religion.* Caird's Evolution of Religion, with lectures. *Senior III.* Open to those who have completed two courses in Philosophy.
- Course XVI. History of Philosophy in the Nineteenth Century.* Lectures, with collateral reading. *Senior III.* Open to those who have completed course XIII. [Either course XV or course XVI will be offered; not both.]

FOR GRADUATES.

Course XVII. The Philosophy of Kant. Systematic study of the relation of Kant to the development of modern philosophy. The most important parts of the Critique of Pure Reason will be read and discussed. Special courses of collateral reading will be followed and reported upon by each individual. *First term.*

Course XVIII. Advanced Logic. Study of principles. Systematic individual investigation, with reports. Bradley's Principles of Logic and Bosanquet's Logic will be taken as the basis of work. *Second term.*

Course XIX. The Philosophy of Kant. Continuation of course XVII, with study of the Critique of Judgment. *Second term.* [Either course XVIII or course XIX will be offered; not both.]

Course XX. Ultimate Psychological Problems. Application of metaphysical principles. Each student will make special study of one problem. Theses. *Third term.*

In the graduate courses there will be one two-hour session each week, the work to count for a full term.

These courses are intended for those who have made a special study of philosophy in the undergraduate years, and have acquired considerable power for independent work. They are not open to undergraduates, save in cases of very exceptional proficiency and by special permission.

Fuller information respecting any of the courses may be obtained by consulting the folder published by the department.

PHYSICAL CULTURE.

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

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

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

PHYSICS.

FOR UNDERGRADUATES.

Course I. General Physics. Recitations and experimental lectures on mechanics, sound, heat, light, electricity and magnetism. *Freshman, III, Sophomore, I, II, III, Sc.* Open to those who have completed the mathematics of the freshman year.

Course II. Molecular Physics. Recitations and experimental lectures on sound, heat, light, electricity and magnetism. *Sophomore Engineers, I, II, III.* Open to those who have completed the mathematics of the freshman year.

Course III. General Physics. Recitations and experimental lectures on elementary physics. *Freshman, III, and Sophomore, I, C1, and I1.* Open to those who have completed the mathematics of the freshman year.

Course IV. Practical Physics. Laboratory practice, involving accurate physical measurements, particularly in heat, light, electricity, magnetism. Open to all who have completed course I. *Junior, II, III, Senior, I, II, III.*

Course V. Practical Physics. Laboratory practice for those who have completed course III. *Junior and Senior, I, II, III.*

Course VI. Practical Physics. Laboratory work for engineering students who have completed course II. *Junior Engineers, I, II.*

FOR GRADUATES AND UNDERGRADUATES.

Course VII. Advanced Physics. Special problems in some department of the science, experimental investigation being made the feature of the work.

POLITICAL SCIENCE.

FOR UNDERGRADUATES.

ECONOMICS.

Course I. Elements of Private Economics. The aim is to thoroughly inculcate established doctrine and show the nature and bearing of questions still unsettled. *Junior I.*

Course II. Economic History. Comprises an account of leading economic schools and movements, with some discussion of the successive phases of population, wage-fund, rent, value, etc. *Senior I.* Open to students who have taken course I.

Course III. American Public Economy. The object is to open the subject of American administration and finance. So far as time allows such topics as money, national banking, protection, public education, transportation and land policy are treated. *Senior III.* Open to those who have completed course I.

POLITICS.

Course I. The State and the Government. A descriptive treatment of these institutions, with discussions of their development, theories, end, etc. *Junior II.*

Course II. The Law and the Constitution. The contents and construction of the constitutions of modern free states, with an introductory outline of the elements of law. *Junior III.*

Course III. Public International Law. *Senior II.* An elementary course open to students who have completed course I, Politics.

Course I. Social Science. History, principles and elements of sociology, with discussions of pauperism, crime, care of defectives, etc. [3]. *Senior III.*

Political Science Seminar meets weekly through the year. Open to graduate students and also to senior undergraduates, under the general regulations concerning seminars.

Moot Senate meets weekly through the second term for practice in parliamentary procedure. Open to seniors and juniors.

FOR GRADUATE STUDENTS.

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

RHETORIC.

Course I. English Composition with elements of Rhetoric. *Fresh. I, II, III., Soph. I, II.*

Course II. Speeches, Tracts, Etc. *Sophomore III.*

Course III. Literary Criticism. Study of models of English in poetry, oratory, fiction, etc., with critical essays, speeches and debates. Open to students who have completed course I. *Junior I, II.*

Course IV. Essays upon Art Subjects. Open to students who have completed course I. *Junior III.*

SCANDINAVIAN LANGUAGES.

Course I. For Beginners.

(a) *Smith's Grammar; Bennett's Phrase-Book.* Blackboard and oral exercises.

(b) *Grammar and Phrase-Book reviewed.* Stories and poems committed to memory. Eriksen's Norske og Danske Forfattere II.

(c) *Eriksen's Norske og Danske Forfattere II.* Compositions and oral exercises. Junior or Senior I, II, III.

Course II. Advanced.

- (a) *Lectures [2]: History of Scandinavian Languages, Scandinavian Archaeology, Norse Mythology, the Viking Age, History of Old Scandinavian Literatures. Critical reading (2) of H. Ibsen; Peer Gynt; Essays.*
- (b) *Lectures [2]: History of Danish and Norwegian Literatures.*
 - (2) *Eriksen's Norske og Danske Forfattere I.* Essays.
- (c) *Lectures [2]: History of Swedish Literature.*
 - (2) *Reading of Masterpieces of Swedish Literature.* Essays. Senior or Junior I, II, III. Open to all students properly qualified.

Course III. Icelandic.

- (a) *Sweet's Icelandic Primer.*
- (b) *Nygaard's Udvalg af den Nørroene Literatur.* Senior or Junior I, II, III.

THE TEACHERS' COURSE.

A special course that may be completed in two years is offered to teachers who desire more of the subject matter of branches taught, and a philosophic understanding of principles that belong to good teaching.

ADMISSION.

Those who may be admitted to this course are :

1. All candidates for degrees in the regular courses.
2. All special students who have had the necessary preparation for entrance to the freshman class, and the special subjects elected.

THE COURSE OF STUDY.

Consists of twenty-four terms of work. In order to thoroughness of preparation in subject matter, at least five of the sub-courses noted below must be completed, one of which must be pedagogy; and in preparation, two terms of psychology must be taken preceding pedagogy, which will bring the latter subject in the second year of this course.

The remaining seven terms' work may be selected from the regular curriculum.

SUB-COURSES.

History	Terms	Physics	3	Terms
English Literature	"	Physiology	3	"
Latin	"	Botany	3	"
German	"	Rhetoric, English Compo-	}	3
French	"	sition and Elocution		
Mathematics and Astronomy ..	"	Pedagogy	3	"
Chemistry	"			

THE UNIVERSITY TEACHERS' CERTIFICATE

will be conferred upon those who satisfactorily complete the work of the course as outlined above.

UNCLASSED STUDENTS.

I. Applicants for admission as unclassified students must present credentials admitting them to the freshman class as regular students. It is provided, however, that persons of mature years may be admitted by a vote of the General Faculty.

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

- a* The line of the work they wish to follow.
- b* Their reasons for not taking a regular course.

III. The committee on unclassified students will meet on the first Tuesday and Saturday of each term in room 37, main building, to consider applications, and all applications must be presented to the committee and not to individual members.

Students who are admitted are not allowed to pursue more than two of the following lines of study:

The grouping of the subjects is as follows:

- I. MODERN PHILOLOGY—English, French, German, Scandinavian.
- II. CLASSICAL PHILOLOGY—Greek, Latin.
- III. COMPARATIVE PHILOLOGY—
- IV. BIOLOGICAL SCIENCE—Botany, Zoology, Physiology, Paleontology.
- V. PHYSICAL SCIENCE—Geology, Chemistry, Physics, Mineralogy.
- VI. MATHEMATICS—Algebra, Trigonometry, Co-ordinate Geometry, Calculus, Astronomy.
- VII. HISTORY—
- VIII. POLITICAL SCIENCE—Political Economy, National Economy, International Law.
- IX. PHILOSOPHY—Logic, Psychology, Ethics, History of Philosophy.
- X. DRAWING—

All applications, after they have been approved, are to be placed on file with the Registrar. Unclassed students desiring to change their lines of study must again present their application to the committee for approval; and must renew their application at the beginning of each year.

THE UNIVERSITY SUMMER SCHOOL.

This school will open Monday, July 30th, and continue in session four weeks, closing Friday, August 24th. This school is organized under the authority of the Department of Public Instruction in the in-

terest of the teachers of the high schools and the graded schools of the State. The instruction will be given in two sections.

I. THE UNIVERSITY SECTION,

which will provide for special and graduate work in several university subjects for teachers in high schools, and for others who wish, as students, to continue work in lines already begun. Instruction will be given by members of the University Faculty or under their supervision, and as the work is completed proper credit will be given upon the records of the University.

The subjects offered in the school of '94 will be Latin, French, Mathematics, Animal and Vegetable Biology, Chemistry, History, Psychology and Pedagogy. All of the advantages of the laboratories, museums and library of the University will be open to the classes of this section.

II. THE ELEMENTARY SECTION

will provide for teachers of the primary and elementary grades in the study of common school subjects with a view to teaching them. These will include Arithmetic, Grammar, History of the United States, Physiology, Botany, Physics, Music, Penmanship, and Special Method courses with illustrative lessons.

Circulars of information will be sent free upon application to the Superintendent of Public Instruction, St. Paul, or to the Registrar of the University.

THE COLLEGE OF
ENGINEERING,
METALLURGY AND
THE MECHANIC ARTS

The College of Engineering, Metallurgy and the Mechanic Arts.

THE FACULTY.

- CYRUS NORTHROP, LL. D., *President.*
CHRISTOPHER W. HALL, M. A., *Dean and Professor of Geology and Mineralogy.*
JOHN G. MOORE, B. A., *Professor of German.*
JOHN F. DOWNEY, M. A., C. E., *Professor of Mathematics and Astronomy.*
CHARLES W. BENTON, B. A., *Professor of French.*
FREDERICK S. JONES, B. A., *Professor of Physics.*
WILLIAM R. HOAG, C. E., *Professor of Civil Engineering, in charge of Road and Sanitary Engineering and Geodesy.*
WILLIAM R. APPELBY, B. A., *Professor of Mining and Metallurgy.*
GEORGE D. SHEPARDSON, A. M., M. E., *Professor of Electrical Engineering.*
GEORGE B. FRANKFORTER, M. A., Ph. D., *Professor of Chemistry.*
CHARLES F. SIDENER, B. S., *Assistant Professor of Chemistry.*
HARRY E. SMITH, M. E., *Assistant Professor of Mechanical Engineering.*
FRANCIS P. LEAVENWORTH, M. A., *Assistant Professor of Astronomy.*
JOEL E. WADSWORTH, C. E., *Assistant Professor of Civil Engineering in charge of Mechanics and Structural Engineering.*
WILLIAM H. KIRSCHNER, B. S., *Assistant Professor of Drawing.*
WILLIAM S. PATTEE, LL. D., *Lecturer on Mining Law.*
HENRY T. ARDLEY, *Principal of the School of Design.*
AMELIA I. BURGESS, *Instructor in Freehand Drawing.*
PETER CHRISTIANSON, B. S., *Instructor in Assaying.*
JAMES M. TATE, *Instructor in Carpentry, Pattern and Foundry Practice.*
JAMES H. GILL, B. M. E., *Instructor in Iron Work.*
FREDERICK W. SARDESON, M. S., *Instructor in Geology.*
CHARLES P. BERKEY, M. S., *Instructor in Mineralogy.*
LAURA MAY DENNISON, *Instructor in Freehand Drawing.*
BIRNEY E. TRASK, B. C. E., *Scholar in Civil Engineering.*
GEORGE H. MORSE, B. E. E., *Scholar in Electrical Engineering.*

SPECIAL LECTURERS FOR 1893-94.

- Civil Engineering*—C. F. LOWETH, A. W. MUNSTER, GEO. L. WILSON, F. W. CAPPELEN.
Mechanical Engineering—WM. A. PIKE.

- HARRY W. DIXON, *Engineer.*
JOHN F. CATES, *Engineer.*

ANNOUNCEMENT.

In this college there are six regular courses of study, viz: Civil Engineering, Mechanical Engineering, Electrical Engineering, Mining, Chemistry and Metallurgy leading to the corresponding baccalaureate degrees.

The School of Design offers a three years' course in practical, ornamental design and elementary art to students of mature years who can pass an examination in elementary drawing.

Unclassed students are admitted to pursue, under the direction of the faculty, one or two lines of study selected from some regular course. Such students must be persons of mature years, and present preparation sufficient to admit them to the freshman class, or shall give other evidence of ability to do with credit the work applied for.

ADMISSION.

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

English Grammar and Composition with Essay—The essentials of grammar will be required, with sufficient knowledge of composition to enable the candidate to write with ease and precision a business letter or draft a series of resolutions. The essay will be on a subject announced at the examination, preparation for which will require a knowledge of the right use of rhetorical figures and of what is meant by precision, brevity and style. Preparations for this essay will require the careful reading of Shakspeare's Merchant of Venice, Lambs' Tales from Shakspeare, Scott's Marmion, Hawthorn's Twice Told Tales, Defoe's Robinson Crusoe. Equivalent of these four books will be accepted.

Algebra—Elementary and higher, the latter to include factoring, highest common divisor, lowest common multiple, fractions, involution, evolution and radicals.

Geometry—Plane and solid. Olney's text-books or their equivalent.

History—History of the United States and History of Greece and Rome.

Physiology—Martin's Human Body, briefer course or its equivalent.

Natural Philosophy—Gage's Introduction to Physical Science or its equivalent.

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

Botany—Phanerogamic, Gray's Lessons and Manual or Wood's Class Book.

Drawing—Two terms of freehand drawing.

German—Meissner's German Grammar (Part I, II, III), Boisen's German Prose and Buchheim's German Poetry for beginners, or

French—Chardenal's Course, first two books of Telemaque.

English—Latin Elements of English and History of English Literature.

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

For a more detailed statement of the foregoing subjects see pp. 73-75, since the examinations are identical with those given in these subjects for admission to the college of Science, Literature and the Arts.

ADVANCED STANDING.

Candidates for advanced standing must pass a satisfactory examination for admission and also upon those studies which have been pursued by the class they propose to enter.

Students from other institutions will be admitted to such standing as their credentials or the examinations taken under the direction of the faculty of this college shall fairly entitle them.

COURSES OF STUDY.

FRESHMAN YEAR—Same for all courses.

FALL TERM.	WINTER TERM.	SPRING TERM.
Algebra, 5.	Trigonometry, 5.	German, 4. or French, 4.
*German, 5, or French, 5.	German, 5 or French, 5.	Chemistry, 4.
Chemistry, 4.	Chemistry, 4.	Surveying, 5.
Freehand Drawing, 5.	Mechanical Drawing, 5.	Descriptive Geometry, 5.
Military Drill, 3.	Carpentry, 2.	Military Drill, 3.

*Students presenting French for admission must take French throughout freshman year.

SOPHOMORE YEAR—FIRST TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Analytical Geometry, 5.	Analytical Geometry, 5.	Analytical Geometry, 5.
Topography, 4.	Carpentry and Pattern Making, 5.	Carpentry and Pattern Making, 5.
Draughting, 2.		
Mechanical Drawing, 3.	Mechanical Drawing, 3.	Mechanical Drawing, 3.
Physics, 4.	Physics, 4.	Physics, 4.
Military Drill, 3.	Military Drill, 3.	Military Drill, 3.

SOPHOMORE YEAR—SECOND TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Differential Calculus, 5.	Differential Calculus, 5.	Differential Calculus, 5.
*French, 4, or German, 4.	French, 4, or German, 4.	French, 4, or German, 4.
Working Drawings, 5.	Working Drawings, 5.	Working Drawings, 5.
Physics, 4.	Physics, 4.	Physics, 4.
Engineering Instruments, 3.	Pattern Work, 2.	Pattern Work, 2.

SOPHOMORE YEAR—THIRD TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Integral Calculus, 5.	Integral Calculus, 5.	Integral Calculus, 5.
French, 4, or German, 4.	French, 4, or German, 4.	French, 4, or German, 4.
Higher Surveying, 4.	Pattern and Foundry Work, 5.	Pattern and Foundry Work, 5.
	Machine Drawing and Design, 3.	Machine Drawing and Design, 3.
Physics, 4.	Physics, 4.	Physics, 4.
Field Work, 3.		
Drill, 1.	Drill, 1.	Drill, 1.

*Students who presented German for admission must take French second and third terms Sophomore year.

SOPHOMORE YEAR—FIRST TERM.

MINING.	CHEMISTRY.	METALLURGY.
Analytical Geometry, 5. Topography, 4.	Analytical Geometry, 5. Topography, 4.	Analytical Geometry, 5. Topography, 4.
Mechanical Drawing, 3. Physics, 4.	Mechanical Drawing, 3. Physics, 4.	Mechanical Drawing, 3. Physics, 4.
Mineralogy, 4.	Chemistry, 4. Mineralogy, 4.	Chemistry, 4.
Military Drill, 3.	Military Drill, 3.	Military Drill, 3.

SOPHOMORE YEAR—SECOND TERM.

MINING.	CHEMISTRY.	METALLURGY.
Differential Calculus, 5. * French, 4, or German, 4.	Differential Calculus, 5. French, 4, or German, 4.	Differential Calculus, 5. French, 4, or German, 4.
Working Drawings, 5. Physics, 4.	Working Drawings, 5. Physics, 4.	Working Drawings, 5. Physics, 4.
Mineralogy, 4.	Mineralogy, 4. Chemistry, 4.	Chemistry, 4.

SOPHOMORE YEAR—THIRD TERM.

MINING.	CHEMISTRY.	METALLURGY.
Integral Calculus, 5. French, 4 or German, 4.	Integral Calculus, 5. French, 4, or German, 4. Chemistry, 4.	Integral Calculus, 5. French, 4, or German, 4. Chemistry, 4.
Machine Drawing and Design, 3. Physics, 4.	Physics, 4.	Machine Drawing and Design, 3. Physics, 4.
Assaying, 3. Laboratory, 4.	Assaying, 3. Laboratory, 4.	
Drill, 1.	Drill, 1.	Drill, 1.

* Students who presented German for admission must take French second and third terms Sophomore year.

JUNIOR YEAR—FIRST TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Mechanics, 5.	Mechanics, 5.	Mechanics, 5.
Curves and Earthwork, 4.	Kinematics and Graphics, 5.	Kinematics and Graphics, 5.
Field Work, 4.	Forge Work, 5.	Forge Work, 5.
Mineralogy, 4.	Machine Drawing and Design, 2.	Machine Drawing and Design, 2.
Photography, 1 (optional).	Photography, 1 (optional).	Photography, 1 (optional).
Physics, 4.	Physics, 4.	Physics, 4.
Technical Essay.	Technical Essay.	Technical Essay.

JUNIOR YEAR—SECOND TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Mechanics, 5.	Mechanics, 5.	Mechanics, 5.
Structural Details, 3.		
Materials of Engineering, 3.	Materials of Engineering, 3.	Materials of Engineering, 3.
Railway Structures, 3.	Physics, 5.	Physics, 5.
Hydrography, 2.	Machine Work, 5.	Machine Work, 5.
Mineralogy, 4.	Electrical Measurements, 3.	Electrical Measurements, 3.
Highway Construction and Maintenance, 1.		
Technical Essay.	Technical Essay.	Technical Essay.

JUNIOR YEAR—THIRD TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Mechanics, 5.	Mechanics, 5.	Mechanics, 5.
Elementary Designs, 2.	Elementary Designs, 2.	Elementary Design, 2.
Railroad Work, 3.	Machine Design, 4.	Machine Design, 4.
General Astronomy, 4.		
Bridge Stresses, 5.	Machine Shop, 5.	Machine Shop, 5.
	Electrical Generators and Motors, 4.	Electrical Generators and Motors, 4.
	Electrical Measurements, 3.	Electrical Measurements, 5.
Technical Essay.	Technical Essay.	Technical Essay.

JUNIOR YEAR—FIRST TERM.

MINING.	CHEMISTRY.	METALLURGY.
Mechanics, 5.	Mechanics, 5.	Mechanics, 5.
Geology, 4.	Geology, 4.	Geology, 4.
Chemistry, 4.	Chemistry, 4.	Chemistry, 4.
	Water Analysis, 4.	
	Assaying, 4.	
Photography, 1 (optional).	Photography, 1 (optional).	Photography, 1 (optional).
Mining, 4.		Mining, 3.
Metallurgy, 3.	Metallurgy, 3.	Metallurgy, 3.
		Mineralogy, 4.
Technical Essay.	Technical Essay.	Technical Essay.

JUNIOR YEAR—SECOND TERM.

MINING.	CHEMISTRY.	METALLURGY.
Mechanics, 5.	Mechanics, 5.	Mechanics, 5.
Materials of Engineering, 3.	Materials of Engineering, 3.	Materials of Engineering, 3.
Geology, 4.	Geology, 4.	Geology, 4.
Mining, 3.	Chemistry, 4.	Mining, 3.
Chemistry, 4.	Analysis of Iron and Steel, 2.	
Metallurgy, 3.	Gas Analysis, 2.	Mineralogy, 4.
	Metallurgy, 4.	Metallurgy, 4.
Technical Essay.	Technical Essay.	Technical Essay.

JUNIOR YEAR—THIRD TERM.

MINING.	CHEMISTRY.	METALLURGY.
Mechanics, 5.	Chemistry, 4.	Mechanics, 5.
Elementary Designs, 2.		Elementary Designs, 2.
Machine Design, 4.	Machine Design, 4.	Machine Design, 4.
Mining, 4.	Industrial Chemistry, 4.	Mining, 3.
Metallurgy, 3.		Assaying, 3.
		Laboratory, 4.
	Metallurgy, 3.	Metallurgy, 4.
Applied Geology, 4.	Applied Geology, 4.	Applied Geology, 4.
Chemistry, 4.		
Technical Essay.	Technical Essay.	Technical Essay.

SENIOR YEAR—FIRST TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Geodesy, 4.	Thermo Dynamics, 5.	Thermo Dynamics, 5.
Railway Economics, 3.	Machine Work, 4.	Electrical Laboratory, 1.
	Valve Gear, 3.	
Geology, 1.	Geology, 1.	Geology, 1.
Details of Iron Construction, 4.	Designs, 4.	Electrical Designs, 3.
Field Work, 4.		Alternating Currents, 2.
Graphic Statics, 4.		
or Elective, 4.	Elective, 4.	Elective, 4.
Law, 1.	Law, 1.	Law, 1.

SENIOR YEAR—SECOND TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
Bridge Design, 5.	Steam Engines, 5.	Steam Engines, 5.
Hydraulics, 2.	Mechanical Laboratory, 5.	Mechanical Laboratory, 5.
Sanitary Engineering, 4.	Electrical Laboratory, 3.	Electrical Laboratory, 3.
Stereotomy, 5.	Electric Lights, 2.	Electric Lights, 2.
Least Squares, 4.	Machine Work, 2.	Central Stations, 2.
Elective, 4.	Elective, 4.	Elective, 4.
Thesis, 1.	Thesis, 1.	Thesis, 1.

SENIOR YEAR—THIRD TERM.

CIVIL ENGINEERING.	MECHANICAL ENGINEERING.	ELECTRICAL ENGINEERING.
	Designs and Specifications, 5.	Designs and Specifications, 5.
Iron Buildings and Roofs, 5.	Mechanical Laboratory, 3.	Electrical Transmission, 4.
	Machine Work, 2.	
Masonry, 4.		
Cements, 2.		
Elective, 4.	Elective, 4.	Elective, 4.
Thesis, 1.	Thesis, 1.	Thesis, 1.

SENIOR YEAR—FIRST TERM.

MINING.	CHEMISTRY.	METALLURGY.
Thermo Dynamics, 5.	Organic Chemistry, 4.	Thermo Dynamics, 5.
Mining, 4.	Special Problems, 4.	Mining, 3.
Metallurgy, 3.	Metallurgy, 4.	Metallurgy, 4.
Economic Geology, 4.	Chemistry, 4.	Chemistry, 4.
Ore Testing, 4.		Ore Dressing, 4.
	Photography, 1.	
Elective, 4.	Elective, 4.	Elective, 4.
Law, 1.	Law, 1.	Law, 1.

SENIOR YEAR—SECOND TERM.

MINING.	CHEMISTRY.	METALLURGY.
Mining, 4.	Chemistry, 4.	Mining, 3.
Metallurgy, 3.	Metallurgy, 3.	Metallurgy, 4.
Steam Engines and Motors, 5.	Chemical Philosophy, 5.	Steam Engines and Motors, 5.
Ore Dressing, 4.		Ore Testing, 4.
Electrical Measurements, 3.	Electrical Measurements, 3.	Electrical Measurements, 3.
Elective, 4.	Elective, 4.	Elective, 4.
Thesis.	Thesis.	Thesis.

SENIOR YEAR—THIRD TERM.

MINING.	CHEMISTRY.	METALLURGY.
Designs and Specifications, 5.	Designs and Specifications, 5.	Designs and Specifications, 5.
Mining, 4.	Chemistry, 4. Domestic, Photographic.	Mining, 3.
Electrical Generators and Motors, 4.		Electrical Generators and Motors, 4.
Metallurgy, 3.	Metallurgy, 3.	Electro-Metallurgy, 4.
Geology, 4.		Metallurgy, 4.
Elective, 4.	Elective, 4.	Elective, 4.
Thesis.	Thesis.	Thesis.

NOTES ON THE FOREGOING COURSES.

Aside from their technical work all regular students in this college take one year in each of the following subjects, save one term of German or French, which is given to military drill: German, French, Chemistry and Physics. In several courses an elective study is offered through the senior year.

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

Students in the college of Science, Literature and the Arts, who contemplate taking a degree in this college after completing their course, are recommended to select their electives with reference to as full a preparation as possible for the technical work of the course they propose to enter.

The elective of any term may be chosen from the work of either junior or senior year and from any department of this college or of the college of Science, Literature and the Arts, provided it can be pursued with profit to the student. The list of these electives in the last named college will be found on pp. 83-88.

The Modern Languages.—The work in modern languages will be directed to those practical ends which are so essential to a well-rounded technical education. One year's work in German and two-thirds of a year in French are required. The grammar and extracts from standard authors, some of them distinguished scientific men, receive such attention that the student may prepare himself for mastering technical literature.

Mathematics.—The course in mathematics covers six terms in freshman and sophomore years. One term each in the following subjects: Higher Algebra, Trigonometry, Descriptive Geometry, Analytical Geometry, Differential Calculus and Integral Calculus. With a thorough preparation in mathematics on admission to the college, it is believed that the student can in that time develop the ability to reason accurately and independently. He will also be prepared to meet those special needs that the higher technical and scientific work of the junior, senior and graduate years of his studies will bring.

Chemistry.—A year of work in chemistry is required in all the courses, in which the student will get a good practical knowledge of the metallic elements, a familiarity with the principal ores of the metals, and an understanding of the chemical principles involved in their extraction. The preparation, properties and uses of the salts of the

metals will be considered. Associated with this work and following it is a thorough course in qualitative analysis, required of all students in Mining, Metallurgy and Chemistry.

Physics.—The required year of physics is intended to be elementary and general, giving the student such a knowledge of phenomena and principles as will fit him for any subsequent work in the science. The regular work of the class room is supplemented by experimental lectures, not only to illustrate the laws of phenomena, but also to give the student ideas of methods and manipulation. With this general knowledge the student enters the laboratory and devotes himself to the more exact and exhaustive study of those particular lines which pertain to the special degree for which he is a candidate. The first year is therefore preparatory and the same for all students, while the subsequent years are adapted to the requirements of individual cases. Independent work in the laboratory is the special feature of this department after the first year.

Geology and Mineralogy.—The work in geology and mineralogy is made a special feature of the courses in mining, chemistry and metallurgy. The elements of both subjects are required of civil, electrical and mechanical engineers. The courses given are those described under the College of Science, Literature and the Arts until the special problems of the mining engineers are reached. In these each student is expected to visit some mine or mineral producing district, take his field observations, collect his material and make his notes and specimens the basis of a scientific study. The instruction throughout is of the most practical character since it is given to men engaged in preparation for the practical pursuits of the technical professions.

Drawing.—The work in drawing, as arranged by year and term, is exhibited in the following detailed description of the courses:

- Freshman Year— I. First Term—Freehand Drawing (5): Outline drawing from models; lettering; pen and pencil.
II. Second Term—Mechanical Drawing (5): Draughting instruments; geometrical drawing and simple projections.
III. Third Term—Descriptive Geometry (5): Point, line and plane; tangents, intersections and developments.
- Sophomore Year—IV. First Term—Mechanical Drawing (3): Isometric, horizontal, oblique and perspective projections; shades and shadows, rendered in line and with the brush.

- V. Second Term—Working Drawings (5): Conventional methods, freehand working drawings; engineering details; tracings and blue prints.
- VI. Third Term—Machine Drawing and Design (3): Details: assembly drawing; cam outline.
- Junior Year— VII. First Term—Machine Drawing and Design (2): spur and bevel gear outlines; elementary machine design. For mechanical and electrical engineers.
- Junior Year—First Term—Photography (optional) (1): The exposure and development of dry plates.

The intimate relation existing between a knowledge of descriptive geometry and the intelligent appreciation of the methods employed in preparing working drawings is recognized, consequently the study of descriptive geometry is pursued early in the course.

Apparatus—Adjoining the drawing rooms are printing and dark rooms fitted with complete apparatus for giving instructions and practice in photography and blue printing.

A large collection of prints, drawings and models, including a full set of Schroeder's models for descriptive geometry is at hand for reference. Additions are being made constantly to this collection.

The drawing rooms are easily supplied from the shops and laboratories with examples of modern engineering construction.

Departments.

TECHNICAL COURSES OF INSTRUCTION.

CIVIL ENGINEERING.

I. TOPOGRAPHICAL ENGINEERING.

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

Course II (a). Topography. The methods of conducting topographical surveys are taken up in the order of increasing accuracy. At first a text-book is used to acquaint the student with the instruments employed, method of use and theory of adjustment. Lectures are given on the details of field work; parties of topographers are formed and each makes a complete topographic survey of a certain tract. Observations on Polaris at elongation for azimuth and at culmination for latitude conclude the field work. Individual work characterizes this course. Sophomore I, 96 hours.

(b) *Draughting.* Different methods of representing topographic features are treated. The student executes a plate each of pen and brush conventional signs. All notes taken in course II (a) are reduced, areas computed and topographical maps made of lands surveyed. 24 hours.

Course III. Analytical Study of Engineering Instruments continued, including stadia, gradientor and plane-tables. Reduction charts are made and studied and cross-wires are replaced in transits. Sophomore II, 66 hours. Open to those who have had courses I and II.

Course IV. Higher Surveying. Analytical study of the aneroid and mercurial barometers and barograph is made for determining their efficiency in hypsometric surveys; of the solar compass and solar transit and various solar attachments for establishing government standard lines and the plane-table and stadia as a rapid means of prosecuting topographical surveys. Sophomore III, 88 hours.

Course V. Field Work and Platting. Observations are made with barometers for difference of level, checked with spirit levels. Meridians and parallels of latitude are run with solar compass and attachments, and an outline survey made, computed and platted. A plane-table survey, employing stadia and telemeter is made by each party, and each student makes a map of the same. Sophomore III, 66 hours.

Course VI. (a) Geodesy. Lectures and text-book; Geodetic reconnaissance; base-line measurement, employing bars and steel tape; measure of angles, horizontal and vertical; field methods for time, latitude, longitude and azimuth; precise and trigonometric leveling; adjustment of observations; theory of computing geographical positions and projections of maps. Lectures and text. Senior I, 48 hours.

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

RAILWAY AND HIGHWAY ENGINEERING.

Course I (a). Curves and Earthwork. Problems attending final location surveys of railroads and track laying; theory of the computation

of volumes and preparation of preliminary estimates. Text-book and notes. Junior I. 48 hours.

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

Course II. Railway structures. The different standard structures relating to railroad construction and maintenance are presented by lectures, the student making working drawings with bills of material, such structures as the following being treated: cattle guard, snow fence, timber culvert, pile bridge, water tank, station house, and trestle and Howe truss bridge. Field and office. Junior II. 72 hours.

Course III. Railway location and estimates. Reconnoitering and preliminary surveys are made, followed by field maps and final location; profiles and cross-sectioning. Complete estimates covering the cost of earth and rock work, timber structures and right of way involved in the actual construction of the line are made, together with plans of important bridges and a right-of-way map of the adopted location. Junior III. 72 hours.

Course IV. Railway economics. Discussions on the economic location of railways. Text. Senior I. 36 hours.

Course V. Highway construction and maintenance. The economic relation of highways in transportation, with a treatment of the practical questions relating to materials and methods necessary to maintain good streets and highways. Lectures. Junior II. 12 hours.

HYDRAULIC AND SANITARY ENGINEERING.

Course I. Hydrographic Survey. Text work on making soundings; methods of determining discharge of streams. Following this the electric current meter of the department is rated and a survey made, employing it to determine the volume of flow in the Mississippi river, followed by a plat of the cross-section of the river at point of survey. Junior II. About 22 hours.

Course II (a). Hydraulics. Lectures on rainfall and evaporation; their mutual effect on water supply; how determined by soils and topographical features. Methods and means employed in water collection, purification and distribution for domestic supply, land drainage, etc. Text-book on impurities of water; flow of water through pipes; coefficients for weir formulas; flow of water in open channels and reservoir embankments. Senior II. 33 hours.

(b) *Sewers.* Sewer systems, combined and separate, sewage purification and disposal are treated principally by lectures. 11 hours.

Course III. Technical reading and office work. During the first half of the term reading is directed on lines relating to course I; and the second half is given to a design with drawings of a system of water supply. Senior II. 44 hours.

APPLIED MECHANICS.

Course I. Statics and Dynamics. A study of the laws of equilibrium, motion, work and energy as applied to particles and rigid bodies. Recitations and lectures. Junior I. 60 hours. Open to students who have completed the first five courses in mathematics.

Course II. Mechanics of materials. A study of the strength and elastic properties of materials of construction, the principles governing the design of beams, columns and shafts. Recitations and lectures. Junior II. 55 hours. Open to students who have completed course I.

Course III. Hydro-mechanics. A study of the laws of equilibrium and flow of fluids. Junior III. 55 hours. Open to students who have completed course II.

Course IV. Materials of engineering. (a) Metallurgy of iron and steel. Lectures and recitations. Junior I. 11 hours. Open to class in mechanics.

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

(c) *Laboratory Work* on the strength and physical qualities of cements and mortars. Senior III. 24 hours. Open to class in masonry.

STRUCTURAL ENGINEERING.

Course I. Structural Details. Designing of joints, splices and simple structures; lectures and drawings. Junior II. 36 hours. Open to students who are pursuing course II in Applied Mechanics.

Course II. Elementary Designing. A study of the application of the principles of architectural design to engineering work. Critical studies of existing structures; lectures. Junior II. 12 hours. Open to students who have completed course I.

Course III. Bridge Stresses. Analytical determination of the stresses in roof, highway and railway bridges; recitations and lectures. Junior III. 60 hours. Open to students who have completed course II in Applied Mechanics.

Course IV. Graphic Statics. The graphic determination of stresses in framed structures, continuous girders, masonry and steel arches; recitations and drawings. Senior I. 48 hours. Open to students who have completed course II in Applied Mechanics.

Course V. Details of Iron Construction. Computation of stresses and making of working drawings of parts of actual structures; with study of causes of failure; lectures and drawings. Senior I, 96 hours. Open to students who have completed courses I, II, III.

Course VI. Bridge Design. A complete design of a highway or railway bridge, including estimates and specifications; lectures, computations and drawings. Senior II. 120 hours. Open to students who have completed courses I, II, III.

Course VII. Stereotomy. Working drawings by which to cut the stones of arches, domes and wing-walls; a complete design of a stone arch bridge, with specifications; lectures and drawing. Senior II. 90 hours. Open to students who have completed courses I, II, III and IV.

Course VIII. Masonry Construction. Text-book work, treating wood, stone and brick, as to kind, cost and strength, with specifications and estimates relating to their use in engineering structures; foundations for tall buildings and bridge piers; analysis and computation of a high masonry dam; laboratory tests of brick and stone; lectures and recitations. Senior III. 48 hours. Open to those who have completed the courses in Applied Mechanics.

Course IX. Iron Buildings and Roofs. Design of a machine shop, foundry or other building, with regard to appearance, strength and protection from fire; lectures and drawings. Senior III. 90 hours. Open to students who have completed courses I to VI inclusive.

EQUIPMENT.

There is a very complete equipment of the best field and office instruments, including transits, levels, plane tables, solar compasses, level and telemeter rods, tapes, chains, protractors, planimeters, section-liners, calculating machines, hand levels, clinometers, prismatic compasses, aneroid and mercurial barometers; a complete equipment for geodetic work, consisting of astronomical clock and transit-circle, chronograph, chronometers—sidereal and solar, secondary base line apparatus, repeating theodolites, heliotropes, declination compasses and magnetometers; a current meter with electric register, pocket chronograph and rating apparatus for hydrographic work. The department has a good instrumental equipment for the field-work of topography

and geodesy, including the following: one field-astronomical transit, two sextants, one box sextant, three solar attachments, one solar transit, one self-registering and one micrometer barometer, four aneroid barometers, one magnetometer, one dip circle, one precise level, pantometers, pedometers and other instruments for daily use.

MECHANICAL ENGINEERING.

STEAM ENGINEERING.

Course I. Thermodynamics. Recitations and lectures on the nature of heat and principles as applied to engines; boilers; and other motors. Senior I term. 60 hours. Open to students who have completed course I in Applied Mechanics and course II in Machine Design.

Course II. Steam Engines. The principles of course I applied to the design and working of heat engines; boilers; indicators; combustion of fuel; prevention of smoke, etc. Lectures and recitations. Senior II term. 55 hours. Open to those who have completed course I.

Course III. Valve Gears. Application of graphical methods to the design of valve gear and link motions. Senior I term. 55 hours. Open to students who have completed course I, Machine Design.

Course IV. Mechanical Laboratory. Calibration of dynamometers, steam gauges, wires, meters and other apparatus. Testing lubricating value of oils; calorimetry; tests of water motors; pumps; injectors; gas and steam engines; boilers; indicator practice and special research work. Senior II term. 110 hours. Open to students who have completed course I.

MACHINE DESIGN.

Course I. Kinematics and Graphics. The transmission of motion and the graphical solution of problems without consideration of the strength of parts. Lectures and recitations. Junior I term. 84 hours. Open to those who have completed course II of Mathematics.

Course II. Principles of Machine Design. Principles and methods of design of machine members, with problems. Recitations and lectures. Junior III term. 44 hours. Open to those who have completed course II of Applied Mechanics.

Course III. Machine Design. Design and detail drawings of machine parts. Senior I term. 96 hours. Open to those who have completed course II.

Course IV. Constructive Design. Design of a complete structure, as an engine boiler or special machine, with specifications. Senior III term. 110 hours.

PRACTICAL MECHANICS.

Course I. Carpentry and Joining. Wood working; use of tools; lathe and bench work. Freshman, II term. 44 hours. Open to all engineering students.

Course II. Pattern Making. Patterns for moulding, core boxes, flasks, etc. Sophomore, I and II terms. 164 hours. Open to all who have completed course I.

Course III. Foundry Practice. Moulding; casting; mixing metals; brass work, and core making. Sophomore, III term. 110 hours. Open to all students.

Course IV. Blacksmithing. Use of tools; forging; welding; tool dressing; tempering. Junior, I term. 120 hours. Open to all students.

Course V. Machinist's Work. Chipping; filing to gauge; machine work; gear cutting; construction; finishing. Junior, II term. 110 hours. Open to those who have completed course IV.

Course VI. Machinist's Work. Construction; tool making; special work. Senior, II and III terms. 88 hours. Open to students completing courses I to VI.

The department aims to equip the student with the necessary training to deal with the problems of the engine from the most advantageous standpoint. It attempts to place engineering practice before him, both theoretical and practical, in order that he may form a true estimate of its value and give him a broad foundation for a professional career.

The more strictly professional work of the course naturally divides itself into three principal lines: theoretical engineering, experimental engineering and manual training, or the mechanic arts.

THEORETICAL ENGINEERING.

The course in theoretical engineering consists of the study of pure mathematics followed by the applied principles in the mechanics of engineering; pure mechanism or kinematics which traces the motion of connected parts without reference to the causes of motion, work done or energy transmitted; and machine design, in which the strength of parts and the proportioning of machinery is studied and actual designs and problems worked out.

The subject of pure mechanism is supplemented in the drawing room where the successive positions of moving parts and the graphical solu-

tion of problems may be laid down on paper. In the last year of the course the study of thermodynamics is given by lectures, recitations and problems on the nature of heat and the measurement of its effect on fluids; generation of steam and the graphics of heat engines are considered, and the principles of mechanics and thermodynamics as applied to the design and construction of steam engines, turbines and other motors are investigated. The lecture and drawing rooms are well supplied with framed photographs, blue prints, sectional drawings and charts of modern machine tools, engines, boilers, etc., and the collection is constantly increasing. Among the additions of the past year to this collection of illustrative matter may be mentioned the following: Framed lithograph of machinery, Gould & Eberhardt, Newark, N. J.; samples of various oils manufactured by the Standard Oil Co.; samples of Paige link belt, Paige Link Belt Co., Concord, N. H.; framed blue print of injector section, Wm. Sellers & Co., Philadelphia, Pa.; samples of covering for steam pipe, Mr. Spinkman, Milwaukee, Wis.

Opportunity for the student to specialize is given by offering an elective study throughout the senior year.

EXPERIMENTAL ENGINEERING.

The work in experimental engineering begins with the investigation of the materials used in engineering. Their physical qualities are tested, the theory of strength of materials is applied, and the results compared with the results of the tests.

The instruments of precision used in mechanical tests are calibrated; practice is given on the preparation of tables, curves of efficiency, and the correction and determination of constants; the power given out by motors and the efficiency of mechanism and of boilers are measured; the methods of scientific and commercial tests are investigated and practice given in making reports on the same.

A course in experimental physics also extends through the junior year.

MECHANIC ARTS.

The shop work aims to acquaint the student with the methods of modern manufacturing establishments, and enable him, as far as possible, to acquire skill in the processes.

The wood-working and pattern-making course is intended to embody the application of tools and practical methods to the work, and the proper construction of patterns for moulding parts of machines. This is supplemented by instruction in the moulding and founding of these parts in brass and iron.

In the forge shop the student is instructed in welding, forming

various shapes in iron, and in the making and tempering of hand and machine tools. The instruction in the machine shop is intended to give the student familiarity and skill in the use of hand and machine tools; working to gauge; finishing; construction; erection; and all operations of the modern machine shop.

Unclassed students, in this department, are expected to conform as closely as possible to the work as laid out, with reference to their needs. This instruction is intended for mature students who have had some practical experience and who intend to prepare themselves especially for positions of trust as superintendents of shops and establishments, but who are unable to pursue the full professional course. It consists mainly of shop work, drawing, elementary mathematics and engine running, but students sufficiently prepared may enter other classes under regulations stated elsewhere.

THE MECHANICAL LABORATORY

Is supplied with power, and contains a variety of apparatus for experimental purposes, among which are the following: A 50,000-pound Olson testing machine, which can be adapted to compressive, tensile, transverse, torsion and shearing tests. Other pieces of apparatus, designed by the department, are used in connection with the testing machine in making tests of full-sized beams, up to 25 feet in length. An extensometer, for use in connection with the tensile tests, is capable of accurately measuring extension to one ten-thousandth of an inch. There is a Riehle cement tester for ascertaining the tensile strength of cements; a dynamometer for measuring transmitted power; an oil testing machine; standard scales; a pair of very accurate and highly finished test gauges registering pressure up to 900 pounds; a test-pump for pressure gauges; a pump for testing boilers; a mercury column for calibrating steam gauges and indicators, and other apparatus for making mechanical tests; a dynamometer for determining the power of lathe tools; a five-horse power Otto gas engine, and a ten-horse power experimental steam engine and a steam pump for use in hydraulic investigations. A friction brake; a throttling, super-heating and separating tank; calorimeters; pyrometers; revolution counters; tanks; steam engine indicators; gauges; thermometers; a water motor and a Worthington water meter; a Wheeler condenser with air pump; and other instruments required for complete steam engine and boiler tests or for use in other research work.

The engine and boiler room is provided with an automatic cut-off engine of modern type, capable of developing thirty-five horse-power.

A steel boiler of ample size, furnished with a feed pump injector, and all necessary fittings for conducting efficiency tests, supplies steam for the engine and laboratories.

The department has a very fine skeleton pressure gauge, and a number of sectional working models, presented by the manufacturers, among which may be mentioned a Deane steam pump, marine steam pop-valve, Westinghouse engine air brake valve, triple valve and a Van Deutzen jet pump.

THE SHOPS.

The shops are equipped with tools which represent the best American practice. Each shop will accommodate from ten to twenty students at a time.

The instruction given is based on the Russian system, in which the leading idea is to teach principles rather than to produce objects of commercial value. It is believed that the greatest progress can be made in a given time by this method, as the student proceeds, by a carefully planned series of exercises, from the simplest to the most difficult operations, learning the process but avoiding the repetition of the ordinary shop. So far as is consistent with this system the work is adapted to parts of some machine or structure in common use, and after finishing the exercises referred to above, the class will build some complete machine or structure, as a review and application of the preceding work.

The machine and vise shop contains speed lathes, engine lathes of various sizes, planer, shaper, universal milling machine, vertical drill press, emery tool grinder, a Brown & Sharp cutter and reamer, grinder, grinding attachment to lathe, ten benches with vises, surface plates, a set of Bett's standard gauges, taps, dies, reamers, arbors, drills, chucks and other hand tools and accessories for practice in machine, tool and vise work. The small tools are kept in a tool-room and issued on the check system.

The shop for pattern making and general wood work contains benches with vises and tools, lathe and lathe tools, an improved universal sawing machine for pattern making, a jig saw, planer, boring machine, grindstone and other tools for use in the courses in carpentry and pattern making.

The forge shop is equipped with stationary and portable forges, a blower and exhaust fan, anvils, hand drill press, drills, taps, dies, sledges, swages and other tools generally used in blacksmithing.

The foundry contains an eighteen inch Collian cupola, brass furnace,

core oven, moulding tools, benches, ladles, crucibles and all of the tools and material ordinarily needed in moulding and casting iron, brass or white metal.

ELECTRICAL ENGINEERING.

Course I. Measuring Instruments. Outline of industrial uses of electricity; applications of Ohm's law; laboratory and commercial methods of electrical measurements; use and abuse of instruments. Jun. II, E. E., M. E.; Sen. II, Min. and Met. Lectures, 32 hours. Preparation required:—Physics, course III.

Course II. Generators and Motors. Primary and secondary batteries; theory of electro-magnet, dynamo and motor; systems of distribution; calculation of conductors; methods of regulation; installation and operation of electrical machinery. Jun. III, E. E. and M. E.; Sen. III, Min. and Met. Lectures, 44 hours. Preparation required:—E. E. course I; differential and integral calculus.

Course III. Electrical Laboratory (a). Tracing circuits and locating faults by magneto-galvanometer; measurements of conductivity and insulation by portable bridge, voltmeter and ammeter, high resistance voltmeter, sensitive galvanometer and condenser; measurements of capacity; calibration of ammeters, voltmeters and recording wattmeters; magnetization, characteristic and efficiency curves of dynamos. Jun. III, E. E. Laboratory 120 hours. Preparation required:—Physics, courses III, V, E. E., courses I and II.

(b) An abridgment of this course, 72 hours, is given to Mechanical Engineers.

Course IV. Alternating Currents. Phenomena measurement and use of alternating currents; elementary theory of transformer, alternator and A. C. motor; use of condensers and choke coils; methods of regulation. Senior I, E. E. Lectures, 22 hours. Preparation required:—E. E., courses I and II.

Course V. Electrical Laboratory (c). Use of ballistic galvanometer; magnetic tests of iron; measurements of self and mutual induction; calibration of A. C. measuring instruments; curves from alternator and transformers by method of instantaneous contact; regulation and efficiency tests of alternators, transformers and A. C. motors. Sen. I, E. E. Laboratory, 96 hours. Preparation required:—E. E., courses I, II, III and V.

Course VI. Electrical Design (a). Problems in designing switches, electro-magnets and mechanisms. Complete working drawings and

specifications to accompany each design. Sen. I, E. E. Draughting, 66 hours. Preparation required:—E. E. courses I, II, V; M. E. course machine design and shop work.

Course VII. Electric Lighting. Comparison of different sources of light; photometry; physics of the arc; history, design and regulation of arc lamps; adaptation to constant current, constant potential and A. C. circuits; carbons; history, manufacture and economy of incandescent lamps; distribution of lights. Sen. II, E. E. and M. E. Lectures 22 hours. Preparation required:—E. E. courses I and II.

Course VIII. Arc and Incandescent Lamps. Photometric and electrical tests of lamps; regulation and comparison of different arc lamps for constant current, constant potential and alternating currents; regulation of constant current dynamos; special problems as assigned. Sen. II, E. E. and M. E. Laboratory, 72 hours. Preparation required:—E. E. courses III or IV, VIII.

Course IX. Central Stations. Preliminary surveys; choice of electrical systems; load diagrams; best units of power; comparison of steam and water power; location and design of station; switchboard; calculation, erection and maintenance of lines; erection of boilers, engines and dynamos; operation and regulation; maintenance of plant; emergencies; examination of stations in Minneapolis and St. Paul. Sen. II, E. E. Lectures, 22 hours. Preparation required:—E. E. courses II, III or IV; M. E. courses, thermo-dynamics, steam engine.

Course X. Electrical Transmission. Utilization of natural forces; methods and efficiency of shafting, belt, rope, cable, steam, compressed air and hydraulic transmission; theory of electric motor; electrical transmission between two machines; distribution with constant current, constant potential and alternating systems; study of particular plants; application to railway, mining and miscellaneous purposes. Sen. III, E. E. Lectures, 40 hours. Preparation required:—E. E. courses I, II.

Course XI. Electrical Design (b). Designs, specifications and estimate for an electric light or power plant, or other problem approved. Sen. III, E. E. Draughting, 100 hours. Preparation required, E. E. courses VII, VIII, IX, X.

Course XII. Thesis. Original research, usually of an experimental nature. The thesis is designed to demonstrate the ability of the student as an independent worker, and as a rule to make some contribution to knowledge. Sen. II and III, E. E. 110 or more hours.

COURSES OPEN TO GRADUATE STUDENTS.

Course XIII. Arc and Incandescent Lamp Investigations.

Course XIV. Problems in the Design and Operation of Generators and Motors.

Course XV. Alternating Current Investigations.

Course XVI. Design and Testing of Electric Light and Power Plants.

Course XVII. Experimental Problems in Electric Railway Work.

Course XVIII. Signal Circuits, Telephone, Telegraph and Fire Alarm Lines and Instruments. Lectures and experiments.

JOURNAL READING.

Discussion of current electrical periodicals. Two hours per week throughout the year. Open to seniors and juniors.

TECHNICAL ESSAYS.

Translation into idiomatic English from an approved technical article in German; similar translation from the French. One essay giving bibliography and present state of the art in some particular application of electricity. One report from personal inspection of some electrical plant.

Three essays to be completed during junior year, one during senior.

EQUIPMENT.

The department of Electrical Engineering is associated with the department of Physics, and has free use of all its apparatus and facilities for work.

This includes three rooms with eight solid masonry pillars for the support of sensitive instruments; dynamo room with engine, dynamos, motors, etc.; battery room; four laboratory rooms for general work; photometer room; photographic room; library and reading room; professor's private study and laboratory.

All the rooms are wired for electric light, time, experimental current and call bells. In the attic are a meteorological room and a photograph room, provided with exposed window, skylight, etc., and a large dark room for arc light photometry.

The department of physics possesses a large and valuable collection of apparatus for lecture purposes and practical laboratory work. Besides a great variety of instruments for general physical measurements the department has a large projecting lantern with Clark focussing arc lamp, one Kruss incandescent lamp photometer, Holtz, Toepler-Holtz and frictional electric machines, storage batteries, Thomson quadrant

electrometer, spark micrometer, electric condensers, three induction coils, a collection of magnets of various forms, sets of telegraph instruments, forty direct reading and reflecting galvanometers and magnetometers of various kinds, a number of bridges and resistance boxes, three standard ohms, a number of silver and copper voltmeters, voltmeters and ammeters, an eighty-ampere Edison dynamo with ammeter, lamp indicator and chemical meter and a Westinghouse engine.

Besides having the free use of the extensive equipment of the physical laboratories, the department of electrical engineering possesses a number of dynamos, including a three hundred light Slattery alternator and exciter, nine-light Thomson-Houston arc dynamo, a ten-light Wood arc dynamo, a fourteen-light Brush arc dynamo (loaned), two one-half kilowatt Edison motors, C. & C. constant current motor, a series of machines with sectioned fields, small Turner motor, A. C. motor with primary and secondary field coils, tri-phase induction motor, thirty large secondary cells and one hundred and fifty small ones, twenty primary cells of various types, ten transformers, six banks of incandescent lamps, ten arc lamps of different types, twelve adjustable absorption rheostats, a cradle dynamometer, six ammeters and six voltmeters for direct and alternating currents, two recording wattmeters, six galvanometers, a portable testing set, a sub-divided standard condenser, five ordinary condensers, three carbon megohms, set of telephone instruments, an arc light photometer, a large variety of switches and other electrical supplies. Three of the dynamos are provided with instantaneous contact devices and movable brushes for exploring magnetic fields, studying armature reactions, etc. Suitable switchboards are provided for the dynamos and lines, and a very complete board is being constructed with the necessary equipment for obtaining instantaneous values for alternating current curves. One of the continuous current machines has been provided with a set of rings and brushes for obtaining simple or tri-phase alternating currents.

LIBRARY AND READING ROOM.

The library of the physics and electrical engineering departments contains an excellent collection of standard and other works relating to these subjects. New books and trade publications are being added continually. Files of ten electrical and street railway journals are nearly complete and others are being collected and bound. These, with the files in the general and departmental libraries of the University offer excellent facilities for research work.

The reading room of the electrical engineering department 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 in touch with current progress and best modern practice, and teaching the students the value of the technical press.

There is a growing collection of samples furnished by various manufacturers and dealers, a great help in exhibiting best modern practice and in teaching young engineers to appreciate the merits of different products. A collection of samples from repair shops and elsewhere is of especial value in illustrating the treatment received by apparatus in commercial use and the necessity for careful design and construction. Free access is given to the private library and collection of the professor in charge.

INSTRUCTION.

Since electrical engineering is so closely allied with mechanical engineering the two courses are nearly parallel, the electrical students taking less shop work and more laboratory practice in the junior and senior years. The course aims to give the students a knowledge of fundamental phenomena, principles and the various applications of electricity, the methods and instruments used in measuring and transforming it, and practice in the design and construction of electrical apparatus. Practice and theory are taken together, similar subjects being studied in the class-room and laboratory at the same time so far as practicable. During the junior and senior year students have daily work with electrical instruments and apparatus of commercial size and with commercial problems. Occasional inspection tours among the extensive and varied electrical interests in Minneapolis and Saint Paul furnish excellent illustration. All engineering students are strongly advised to spend their vacation in factories, repair shops, electric light and railway stations, etc., as opportunity may allow, in order to obtain commercial experience, and that they may better appreciate the relations of their technical training to actual work.

It is the aim to train the students to be independent and efficient workers, and they are encouraged to adopt the methods of professional engineers. In the lectures and laboratory work frequent reference is made to original memoirs and various articles in the technical journals and books. Students are required to verify the formulas used in various calculations, and are encouraged to derive their own formulas for simplifying work in special cases. At the same time they are expected to use logarithms, slide rule, tables, curves, charts and all legitimate means for obtaining accurate results with least amount of drudgery.

LECTURES.

In a subject developing so rapidly text-books are necessarily incomplete. The class-room instruction is therefore given largely by lectures illustrated by experiments and lantern slides and supplemented by problems. References for collateral reading accompany each lecture. Occasional lectures by non-resident engineers bring to the students ideas fresh from the industrial world, outlining some of the problems to be faced in their special lines and the methods employed in dealing with such problems. The special lectures in this department during the year 1893-94 were on "Telephony," by Mr. Morgan Brooks, of the Electrical Engineering Co., of Minneapolis, and on "Electric Railway Construction," by Mr. C. K. Stearns, of the General Electric Co. It is the intention to secure a large number of non-resident lecturers during the year 1894-95.

LABORATORY WORK.

The work in the physical and electrical laboratories is designed to train the student in methods of precision and investigation, and to give them practical experience in using and testing commercial apparatus. In the earlier parts of the work specific directions are given for each experiment. In the more advanced work the 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 advanced as rapidly as their attainments warrant.

In fitting up the laboratory care is taken to secure representative types of apparatus. The dynamos, belts, friction-clutches, lamps, switches, wiring, etc., are carefully chosen and are of commercial style and size, in order to acquaint the student with actual practice. In putting up new lines in the laboratories 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, for which the shops afford ample facilities. During the present year the students have designed and constructed a series machine, a tri-phase induction motor, a set of rings and brushes for obtaining simple or tri-phase alternating currents from a continuous current machine, an instantaneous contact maker, several absorption rheostats and lampboards, a switchboard for the alternator and circuits, a switchboard for curves of instantaneous values, an electrostatic galvanometer, a hot wire voltmeter, a double-scale ammeter, three sets of pole pieces for arc dynamos and a large number of switches. They have also repaired a number of instruments and have rewound the fields and armature of an arc light dynamo.

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 junior year. In the senior year they work out, on the drawing board, designs of electro magnets, and mechanisms and dynamos, lines, switches, switchboards and plants. Complete working drawings and specifications of some special problem are worked out and each student is expected to help construct in the shops some piece of electrical apparatus previously designed by himself or others.

At present the advanced students are working out full designs and specifications for wiring the buildings and grounds of the University and for a central plant for electric light and power.

CHEMICAL ENGINEERING.

Course I. The Metallic Elements. Lectures and laboratory work. The course includes a study of the more common metals, their compounds and characteristic reactions. Freshman I. 96 hours.

Course II. Qualitative Analysis. Lectures and laboratory work. The course includes the qualitative separation and the characteristic test for the more common metals. Freshman II. 96 hours. Open to those who have completed course I.

Course III. Qualitative Analysis. Lectures and laboratory work. The course includes a study of the acids, their detection and separation. Freshman III. 96 hours. Open to those who have completed course II.

Course IV. Quantitative Analysis. Lectures and laboratory work. The course includes an introduction to quantitative and a beginning of gravimetric analysis. Sophomore I. 96 hours. Open to those who have completed course III.

Course V. Quantitative Analysis. Lectures and laboratory work. A continuation of course IV. Sophomore II. 96 hours. Open to those who have completed course IV.

Course VI. Volumetric Analysis. Lectures and laboratory work. The course includes an introduction to volumetric determinations with a discussion of standard solutions and the necessary stoichiometric calculations. Sophomore III. 96 hours. Open to those who have completed course V.

Course VII. Theoretical Chemistry. Lectures and reading. The course includes a discussion of Lothar Meyer's *Modernen Theorien der Chemie*, Ostwald's *Grundriss der Allgemeinen Chemie* and Remsen's

Theoretical Chemistry. Junior I. 48 hours. Open to those who have completed course III.

Course VIII. The History of Chemistry. Lectures and reading. The course includes a full historical discussion of alchemy and chemistry. Junior II. 48 hours. Open to those who have completed course III.

Course IX. Organic Chemistry. Lectures and laboratory work. The course includes the aliphatic series with a preparation of the more important compounds, supplemented by Levy's *Anleitung für Darstellung Organischen Präparate*. Junior III. 96 hours. Open to those who have completed course V.

Course X. Organic Chemistry. Lectures and laboratory work. A continuation of course IX. The course includes the aromatic series with a preparation of some of the more important compounds supplemented by Fischer's *Organische Präparate*. Junior I. 96 hours. Open to those who have completed course IX.

Course XI. Water Analysis. Lectures and laboratory work. The course includes an exhaustive discussion of the chemical and sanitary properties of waters. Junior I. 48 hours. Open to those who have completed course VI.

Course XII. Gas Analysis. Lectures and laboratory work. The course includes an exhaustive chemical examination of the common gases, with a determination of light and heat efficiency in combustible gases. Junior II, 48 hours. Open to those who have completed course XI.

Course XIII. The Chemistry of Sugar; lectures and laboratory work. The course includes a discussion of the Carbo-hydrate group. Optical activity and the methods of analysis. Senior I, 48 hours. Open to those who have completed course X.

Course XIV. Industrial Chemistry; laboratory work and reading. The course includes the analysis of various commercial products. Junior III, 48 hours. Open to those who have completed course VI.

Course XV. Wine and Beer Analysis; lectures and laboratory work. The course includes the determination of alcohol in wine, beer and various commercial products, with a special study of fermentation. Senior II, 48 hours. Open to those who have completed course X.

Course XVI. Special Problems; laboratory work. The course includes the working out of various mineralogical, technological and metallurgical problems. Senior I, 48 hours or more. Open to those who have completed course VI.

Course XVII. Photographic Chemistry; lectures and laboratory work. The course includes a study of the compounds effected by the chemical rays of light, and a discussion of developers and fixers. Senior III, 24 hours. Open to those who have completed course VI.

Course XVIII. Domestic Chemistry. Lectures and laboratory work. The course includes a study of the common household products, as sugar, starch, bread, soap, soda, vinegar, coffee, tea; the various ethereal oils; spices; milk and meat. Senior III. 96 hours. Open to those who have completed course V.

COURSES FOR GRADUATE STUDENTS.

1. *Special Inorganic Preparations.*
2. *Research work in Electro Chemistry.*
4. *The Plant Alkaloids.*
5. *Stereo-Chemistry and the Optical Activity of Organic and Inorganic Compounds.*

Special Research work in General Analytical Chemistry.

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

LABORATORIES.

The department of chemical engineering occupies the west half of the chemical and physical building. There are twenty-two rooms arranged as laboratories, lecture rooms and store rooms. The laboratories consist of general, qualitative, quantitative and organic rooms, with several technical rooms for water, gas, microscopic, spectroscopic, polariscopic, special organic and metallurgical work.

APPARATUS.

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

The library is supplied with many standard technical works and with all the more important technical journals, as for example: Journal of the Society of Chemical Industry, Journal für Praktische Chemie, Jahrsberichte über die Fortschritte der Chemie und Technologie, Zeitschrift für Aungewandte Chemie, Zeitschrift für Analytische Chemie, Chemical News and Chemicker Zeitung.

SCHOOL OF MINING AND METALLURGY

The object of a School of Mining and Metallurgy is to give training towards accuracy in methods and close economy in working wherever ores are to be mined and metals extracted from them.

The various subjects are presented in a thorough, practical manner, and give every opportunity for following out in detail the various operations, from the determination of the value of the ore to the shipment of the finished product from the same.

The work naturally falls under the following subdivisions, supplemented by thorough courses in physics, chemistry, mineralogy and geology.

Course I. Assaying. To determine if ore has value for treatment. Lectures and recitations. Practical work. 132 hours.

Course II. Mining Engineering. To furnish material for treatment. Lectures and recitations; practical work. 253 hours in mining and 198 in metallurgy.

Course III. Ore Testing. To determine best method of treatment. Lectures and recitations; practical work. 96 hours.

Course IV. Ore Dressing. Ore testing carried into practice on a large, commercial scale. Furnishing products for metallurgical treatment. Lectures and recitations; practical work. 88 hours.

Course V. Metallurgy. Smelting and refining of ores and ore dressing products. Reduction to metals. Lectures and recitations; practical work. 198 hours in mining and 252 hours in metallurgy.

ASSAYING.

Lectures and Recitations. The lectures treat of and describe apparatus, reagents, assay furnaces, fuels, etc., in connection with this subject. The principles of assaying and sampling are fully explained. A collection of representative ores of various metals with a collection of corresponding slags are shown and instruction given as to nature and quantity of fluxes. A complete set of crucibles, slags, buttons, cupels, etc., serve to illustrate the lecture. Explanation of different charges and fluxes for gold, silver and platinum ores, also base metal ores, lead antimony, tin and mercury, with those of copper and iron. Method of assay of alloys of gold, silver, copper and lead. Lectures to include special and rapid methods of testing slags and metallurgical products as employed in western smelting works.

Practical work. Laboratory course to include preparing and testing reagents, making cupels, etc., and assaying samples of ore, furnace and mill products. The different charges are to be tried and practical conclusions drawn. Assay of bullions for fineness.

Great importance is attached to the work in the laboratory. A large, well-ventilated furnace room, in which are located muffle and crucible furnaces and another room of similar dimensions equipped with desks, pulp and button balances, afford accommodations to a large number of students. Ores of various metals of known value are given the students, who are required to make up the necessary charges and submit their report in detail. The ores are representative ones and such as would be met with and handled by any assayer in the field.

The course of instruction extends through one term of sophomore and junior year. Three hours per week are devoted to lectures and recitations, which thoroughly prepares the students for the following eight hours' practical work in the laboratories. This work is offered to students completing the necessary courses in mineralogy and chemistry.

MINING ENGINEERING.

Lectures in mining continue through two years, and may be divided into:

(a) *Mining.*—Ways and means by which minerals and ores are extracted from the earth. Surveying, excavating, drilling, quarrying, blasting, tunneling and timbering, sinking shaft and timbering, winding and hauling, pumping, ventilation and lighting, hydraulic mining.

(b) *Mine Engineering.*—Embracing the entire field of operation for the economical and scientific exploration and production of the minerals and ores of commercial value.

1. Preliminary examination; 2. Subsequent development. (2a) Extraction:—prospecting, exploration, exploitation. (2b) Relation to market and demands.

(a) MINING. *Surveying*.—Treated of in course of civil engineering. Lectures to be only on mine surveying, such as underground work.

Excavating.—Including work on clays, peats, bog, iron ores and other easily worked material.

Drilling and Quarrying.—Tools used, hand, steam and compressed air percussion drills, diamond drills; the new electric drill; cuts, drawings and photographs for illustration. Scientific drilling for blasting; placing shots for least damaging and most effective work.

Blasting.—Powder, dynamite, nitro-glycerine, rack-a-rock and all late explosives; electrical blasting, charge and firing of same.

Tunneling and Timbering.—Description of most effective way of tunneling through various deposits, precautions to be observed, drifting. Preparation and placing of timber and supports.

Sinking Shafts and Timbering.—Through hard rock, clays, sandy soil and quicksands. Method of timbering with cribs.

Winding and Hauling.—All hoisting engines, windlass, winches, drums; ropes and cables; ore cars, locomotives and electrical locomotives with drawings, cuts and comparisons of each.

Pumping.—All representative pumps with necessary and suitable piping, with tabulated details as to power required, capacity.

Ventilation and Lighting.—Explanation of origin of properties of fatal gases; tests, safety lamps; explosions. All the latest modern appliances for health and safety. All methods of lighting, including latest improvements and electric lighting.

Hydraulic Mining.—Principles involved, apparatus, grizzlies, sluices, riffles, advantages and disadvantages.

(b) MINE ENGINEERING. 1. *Preliminary Examination*. Lectures on the method of examination of property to determine desirable data; location, title, possibly a complete survey; topography, geology. veins or bed, mineral or ore, machinery and supplies, facilities (including timber, water, labor, transportation), and selection of representative samples from the deposit, for assay, analysis or metallurgical treatment. Careful examination as to location and nature of deposit; vein pockets or beds of ore, salt, clay, phosphate rock or building stone, noting requirements as to blasting, quarrying, drifting, timbering, pumping or

hydraulic. Consideration of everything pertaining to the successful subsequent development.

2. *Subsequent Development.* (a) *Extraction.*—Lectures on this subject to be divided into three heads, viz.: prospecting, exploration and exploitation. Each division to be treated most thoroughly and exhaustively.

Prospecting.—By trenches and pits, or boring to determine the dip, size and continuity of the deposit, and for the proper location of shafts or tunnels, or for most desirable point of attack.

Exploration.—To be conducted by tunnels or shafts with connecting cross-cut drifts and winzes for blocking out the ore body. Ventilation, drainage and economical handling of the ore and waste rock underground and on the surface.

Exploitation. Including work by pick and shovel, hand or power drilling, cutting, underhand or overhand stopping, also proper disposition of men. Location of pillars, robbing of pillars, timbering, arrangements of tracks, chutes, dumps, hoisting, pumping facilities in shaft. Location of machinery and building on surface for most effective working of machinery and distribution of the mineral or ore for market. Surveying and mapping of all development on surface and underground to be reported and filed in office. Also quantity of ore treated and shipped, cost of mining, treatment and transportation. Value of ore realized and profit, also detailed monthly statement, daily assays or analyses of samples of ore or mineral mined, treated or shipped, of ore in sight and new ore bodies.

(b) *Relation of Market and Demands.* Consideration in detail as to economical disposition of products, such as advisability of sending ore to custom mills, erecting mill, smelting and refining works on property, or shipping to various markets.

Practical Work. Field work during a portion of vacation.

ORE TESTING.

Lectures and Recitations. The lectures treat of use and purpose of all the machinery connected with the subject, supplemented with detail drawings. Also practical schemes for determining the best methods of treatment.

Practical work. There will be a complete testing works connected with the department where the student may see the working of and handle himself, crusher, rolls, Huntington mill, concentrating machinery, such as vanners, puddles, jigs, magnetic separators, pans for

amalgamation, settlers, reverberatory furnace for oxidizing and oxidizing-chloridizing roasts, leaching and chlorination plants, as well as sizing sieves and hydraulic separators.

The student will be given a sufficiently large amount of ore to make the necessary tests upon the different machines, and report the best method of treatment.

Two terms, eight hours per week in senior year, are devoted to instruction and laboratory work. This is required of students in mining and metallurgy.

Detailed specifications have been prepared for an extensive ore testing works. The site selected is on the banks of the Mississippi, between the Great Northern and Northern Pacific railroads. As the funds appropriated to the erection of such a work were sufficient to purchase only the necessary machinery, an appeal was made to the business men of Minneapolis to enlist their interest in providing a suitable building. A most general and hearty response was met and through their generosity over five thousand dollars have been subscribed. The building is to be of stone and will harmonize with the surrounding buildings on the campus. The works will contain all the machinery necessary to illustrate the various processes of testing ores; by using it the student will become acquainted with the machinery used in the leading ore dressing establishments of the west. Ground will be broken this summer for the new building.

ORE DRESSING.

Lectures and recitations. The lectures to consist of a minute description of method and treatment, with many drawings of all the principal mills and dressing establishments in the country, as well as on the continent.

Practical work. The mills and dressing establishments which lie on all sides of Minneapolis are easily accessible and offer special facilities for practical work.

METALLURGY.

Lectures and recitations. This subject will be well illustrated with representative ores of all the most important metals, drawings of furnaces and models, and samples of all the different furnace products. The lectures to treat in detail all the principal methods now in use.

The following subjects will be treated:

- (1) General metallurgy.
- (2) Metallurgy of iron.

(3) Metallurgy of steel.

(4) Metallurgy of copper, lead, silver, gold, zinc, tin and mercury.

(1) General metallurgy. To include the subjects of combustion, fuels (both natural and artificial), refractory materials, and everything connected with smelting furnaces.

(2) Iron. Ores, slags, blast cupolas and reverberatory furnaces; causes and effects of variation of charges, casting, manufacture of malleable iron, wrought and cast iron. All processes compared, including drying, puddling.

(3) Steel. Low furnace steel, cement, crucible steel, basic and acid Siems-Martin steel, basic and acid Bessemer steel, and manufacture of useful implements, including wire, rails, etc.

(4) Copper. Ores, slags, treatment of native copper, oxide and sulphide ores; different methods of treatment and furnaces used; methods of different regions explained and compared.

Lead. Ores, slags, furnaces, methods of roasting, reduction and precipitation in different parts of the world. Refining, extraction of silver by Pattinson's and Parkes' methods, cupellation and manufacture of litharge.

Silver. Ores, slags, furnaces, extraction by pan amalgamation, wet methods, Augustin's, Ziervogel, Von Patera's and Russell's; also refining.

Gold. Washing, sluicing, hydraulic working, Plattner's process, parting of gold and silver.

Tin. Ores, slags, shaft and reverberatory furnaces.

Zinc. Silesian, Belgian and English methods, also modern or American methods.

Mercury. Precipitation and roasting.

Short review of the treatment of antimony, nickel, cobalt and bismuth ores.

Practical work. Visiting smelting and refining works, which are accessible, to be done during portion of vacation.

The work in metallurgy extends through two years and is required of students in chemistry, mining and metallurgy.

LIBRARY.

The departments have already a complete set of the Transactions of the American Institute of Mining Engineers, the Engineering and Mining Journal and other similar books of reference. The students have also access to a very complete private library, as well as to the Minneapolis public library, which contains an exceptionally large and valuable set of publications on subjects relating to mining and metallurgy.

The leading periodicals will also be accessible to all. Constant references in lectures will 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.

PHOTOGRAPHY.

An important addition to the equipment of the school of mining and metallurgy is a photographic outfit. Zeiss an astigmatic lenses, series IV, No. 5, and series III A, a Universal, eight by ten, Rochester Optical Company's camera, with the necessary number of plate-holders, kits, printing frames and trays, offer every opportunity for good negatives and prints.

The school has at its disposal a five by seven Blair folding hand camera, with all the latest adjustments. Films or plates can be used for either snap shots or time exposures, which make the outfit especially suitable for field work and extended trips.

A dark room and considerable adjoining space have been made accessible and recent changes have converted them into a most convenient photographic laboratory. The dark room is eight feet long and six feet wide and is well ventilated. The dimensions of the outer room are twenty feet by six feet. This room is well lighted and is used for printing and toning.

It is now possible for the school of mining and metallurgy to acquire with comparatively little expense, valuable material for illustrative purposes. Photographs of surface and underground appliances, metallurgical plants, copies of drawings and other photographs are indispensable to the study of mining and metallurgy. Every student is expected to present with the report of his field work photographs, as well as sketches, of various subjects under consideration.

THE SCHOOL OF DESIGN.

ADMISSION.

The School of Design offers a three years' course in practical ornamental design and elementary art to students of mature years who can pass an examination in elementary drawing, which will cover substantially the work of one year.

COURSE OF STUDY.

FIRST YEAR.

FIRST TERM.	SECOND TERM.	THIRD TERM.
Study of light and shade from the cast,	Drawing in crayon and charcoal from casts of historic ornament,	Study from the antique, crayon and charcoal,
Perspective drawing,	Sepia painting from geometric casts,	Historic ornament ² in sepia,
Landscape drawing, outdoor work and lectures,	French 4.	French 4.
French 4.		

SECOND YEAR.

FIRST TERM.	SECOND TERM.	THIRD TERM.
The anatomy of pattern,	The anatomy of pattern,	The planning of ornament,
Geometric design.	Cast drawing in sepia,	Study of historic ornament,
Analysis of plant forms,	Original composition,	Plant forms from nature in color,
French.	French.	French.

THIRD YEAR.

FIRST TERM.	SECOND TERM.	THIRD TERM.
Original color designs for walls and ceilings,	Designing for prints, book covers, stained glass and relief work,	Original composition in design adapted to the various periods of historic ornament in "flat" and relief work.
Sepia and water color work from nature,	Advanced study of historic ornament.	
Archæology of Greek Art.		

NOTE.—Students who have completed, in a satisfactory manner, the foregoing course, may, under the approval of the principal, pursue additional studies in advance of those named and along the same or related lines.

NOTES ON THE COURSE.

This course is as thorough and comprehensive as possible within the limits of time specified and is carefully outlined with a view to the gradual and progressive development of artistic training, and the systematic and uniform cultivation of the eye, the hand and the mind to work together for the best results.

Equipment.—The school of design is equipped with a full set of skeleton models for the study of perspective, charts of the orders of architecture and geometric solids for the study of proportion and chiaroscuro. It also has a fine line of casts of historic ornament and architectural details and full length figures and busts of classic and historic sculpture. There is also a small library of standard works of art.

Design.—The actual work in design is not entered upon until the beginning of the second year. It being considered essential that a thorough knowledge of drawing in all its varied aspects and mediums should form the foundation of all decorative and industrial art.

Although one year of drawing is necessary for entrance to the first year's work of this course, a student may enter at once into the second year's work—where the actual study of design begins—by giving satisfactory evidence of having completed all the work required up to that point; and a student may continue to do special work in drawing only, if desired, and students doing advanced work in drawing will be allowed considerable freedom in the choice of subjects and materials, while those with definite aims will receive special and individual training in advanced work.

The study of design is commenced by illustrated lectures on the "Anatomy of Pattern" and the "Planning of Ornament;" these are followed by actual practical work in the original composition of geometric designs founded upon the proper combination of horizontal, vertical and oblique lines and the circle; and upon their relation to the harmony of contrast in repetition, proportion and symmetry, in both form and color.

Natural plant forms are then analyzed and conventionalized, and adapted to varied geometric spaces in repeated units and "all over" treatment in both flat tints and shaded relief.

Applied Design.—When the student has become thoroughly conversant with the laws of natural growth and the underlying principles of design, and when these elements can be rendered with grace and feeling, the study of the application of ornament to different purposes and places is entered upon in relation to printed goods, woven fabrics, sculptured ornament and constructed furniture.

Historic Ornament.—The study of historic ornament in relation to the various periods of art; is here taken up, original decorative designs based upon these periods are executed; and original essays, written and illustrated by the students, are required. Lectures are given on historic ornament and the decorative arts of all the leading periods of art, from the ancient Egyptian to the latest phases of the Renaissance, including the history of art as related to applied art. The advanced study of the human figure and the lower animal forms is taken up in connection with this work and illustrated lectures are given on the anatomy of expression.

An application of the fundamental principles of design to ornament in general rather than to special work of a professional nature is all that can be given in the course outlined, but practical working designs

for carpets, wall paper, wood and stone carvings, blankets, prints, stained glass and book covers, are completed during this course.

GRADUATE STUDIES AND DEGREES.

For the University year 1893-94, graduate courses will be offered in Civil Engineering, Mechanical Engineering, Electrical Engineering, Mining, Chemistry and Metallurgy. These courses are a continuation of the lines of undergraduate work laid out in the foregoing courses of study, and in that department which has conferred upon the student a baccalaureate degree. Upon the completion of a full year of work and by passing a satisfactory examination, with a technical thesis, the student is entitled to a second degree. The degree conferred is that of engineer in the course pursued, or master of science.

For the rules and regulations concerning graduate work, particularly as to the amount of work done, the method of selecting work, the degree of proficiency expected and the time and manner of conducting the examinations, consult the chapter on the Graduate Department; pp. 59 to 66 in this catalogue.

The importance of this graduate work to professional engineers cannot be over-estimated, and all the departments of the college are directing special attention to it. During the coming year major subjects will be offered to graduates in the several departments. In addition to those mentioned in the preceding courses of study the following may be named:

CIVIL ENGINEERING. 1. Experimental mechanics.

2. Structural work as applied to bridges and iron buildings.

3. Geodesy, along lines in the national topographic surveys.

4. Railroads and highways,—the economics of construction and maintenance.

5. Hydraulic and sanitary engineering.

MECHANICAL ENGINEERING. 1. Machine design.

2. Experimental investigations. Special field selected on consultation.

MINING AND METALLURGY. The Mesabi iron ores and their treatment.

CHEMISTRY. Special problems involving original research, meeting the approval of the officers of the department.

DRAWING. (1) Advanced work in spherical projections; (2) descriptive geometry.

PHYSICS. (1) Any line of undergraduate work which has not been taken by the student as an undergraduate. (2) Special problems in electricity and heat; (3) investigations in mechanics and optics for those qualified.

SCHOOL OF DESIGN. (1) The history of decorative art; (2) original composition in ornamental design.

A number of fellowships are being raised in this college, one of which will be offered for the coming year. Graduates of universities where technical courses of recognized standing are offered, are eligible as candidates. Those who desire can learn particulars by corresponding with professor Hoag or professor Shepardson.

THE SOCIETY OF ENGINEERS

is a flourishing organization, holding meetings every Saturday at 1 p. m. for discussion of topics of current interest, hearing reports and lectures from members of the faculty and others. A Yearbook of the society is published, which statedly presents the progress of the engineering departments and the original work done by both instructors and students.

LIBRARIES AND READING ROOMS.

The reference libraries within reach of the student of this college are rapidly becoming valuable. The files of the serial publications in the different fields of engineering, architecture, mining, metallurgy and chemistry are nearly all complete, notably the following:

Proceedings of the American Society of Mechanical Engineers; Proceedings of the American Society of Civil Engineers; Transactions of the American Institute of Electrical Engineers; Transactions of the American Institute of Mining Engineers; Engineering and Mining Journal; The American Journal of Science; The Chemical News; Journal of Analytical and Applied Chemistry; American Chemical Journal; Das Neue Jahrbuch für Mineralogie u. s. w.; The Journal of Geology; The American Geologist; Zeit-Schrift für Krystallographie; reports of the Chief of Engineers, U. S. Army; reports of the Weather Bureau, U. S. Signal Service; Journal of the Franklin Institute; reports of the U. S. Coast and Geodetic Survey; School of Mines Quarterly; The Engineering Magazine; The Colliery Engineer; the Mineral Resources of the United States.

The standard works bearing on special subjects are secured as they appear.

Connected with the several departments are reading rooms in which the leading periodicals relating to the particular lines of work are filed. Many are donated by the societies publishing them, others are loaned by members of the faculty, who at all times place both their periodical lists and their entire professional libraries at the disposition of the students, and still others are secured by exchanging the publications of the University and the Yearbook of the Society of Engineers.

TECHNICAL ESSAYS AND THESES.

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

THESES. Each member of the senior class in this college in addition to the final examination must prepare a thesis on some subject particularly relating to his course. This paper must contain some original research made by the student himself; it must bear merits as a technical paper and must be creditable as a specimen of literary work.

The thesis shall be written or printed and a copy deposited in the library of the University. The subject of the thesis must be announced to the head of the department in which the student is a candidate for a degree and the work of preparation be formally begun at the beginning of the second term of senior year. During the third term the student is expected to put at least ten hours a week on this work.

The subject of the thesis and the character of work done upon it will be suggested in large measure by the course of study pursued by the candidate. Great emphasis is laid upon the careful and accurate preparation of the thesis, because, more than any other work the undergraduate does, this certifies to his ability to undertake the difficult and responsible duties involved in the direction of engineering and industrial interests.

The thesis must be completed and put in the hands of the faculty as early as the senior examination week of the third term.

THE GILLETTE-HERZOG PRIZES.

THE GILLETTE-HERZOG MANUFACTURING COMPANY offers for competition, by the students of the college of Engineering, Metallurgy and the Mechanic Arts, two annual prizes, viz:

A FIRST CASH PRIZE OF FIFTY DOLLARS accompanied by a GOLD MEDAL.

A SECOND CASH PRIZE OF THIRTY DOLLARS accompanied by a GOLD MEDAL, under the following conditions:

I. The subjects admitted:

I. MECHANICAL ENGINEERING in such branches as engine and machine construction and design; heating systems as applied to large manufacturing plants; general construction and arrangement of ideal manufacturing plants to show most economical construction of buildings, most advantageous arrangement of machinery and most expeditious handling of work.

II. ARCHITECTURAL AND STRUCTURAL ENGINEERING as seen in the construction of fire proof buildings, and iron and steel structures generally. The efficiency of cast iron, wrought iron and steel columns should be compared. This subject should also include the construction of iron and steel roofs and trusses, girders, etc.

III. CIVIL ENGINEERING as in bridge construction; e. g., the design of a swing bridge with a discussion of the whole question of strains.

IV. ELECTRICAL ENGINEERING particularly in the electric lighting of manufacturing plants and the use of electric motors in such plants.

V. ORNAMENTAL DESIGN as original designs for ornamental wrought iron work.

2. While the competition is open primarily to seniors in Mechanical, Civil and Electrical Engineering, and advanced studies in the School of Design, special circumstances may make it advisable to admit graduate students to the competition.

3. The names of ten (10) students selecting suitable subjects shall be presented in good faith as signifying their intention to compete for the prizes before the Gillette-Herzog Manufacturing Company shall be bound to declare the prizes open to competition.

Further, the Gillette-Herzog Manufacturing Company and the President of the University shall name the board to adjudge prizes; prizes

may be withheld if the theses and designs are of insufficient merit; the judges shall keep the practical usefulness of the theses in mind; honorable mention may be made of any thesis; each thesis accompanied by its designs shall be handed in without the name of the writer or any designating mark, and all theses shall be presented in duplicate, one copy becoming the property of the University and the other of the Gillette-Herzog Manufacturing Company.

The prizes awarded under the second annual offer in 1893 were as follows:

FIRST PRIZE to Delos C. Washburn for a design of the steel frame of a machine shop or iron foundry.

SECOND PRIZE to Frank E. Reidhead, for a design of a series electric motor.

FEES.

The fees for work in the various shops and laboratories of the college are as low as possible. They are intended to cover only the actual cost of the material used by the student. They will therefore be found to vary from year to year.

As a sample of the charges a list of the fees for the third term, of the year just closing is here appended:

Incidental fee (for the year).....	\$5.00
Chemistry, freshman.....	5.00
Electrical measurements, junior, E. E.....	5.00
Electrical measurements, junior, M. E.....	3.00
Experimental mechanics, senior.....	5.00
Machine work, junior.....	3.00
Materials of engineering, junior.....	2.00
Pattern and foundry work, sophomore.....	3.00

THE COLLEGE OF
AGRICULTURE
THE SCHOOL OF
AGRICULTURE
THE DAIRY SCHOOL
AND THE
EXPERIMENT STATION

The College of Agriculture.

THE FACULTY.

CYRUS NORTHROP, LL. D., *President.*

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

OTTO LUGGER, PH. D., *Professor of Entomology and Botany.*

HARRY SNYDER, B. S., *Professor of Agricultural Chemistry.*

M. H. REYNOLDS, V. M. D., M. D., *Professor of Veterinary Medicine and Surgery.*

THOMAS SHAW, *Professor of Animal Husbandry.*

WILLET M. HAYS, B. AGL., *Professor of Agriculture.*

HENRY W. BREWSTER, PH. D., *Assistant Professor of Mathematics.*

T. L. HAECKER, *Instructor in Dairying.*

The instruction not given by the faculty of the college of Agriculture is given by the faculty of the college of Science, Literature and the Arts.

THE COLLEGE OF AGRICULTURE

is designed to give to young men, who may desire it, the advantages of a thorough, liberal and practical education, not only to prepare them for the successful prosecution of agriculture in all its branches, but to secure to the student the mental discipline and training necessary to qualify him for any other calling or profession, and fit him to discharge intelligently the duties of an American citizen. The period of study requisite for graduation extends through four years.

REQUIREMENTS FOR ADMISSION.

Candidates for admission to the freshman class are required to show attainment equal to that represented by the certificate of graduation from the School of Agriculture, and graduates of the School of Agriculture are admitted on certificate.

SCOPE OF INSTRUCTION.

The object of this college is to teach practical and scientific agriculture, combined with such other branches of learning as are necessary for mental discipline and training, and such as constitute a liberal education, and embrace the following studies and exercises:

FRESHMAN YEAR.

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

SOPHOMORE YEAR.

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

In electing from chemistry, physics, botany and zoölogy the student is required to take the long course in two and the short course in the other two.

JUNIOR YEAR.

FIRST TERM.	SECOND TERM.	THIRD TERM.
†Veterinary Science, 4.	†Veterinary Science, 4.	†Horticulture, 4.
†Agricultural Chemistry, 4.	†Agricultural Chemistry, 4.	†Animal Industry, 4.
†Feeding,	†Dairying, 4.	†Entomology.
Botany,	Mineralogy,	†Agricultural Chemistry, 4.
Psychology,	History,	Astronomy,
History,	English,	German,
Political Science,	Scandinavian,	Drawing,
Mineralogy.	French,	English,
Scandinavian,	Mathematics,	Botany.
Mathematics,	Psychology,	Mineralogy,
English,	Political Science,	Political Science,
Physics,	German,	Veterinary Science,
Rhetoric,	Physics,	Animal Biology,
Entomology,	Animal Biology,	Physics,
German,	Botany,	Latin,
Animal Biology,	Rhetoric.	Surveying.
Latin.		

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

FIRST TERM.	SENIOR YEAR. SECOND TERM.	THIRD TERM.
†Geology, 4.	†Farm Economics, 4.	†Field Agriculture, 4.
†Field Agriculture, 4.	†Carpentry, 4.	†Dairying, 4.
†Horticulture, 4.	†Agricultural Chemistry,	†Veterinary Science, 4.
†Agricultural Chemistry,	Animal Biology,	Political Science,
Botany,	Botany,	Astronomy,
English,	Geology,	Ethics,
Physics,	Political Science.	Botany,
Political Science,	Latin,	Pedagogy,
History,	Ethics,	Applied Geology,
History of Philosophy,	Mathematics,	Animal Biology,
English Literature,	English,	Latin,
Animal Biology.	Military Science.	Social Philosophy,
	French,	English,
	Pedagogy,	Mathematics,
	German,	History,
	Scandinavian,	Philosophy of Religion,
	Physics,	Scandinavian,
	History.	French,
		German,
		Social Philosophy.

GRADUATION.

Upon the completion of this course the degree of Bachelor of Agriculture is conferred.

FACILITIES FOR INSTRUCTION.

Students in the college of Agriculture receive the benefit of the library and apparatus of the other departments of the University, as well as those belonging to the college. The whole may be enumerated as follows:

The general library, containing more than 30,000 volumes, and receiving frequent additions; many volumes are especially devoted, in a practical manner, to the subjects of agriculture, horticulture, tree culture, stock-raising and veterinary science; besides these there are several hundred volumes on zoölogy, physiology and other sciences related to agriculture.

The general museum; the museum of technology; the museum of agriculture, containing at present a collection of models of machines and implements, a collection of the seeds of vegetables, grain and gar-

den seeds in glass jars, a collection of grains and grasses in the straw, and cabinets of insects of Minnesota; these form but a small part of the equipment for instruction in agriculture.

The Agricultural Experiment station furnishes young men an opportunity to take part in lines of experimental work pertaining to general farming, the management of stock and the dairy, and the various branches of horticulture.

A Veterinary hospital gives the student a chance to observe the practical treatment of sick domestic animals. Special effort is being made to make this course more valuable than ever before.

THE UNIVERSITY FARM.

The Experimental farm, consisting of two hundred and fifty acres of most valuable land, is located between St. Paul and Minneapolis, adjoining the State Fair grounds. It contains every variety of soil and exposure required for illustrative and experimental work, and is furnished with a full equipment of buildings, stock, implements and machinery.

The farm is stocked with fine specimens of the best breeds of domestic animals; designed to illustrate their characteristics and value for various purposes and for experiments in feeding, breeding and management.

OBJECTS OF THE FARM.

The farm is designed to accomplish the following purposes:

(1). To furnish to students practical illustration in the field, stable, orchard, garden, dairy and vineyard, of the instruction given in the classroom and laboratory.

(2). To train young men in all the details of practical agriculture.

(3). To aid students in defraying, by their labor, a portion of their expenses while acquiring their education.

(5). To carry on the work of an agricultural experiment station, assisting, by scientific investigation and experiment, in determining the adaptation of new varieties of grain, grasses, fruits and vegetables to the soil, climate and wants of Minnesota, and to distribute the results of such investigation among the farmers of the state.

The School of Agriculture.

FACULTY.

CYRUS NORTHROP, President.

HENRY WEBB BREWSTER, Ph. D., Assistant Principal, in charge of the School, *Mathematics*.

SAMUEL B. GREEN, B. S., *Horticulture and Applied Botany*.

OTTO LUGGER, Ph. D., *Zoology and Entomology*.

CHARLES R. ALDRICH, *Carpentry and Drawing*,

FLORENCE A. BREWSTER, *Librarian*.

WILLIAM ROBERTSON, B. S., *Physics, Language*.

J. A. VYE, *Penmanship, Accounts*.

HARRY SNYDER, B. S., *Chemistry*.

T. L. HAECKER, *Dairy Husbandry*.

M. H. REYNOLDS, V. M. D., M. D., *Physiology, Veterinary Science*.

GEORGE H. MORGAN, Lieutenant U. S. A., *Military Tactics*.

WILLET M. HAYS, B. S. A., *Agriculture*.

THOMAS SHAW, *Animal Husbandry*.

J. M. DREW, *Arithmetic and Blacksmithing*.

OPENING.

The coming year will open October 9, 1894, and close March 29, 1895. The fall term closes Friday, Dec. 21st, and the winter term begins Thursday, Jan. 3d, giving a vacation of thirteen days.

ADMISSION.

Admission is given to students who have completed a common school course in English Grammar, Arithmetic, History of the United States and Geography, as prescribed by the state department of public instruction.

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

Students deficient in grammar and penmanship, who understand arithmetic through fractions, will be admitted to a preparatory class in those branches.

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

EXPENSES.

The cost to the students for board and washing is no more than the actual cost of maintaining the table and caring for the house. This does not exceed \$3.00 per week. A month's board is assessed in advance for the purchase of provisions at cash prices. At the end of the month the exact cost is calculated and the proper deduction made from the next assessment.

Two beautiful and commodious buildings have been erected for the comfort of students. The culinary department is managed by an experienced matron, and the entire house is under the supervision of the principal. The buildings are warmed by steam and the sleeping rooms are each furnished with a bedstead, mattress, dressing bureau and table. Students furnish their own bedding, pillows and towels.

Trains on the Great Northern railroad stop at St. Anthony Park, one mile distant. Baggage is transferred free at the beginning and end of the school year.

BEDDING AND TOWELS.

Each student furnishes four sheets, one pair of blankets, one quilt, one bedspread, one pillow, three pillow cases, two bath towels and comb and brush.

TEXT BOOKS.

Text books are furnished at an annual rental of \$2 to students who do not desire to purchase.

TOOLS.

Each student is expected to furnish his own drawing tools at a cost not to exceed \$5.

MILITARY DRILL UNIFORM.

It is recommended that all students taking the drill provide themselves with the uniform, which consists of blouse, trousers, vest and cap, modeled after the U. S. Military Academy uniform, of cadet gray, and is as neat and economical a dress as the student can obtain. The leading furnishers of Minneapolis and St. Paul furnish the suit complete, to measure, for about \$20. The vest may be omitted, for which allow \$3. A much cheaper suit than the above can be obtained, but is not recommended.

FEEES.

Students pay an incidental fee of \$1 per term and also pay all breakages of apparatus used in practical work.

DEPOSIT.

In addition to the assessment of \$12 for board, at the beginning of the term a deposit of \$5 is required of each student as a guaranty for the return of all books, tools and other articles borrowed.

THE TOTAL EXPENSES FOR THE YEAR need not exceed \$85 to each student.

LABOR.

The school is conducted upon the principle that character makes all labor honorable. As much, therefore, of the labor at the home and on the farm as can be distributed among the students is given to them at a fair rate of compensation.

COURSE OF STUDY.

FIRST YEAR.

FIRST TERM.

Agriculture [3].
History of Breeds [2].
Botany [5].
*Carpentry [2½].
*Drawing [2].
Physiology [5].
*Blacksmithing [1].
Military Drill [2].

SECOND TERM.

Botany [5].
Farm Accounts [5].
*Carpentry [2½] and *Drawing [2].
or
Algebra [5].
Physiology [4].
*Blacksmithing [1].
Military Drill [2].

SECOND YEAR.

FIRST TERM.

Breeding Animals [2½].
*Dairy Husbandry [2½].
Dairy Chemistry [2].
Fruit Culture [3].
Veterinary Science [5].
Zoölogy and Entomology [5].
OR
Algebra [5].
Military Drill [2].

SECOND TERM.

*Veterinary Science [3].
Agricultural Chemistry [5].
Dairy Husbandry [3].
Vegetable Gardening [3].
Field Crops [5].
OR
Algebra [5].
Military Drill [2].

THIRD YEAR.

FIRST TERM.

*Agricultural Chemistry [5].
Forestry [3].
Feeding [3].
Physics applied to Agriculture [2].
Plane Geometry [5].
Lectures on Farm Law.
Military Drill (Optional) [2].
*Dressing and Curing Meats [1].

SECOND TERM.

Greenhouses and Hot-beds [3].
Physics applied to Agriculture [3].
Soils and Fertilizers [5].
Civics [4].
OR
Geometry [4].
Military Drill (Optional) [2].
*Handling Grain and Machinery [1].

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

PROGRAM—FALL TERM, 1894.

	8:15	9:05.	9:55.	10:45		1:15.	2:05.	2:55.	3:45.	4:35 to 5:10.
Aldrich						"C" I. Carpentry, 5. Drawing, 4.		"C" II. Carpentry, 5. Drawing, 4.		
Boss							"A." Dressing and Curing Meats, 1.			
Brewster	"B." Algebra, 5. S. W. R.	"A." PlaneGeom. 5. S. W. R.			C					
Drew			"C" II. Arith., 5. A. R.	"C" I. Arith., 5. A. R.	H	"C" II. Blacksmithing, 2 Tu., W.		"C" I. Blacksmithing, 2. Tu., W.		
Green	**"C" I. Botany, 5.	**"C" II. Botany, 5.	"B." Fruit Cult., 3.—T.W.T.	"A." Forestry, 3. T. W. T.	A					
Haecker					P					
					E	§"B." Dairy- Stock, 1. Tues.	§B. Home Dairying, 3. BI Three hours per week. T. BII Three hours per week. Th. BIII Three hours per week. Sa.			
Hays	†"C" II. Agr. 3, D.H. T. W. T.	†"C" I. Agr. 3, D.H. T. W. T.			L					
Lugger		"B." Entomology & Zoology, 5.								
Morgan										A, B, C. Military Drill. 2.
Reynolds			"C" I. Physiology 5. D. H.	"C" II. Physiology 5. D. H.			"B." Veterinary Science. D. H. W. and F.			
Robertson	‡"A." Physics, 2. Lab.					"C" II. Gram., 3. Prep., 5. A. R.—T. F. S.		"C" I. Gram., 3. A. R. T., F., S.		

Shaw	†"C" II. History of Breeds, 2. D. H.	†"C" I. History of Breeds, 2. D. H.	†"A." Feeding, 3. Lab.			§"B." Animal Breeding, 2½. D. H. W., Th., F., S.			
Snyder				"B." Dairy Chem. 2. Lab.		"A." Agricultural Chemis- try, 10.			
Vye	Prep. Pen- manship, 5. A. R.	Prep. Arith. 5. S. E. R.							

*Will recite to Mr. Robertson during the first seven weeks of the term.

†"C" I and "C" II classes recite first eight weeks three times per week to Shaw and twice per week to Hays; and last three weeks five times per week to Hays.

†"A" class recites third hour to Shaw in feeding, four times a week for eight weeks; then five times a week to Robertson for four weeks.

§"B" class recites first hour p. m., to Shaw in animal breeding, four hours per week, first seven weeks and to Haecker in dairy stock one hour per week, first seven weeks and four hours per week last four weeks. Each member has one afternoon each week in home dairying.

PROGRAM—WINTER TERM, 1895.

	8.15	9.05	9.55	10.45	11.35	1.15	2.05	2.55	3.45	4.35 to 5:10
Aldrich						"C" I. Carpentry, 5. Drawing, 4.		"C" II. Carpentry, 5. Drawing, 4.		
Boss						"A." Handling Grain and Ma- chinery, 1. Tu.				
Brewster	"C" I. Algebra, 5. S. W. R.	"A." Civics, 4. S. E. R.	"B." Algebra, 5. S. W. R.		C					
Drew		"A." Geom. 4. S. W. R.	"C" II. Arith. A. R.		H	"C" II. Blacksmithing, 2. Tu. and W.		"C" I. Blacksmithing, 2. Tu. and W.		
Green	"C" II. Botany, 5.	"C" I. Botany, 5.	"A." Green H. and H. B. 3 T. W. T.	"B." Veg. Gar. 3 T. W. T.	A P E					
Haecker					L	"B." Dairying, 2. Th. S.	B Home Dairying, 3. BI 3 hours per week. Tu. BII 3 hours per week. Th. BIII 3 hours per week. Sa.			
Hays	"B." Field - Crops, 5. Lab.									
Morgan										A. B. C. Military Drill, 2.
Reynolds			"C" I. Physiology 4. D. H.	"C" II. Physiology 4. D. H.		"B." Veterinary Science, 6. D. H.—W. and F.				
Robertson		"C" II. Gram. 3. Prep. Gram. 5. A. R.		Prep. Arith. 5. S. W. R.		"A." Physics, 8. Lab.—W. T. F. S.				
Snyder		"B." Agr'l Chem. 5. Lab.		"A." Soils and Fertilizers. 5. Lab.						
Vye	Prep. Pen- manship, 5.					"C" II. Accounts, 5. Th. F. S.		"C" I. Accounts, 5. Th. F. S.		

SPECIAL ELECTIVE WORK.

Graduates and others of equal attainments are offered the opportunity of entering as special students for elective work in mathematics, English composition, civil government, German, designs and structures and such lines of practical work as they can individually arrange to prosecute with the instructors in charge of such lines.

Each special student is expected to elect at least three lines of work and to do such an amount of work in those lines as shall appear satisfactory to the respective instructors in charge.

Any one contemplating this elective work should make application to the principal before coming and should state what lines of work are desired.

CONNECTION WITH THE COLLEGE COURSE.

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

EQUIPMENT.

The school possesses well equipped laboratories for instruction in chemistry and physics, plant houses for botany and horticulture, and a library. Provisions are made for a museum. Students have access to the special facilities of the experiment station. The agricultural and horticultural work on the University farm is conducted partially with reference to instruction in the school. The dairy hall is supplied with milk testers, Cooley creamers, hand separators, churns and butter workers, conveniently arranged. In the University barn are silos and root cellars, for illustrating methods of construction and filling, a full line of agricultural implements, a herd of cattle, including thoroughbred Jerseys, Guernseys, Holsteins, Shorthorns and Polled Angus, of the highest type; a prize flock of Southdown sheep, and specimens of many breeds of swine. In addition to a constant, careful study of these animals, the observation of the student is extended by frequent visits to the herds and flocks of breeders of stock situated in or near the Twin Cities.

CHARACTER OF INSTRUCTION.

PHYSICS.

The work in Physics is as largely experimental as may be, constant use being made of the laboratory and its equipment to illustrate and enforce the teachings.

Matter, force, energy, motion, friction, work, heat, light, electricity and other subjects are considered in their application to soils, plants, cultivation, pumps, windmills, artesian wells, springs, siphons, fountains,

water powers, pulleys, levers, centrifugals, steam engines and all farm machinery; to dwelling houses, school houses, also heating, lighting and ventilating the same; to thermometers, barometers, hot-beds, ice-houses, lightning rods and country roads.

CIVICS.

During the last term of the course, students receive instruction in this science and graduate with a good understanding of the origin, necessity, nature and various forms of government, and the machinery employed to carry on public works, establish justice and provide for the common defense; of the organization and management of local institutions, the town, the village, the city and the county; the manner in which states are created and their affairs administered, the three departments, legislative, judicial and executive, and the functions of each; the interdependence of the state and its citizens, as well as the powers and obligations of each, by due attention to which the state may be strengthened and the condition of its citizens ameliorated.

The relation of the states to the general government; the constitution and the powers it confers, and the provisions for amendments are taught. The more important principles of commercial law, including contracts, agency, partnership, corporations and commercial paper receive attention. Instruction is also given in the U. S. method of surveying public lands.

ARITHMETIC.

Students entering the preparatory class in arithmetic are required to understand arithmetic through fractions, both common and decimal. The course gives special attention to denominate numbers, in its various forms, interest discount, etc., evolution and mensuration. The aim is to secure both accuracy and facility in the most practical operations.

ALGEBRA.

No algebra is required. Students intending to enter the College of Agriculture after graduating from the School of Agriculture, should complete elementary algebra through quadratics.

GEOMETRY.

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

CARPENTRY AND DRAWING.

Instruction is given by means of text-books, lectures, and work in the shop and drawing room, in the care and use of tools, including set-

ting and filing saws, filing bits, grinding plane-irons, chisels and other tools; also in laying out work and framing buildings. Methods of construction are illustrated by models and drawings. Various articles for use about the farm are manufactured by the students. Designs are made for dwellings, barns, out-buildings and machinery, and students are requested to bring from home, as practical subjects for their designs, sketches of buildings needed on the farm. Estimates are made of the amount of material and cost of construction.

VETERINARY SCIENCE.

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

In the second year the principles of pathology and therapeutics are taught, for which purpose sick animals are kept and treated in the veterinary hospital, giving the student a chance to examine and care for them and to diagnose common diseases, under the direction of the instructor.

ZOOLOGY.

Chiefly Minnesota animals are considered; (1) their classification; (2) their habits and food; (3) their relation to the farmer.

ENTOMOLOGY.

The class in entomology receives instruction of a practical nature. The course is divided as follows:

Classification of insects, sufficient to enable the student to distinguish between useful and injurious insects and to apply remedies intelligently, as the remedies must be selected according to the kind of insects combatted.

Insecticides and their application; the most approved methods of using arsenical poisons, kerosene emulsions, pyrethrum, and other preparations are taught.

Natural remedies and nature's methods of preventing increase of any injurious insects receive due attention so as to enable the student to apply their teachings. The relation of other animals to insects is also taught, so that the student may know both his friends and his foes. Special attention is given to injurious and useful insects of Minnesota.

PENMANSHIP AND ACCOUNTS.

In this department the student is taught to write a plain hand with rapidity and ease. The work in accounts is applied to the transactions

which the student meets with in the various duties on the farm. He is so taught to keep his accounts that he may know at any time the profit or loss of any department of his business, and is thus enabled to plan intelligently.

Attention is given to the different kinds of negotiable paper; the various forms of endorsements and their effect; business forms and correspondence. Everything is made so plain and practical that students can learn to keep accurately and neatly the accounts of an ordinary business.

HORTICULTURE AND FORESTRY.

Instruction is given in growing the hardy fruits and vegetables for market and home use; raising garden seeds; managing hot-beds, greenhouses and window gardens; propagating and improving plants by selection, crossing and hybridization.

Under the general subject of forestry are considered the effect of forests on climate; the comparative value of hardy deciduous and evergreen trees and shrubs; the value and best methods of forming shelter belts and forest plantations; landscape gardening; the cutting, seasoning and preservation of wood; the characteristics of hardiness and the propagation of hardy ligneous plants.

BOTANY.

This study is taught with special reference to its bearing upon the every day problems that present themselves to the farmer and gardener. It is profusely illustrated with flowers and plants from the greenhouse and nursery. Some instruction is given in the use of the compound microscopes, and the 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.

AGRICULTURE.

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

The selection, laying out and general management of farms; soils and soil formation; drainage; road making; fence building; the general principles of cultivation; farm machinery. In connection with the instruction in shop work and drawing students are taught the planning and construction of farm buildings.

The production of grains and of grasses, clovers and other forage plants; the management of grass lands; the rotation of crops and the management of fields in relation to fertility, to weeds, to live stock and

to profits. Many special subjects, such as stacking grain, handling machinery and exterminating noxious weeds are dealt with.

Green manuring, management of farm manures and place of commercial fertilizers in field management in various parts of the state are discussed.

DRESSING AND CURING MEATS.

A building is being arranged to afford better facilities for the instruction and practice in dressing beef, pork, mutton and poultry and in curing meats.

AGRICULTURAL CHEMISTRY.

Instruction is given in the general principles of the science and is illustrated by the many chemical changes that take place on the farm. The work gradually branches, as soon as the preparation will allow, to the topics that are of material importance to the farmer, such as the composition of plants and food stuffs, and the study of the chemical changes that take place in plants from their germination to their final preparation as food products. The composition of milk and the chemical changes involved in its manufacture into butter, cheese and other products are studied. Practice is given in the analysis of milk and the detection of adulteration. Under the head of soils and fertilizers the demands of the various crops upon the soil are considered. The entire work of this course is supplemented by constant practice in the laboratory.

DAIRY HUSBANDRY.

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

In butter making each student receives practical training in caring for milk, creaming milk by the gravity and centrifugal processes, ripening cream, churning, working and packing butter. Practical work in this branch commences the second week of the term and closes the second week in December, and during the second term it commences the second week in February and continues until the close of the school year.

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.

ANIMAL INDUSTRY.

Origin, history, leading characteristics and standard points of the pure breeds of cattle, horses, sheep and swine in North America. Breeds are compared and instruction is given in selecting animals for breeding, feeding and the show ring.

Breeding:—the principles which govern it; selection in breeding; cross breeding and how to improve the common stock of the country. The lectures are illustrated as far as practicable by the presence of living specimens in the class-room.

Principles of feeding and management:—preparation and the proper blending of foods; food and care suited to animals at different stages of growth; to breeding stock, to animals that are being fattened, and to those that are being prepared for exhibition.

GRADUATION.

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

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

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

This certificate admits students to any one of the special lines of study provided in the College of Agriculture.

STUDENTS' DEBATING SOCIETY.

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

STUDENTS' CHRISTIAN ASSOCIATION.

This society has for its object the study of moral and religious subjects and the holding of regular weekly prayer meetings and conference meetings. All students, regardless of creeds, are welcomed to membership; but no sectarian differences are allowed to be discussed in the meetings or in the reading rooms.

The Factorymen's Dairy School.

The creamery and cheese factory course will begin January 3, 1895, and continue four weeks.

Experience has shown that only a limited number can receive thorough training in the practical work, and for this reason, the number of students has been limited, by the Board of Regents, to the first seventy-five applicants.

This course is designed to furnish persons who are actually engaged in the manufacture of butter and cheese, or who purpose doing so, an opportunity to become more skilled in their work and also to study the many problems which have a direct bearing upon the dairy industry. Recognizing the fact that such persons cannot be away from business for a long period, the term has been so arranged that the time of each student is fully occupied by lectures and actual work every hour for every working day of the term.

The force of instructors has been materially increased and a most thorough course has been mapped out for the coming season. No pains will be spared to maintain the high standard which the school has attained. Each member of the faculty has special qualifications for the duties to which he has been assigned. The lecture course and practical instruction are arranged with special reference to giving the greatest amount of training and practice possible in a four weeks' session. Large additions have been made to the equipment of the Dairy Hall, in both butter and cheese departments; in fact, it has everything needed for conducting work by the most approved methods. No machine will be used, or allowed space, that cannot be approved or endorsed by the professor in charge.

Instruction is divided into five courses.

- 1st. Lectures covering the entire field of dairy husbandry.
- 2d. Practical work daily in the butter room.

3d. Practical work daily in the cheese room, where the manufacture of flats, cheddars, Swiss, brick, Edam and Gouda cheese will be carried on.

4th. Examination of milks and making daily and composite tests.

5th. Practical engineering, steam-fitting and plumbing.

COURSE I.—LECTURES.

This will be a rare treat to any one interested in any branch of dairy husbandry, embracing as it does sixty lectures, every one of which will be given when all students can be present.

COURSE II.—BUTTER-WORK.

The running of separators; refining and churning of cream; the proper acidity of cream to secure best flavor; how to churn, wash and salt butter so as to avoid specks and mottles; to secure good grain and best methods for preparing for market, are some of the points which will receive special attention. As all creamery men should be able to judge butter from a commercial stand-point, students will be trained daily in the art of scoring butter by the score card.

COURSE III.—CHEESE MAKING.

The work in the cheese room will be conducted on a much larger scale than heretofore, including the manufacture of several brands of fancy cheese. The fact that there is a demand for these at highly remunerative prices has induced the regents to provide the necessary means to carry on this work.

A complete record will be required from each student of every step taken. Here will be a good opportunity for cheese makers to meet; investigate new methods; make experiments on doubtful points, compare notes, and thus gather in a few weeks knowledge that otherwise would take years to acquire. Minnesota is not occupying her rightful place in this industry; she does not even supply her home demand, whereas she should have a surplus for other states and foreign countries.

COURSE IV.—MILK TESTING.

The recent invention of the milk test has revolutionized the methods of declaring dividends in co-operative dairying. It has been found that the value of milk for both butter and cheese is measured by the per cent. of fat content, and nearly all factories and creameries now pay on the "relative value plan." It is therefore necessary for every factory-man to familiarize himself with the best methods of milk testing. The chemist will give a general outline of the work, but in order that each

student may have practice in milk testing daily exercise will be given. Power, steam, turbine and hand power test machines and other apparatus are provided.

COURSE V.—MOTIVE POWER.

It is intended to so train students that by the close of the term they will be able to run engines, fire and care for boilers, and do ordinary steam fitting and plumbing. An engine, pumps, piping and other necessary appliances will be provided.

EXPENSES.

A registration fee of \$10.00 is required of each student who is not enrolled in the regular course in the School of Agriculture. Board can be obtained, at reasonable rates, in either of the two cities or in St. Anthony Park. To reach the school from either city, take short line trains from union depots, or interurban from Minneapolis, and Hamline car from St. Paul.

All applications for admission should be addressed to Professor T. L. Haecker, St. Anthony Park, Minn.

The Experiment Station.

OFFICERS OF THE STATION.

WM. M. LIGGETT, *Chairman.*
WILLET M. HAYS, B. S. A., *Vice-Chairman and Agriculturist.*
SAMUEL B. GREEN, B. S., *Horticulturist.*
OTTO LUGGER, Ph. D., *Entomologist and Botanist.*
HARRY SNYDER, B. S., *Chemist.*
T. L. HAECKER, *Dairy Husbandry.*
M. H. REYNOLDS, M. D., V. M., *Veterinarian.*
THOS. SHAW, *Animal Husbandry.*
J. A. VYE, *Secretary.*
ANDREW BOSS, *Farm Foreman.*

The Agricultural Experiment Station, organized on the University farm in 1888 as a part of the department of agriculture of the University, has already won an important position in the agriculture of the State. Much valuable literature has been written in the way of bulletin reports of experiments, also for the agricultural newspapers and the annual reports of the various agricultural organizations of the State. The station has gradually grown in the esteem of the farmers, as shown by their constantly seeking it for advice.

During the year 1893 six bulletins were published and distributed free to all citizens of the State applying for them, also an annual report of 330 pages.

Bulletin No. 26 gives the results of digestion experiments with milch cows when fed pea ensilage and wheat bran, and with hogs when fed barley and shorts; barley; corn and shorts; corn; shorts; corn and bran; pease and bran; pease; and bran.

Bulletin No. 27 is a report of analyses of wheat, milled products, corn, corn-and-cob-meal, various parts of the stalk of corn, and numerous other grains and fodders; also the composition of milk and butter and of the bye-products in the manufacture of butter and cheese. An extended report, showing the high quality of sugar beets, as analyzed, from many counties in Minnesota, is also given.

Bulletin No. 28, on entomology, is a popular classification of our insect enemies and friends, and gives also a discussion of the best means of destroying injurious insects. This bulletin has been adopted by some teachers as a text-book in classes in entomology.

Bulletin No. 29, discusses the advantage of using heavy weight wheat for seed, and besides giving the composition of the seed, gives analyses of the wheat plants while growing from heavy and light seed. Analyses of wheat at different stages of its development show that it takes from the soil most of its mineral food and nitrogen during the earlier stages of growth.

Bulletin No. 30, treats of the composition of virgin and cultivated soils in the Red River valley, in the west central prairies, in the park region, in the northeastern part of the state, in the southeast corner of the state and the soils of the University farm. Alkali, gumbo and peaty soils also are discussed.

Bulletin No. 31, contains a report of an experiment comparing corn, barley, oil-meal, wheat screenings, small wheat, pigeon grass seeds, and wild buckwheat seeds for fattening lambs; and also compares lambs with two-year-old wethers for fattening. Reports are also made of variety trials of wheat, oats, barley and corn; also numerous tests of methods of planting and cultivating these crops.

Bulletin No. 32, contains reports of experiments with late blight and rot of the potato; the cross-fertilization of grapes; conserving moisture in the soil, and notes on varieties of plums, apples, juneberries, grapes and strawberries.

The Annual Report for 1893, besides giving a report of all the bulletins published during the year, contains the report of the chairman,

with plans for increasing the efficiency of the station. In addition to a financial report, a statement of farm products and a detailed record for the dairy herd, there are a few scientific articles not published in the bulletins. Further analyses of the soils of the state are reported and some original methods of analyzing soils are given. Several lectures on bacteria in relation to the dairy are printed; also a list of the varieties of grasses and forage plants under trial at the station.

Experiments are being conducted on representative lands with field and horticultural plants at other points in the state. A building costing \$30,000, partly for the use of the Experiment Station, was erected in 1893; the wing of the barn which had blown down was rebuilt on an improved plan, and a most satisfactory water system has been perfected. The station staff, forming as it does the technical faculty of the college and school of agriculture, gives to the agricultural instruction in the University a very practical turn, made possible by the constant contact of the members with the affairs of the several divisions of the station work. The University, likewise, is a source of great help and strength to the station in aiding to furnish the superb experiment farm.

THE
DEPARTMENT OF LAW

The College of Law.

FACULTY.

- CYRUS NORTHROP, LL. D., President.
WILLIAM S. PATTEE, LL. D., Dean, *Department of Contracts and Equity Jurisprudence.*
CHARLES B. ELLIOTT, LL. B., PH. D., (Judge of District Court for Hennepin Co., Minn.) *Department of Corporations and International Law.*
JAMES PAIGE, A. M., LL. M., *Department of Domestic Relations, Partnership and Agency.*
EDWIN A. JAGGARD, A. M., LL. B., *Department of Torts and Criminal Law.*
A. C. HICKMAN, A. M., LL. B., *Department of Pleading and Practice.*
*..... *Department of Property.*

*To be filled.

LECTURERS.

- GEORGE B. YOUNG, LL. B., St. Paul, Minn., (Ex-Associate Justice of the Supreme Court of Minn.) *Conflict of Laws.*
CHARLES A. WILLARD, LL. B., Minneapolis, Minn., *Bailments.*
HON. JAMES O. PIERCE, Minneapolis, Minn., (Ex-Judge of the Circuit Court at Memphis, Tenn.) *Constitutional Jurisprudence and History.*
HON. C. D. O'BRIEN, St. Paul, Minn., *Criminal Procedure.*
CHARLES W. BUNN, LL. B., St. Paul, Minn., *Mortgages and Suretyship.*
HON. JOHN DAY SMITH, LL. M., Minneapolis, Minn., *American Constitutional Law.*
HON. HIRAM F. STEVENS, St. Paul, Minn., *Law of Real Property.*
T. DWIGHT MERWIN, A. B., St. Paul, Minn., *Law of Patents.*
HON. W. D. CORNISH, St. Paul, Minn., (Ex-Judge of the District Court for Ramsey Co., Minn.) *Insurance.*
HON. ROBERT JAMISON, Minneapolis, Minn., (Judge of the District Court for Hennepin Co., Minn.) *Public Corporations.*
ROBERT D. RUSSELL, A. M., Minneapolis, Minn., (Judge of the District Court for Hennepin Co., Minn.) *Common Law Pleading and Practice.*
HERBERT R. SPENCER, Duluth, Minn., *Admiralty Law.*

ORGANIZATION.

The work of the college is divided into six departments, with a member of the faculty at the head of each, who has the special charge and responsibility of the work under his direction.

I.

William S. Pattee, LL. D., Dean, is at the head of the department of Contracts and Equity Jurisprudence, and lectures also upon special subjects in the department of Property.

II.

Charles B. Elliott, LL. B., Ph. D., (Judge of the District Court for Hennepin County,) has charge of the department of Corporations and International Law, and also lectures upon special subjects in the department of Pleading and Practice.

III.

James Paige, LL. M., has charge of the department of Domestic Relations, Partnership and Agency, and in addition thereto conducts the classes in text-book work in Real Property, and gives special attention to the extensive system of quizzing which has been adopted in the college.

IV.

Edwin A. Jaggard, LL. B., of the St. Paul bar, is at the head of the department of Torts and Criminal Law, and lectures also before the senior class on the subject of taxation.

V.

Hon. A. C. Hickman, LL. B., of the St. Paul bar, has charge of the department of Pleading and Practice. This is regarded as one of the most important departments in the college, and greater attention is to be given it in the future than even in the past. The practice in the Justice, District and Supreme Courts is to be specially emphasized.

VI.

The department of Property has been hitherto under the charge of the dean, assisted by special lecturers on particular topics, but it is expected that some person making that subject a specialty will be placed at the head of the department in the near future.

GRADUATE COURSE.

In addition to the six departments of undergraduate work there is a one year course of graduate work leading to the degree of LL. M. For further particulars respecting the subjects considered in this department reference is made to the three courses of study hereinafter set forth.

ORIGIN.

Provision was made in the charter of the University for the establishment, at the proper time, of a College or Department of Law; and, in the early part of 1888, the Regents, believing the proper time had come, established the college, elected a dean, and provided a full corps of lecturers.

THE BUILDING.

The college opened on September 11, 1888, and its rapid growth necessitated the erection of a commodious building for its special accommodation, which was finished, furnished and taken possession of by the college in October, 1889.

The building was designed for the sole use of this department, was completed and furnished with reference to the needs of such an institution. It is constructed of red brick and brown sandstone, and located in a grove of native trees a short distance from the main University building.

Upon the first floor is a large lecture room, constructed on the plan of an amphitheatre, well lighted, and furnished with comfortable chairs, arranged with special reference to taking notes with ease and convenience. Upon the same floor there is the society room, devoted to the literary association of the college, and also a recitation room for text-book work. Upon the second floor there is a large library room, a lecture room and the offices of the dean.

The building is heated by steam generated by a plant located some distance therefrom, supplied with gas, water and all the modern conveniences necessary to make the building complete and thoroughly equipped.

REQUIREMENTS FOR ADMISSION.

Any person of good moral character will be allowed to matriculate in this department. If, however, the person applying for admission intends to be a candidate for a degree at the end of his course, he must be not less than eighteen years of age.

Graduates of universities or colleges, and students who have graduated from any normal school or state high school of Minnesota, or from similar institution of equal grade in other states, are admitted without examination upon presentation of their diplomas.

All other applicants, if candidates for a degree, will be examined in English composition, including English grammar and orthography, English and American history, also geography, arithmetic and physiology. But if the applicant should be found deficient in any of the foregoing subjects he may enter conditionally and make up the deficiency elsewhere during the junior year.

SPECIAL STUDENTS.

Persons who are not candidates for a degree may enter the college at any time as special students without examination and may pursue whatever subjects they desire, provided they possess such knowledge

and ability as will, in the opinion of the faculty, enable them to pursue the subject of law with profit to themselves. And all such students will be entitled to a certificate upon a satisfactory examination in the subject pursued by them, stating the time they have been members of the school and the subjects in which they have passed a creditable examination.

ADVANCED STANDING.

Should any person desire to enter the senior class for a degree he must be at least nineteen years of age, must have had the required preliminary examination upon the subjects of the junior year, or their equivalent, but no person will be allowed to receive his degree who has not spent one full year in this department. Attorneys at law, however, who have been admitted to practice in the state of Minnesota, may enter the senior class without examination upon presentation of their certificates of admission and shall be entitled to their degree upon a satisfactory showing at the final examination of the year.

Applicants who have diplomas entitling them to admission without examination, should present them to the registrar of the University, who, upon the payment to him of the matriculation fee and the first term's tuition, will register them as students of the college.

Those who are to take examinations or enter as special students, should present themselves to the dean of the college of Law, who will, upon proof of their qualification for admission, refer them to the registrar, where they can pay the matriculation fee and the first term's tuition and receive their cards of admission.

TUITION.

The tuition, payable in advance by all students in the undergraduate courses, is as follows:

Matriculation fee, \$10.00

Tuition, per term, payable each term in advance, \$15.00

Diploma fee, \$10.00

COURSES OF STUDY.

TWO YEARS' COURSE.

The undergraduate course, extending over a period of two years, of nine months each, comprises, among other subjects, the following:

FIRST YEAR (JUNIOR).

Contracts, including the special subjects of agency, bailments, commercial paper, partnership, insurance, and sales; torts; criminal law; real and personal property, domestic relations; pleading and practice.

SECOND YEAR (SENIOR).

Real property, continued, including mortgages and suretyship; equity jurisprudence and procedure; pleading and practice, continued; evidence; corporations; wills and administration; taxation; international law; constitutional law; conflict of laws; and admiralty law.

The subjects as above arranged are not necessarily taken up in the order they are mentioned, but the topics of the first and second years respectively will be considered during those years in such order as best subserves the interests of the students.

THREE YEARS' 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 go over the same subjects as those in the day department, taking a year longer in which to do the work; but if those attending in the evening find time to do the requisite amount of reading and study to enable them to pass the final examination at the end of two years, they will be allowed to graduate at the expiration of that time.

GRADUATE COURSE.

IN JURISPRUDENCE AND POLITICAL SCIENCE.

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

Students are all earnestly advised to pursue this course, as it offers an opportunity to acquire a wider knowledge of certain subjects, which cannot be fully discussed in the undergraduate course, and as it offers other subjects of importance not considered at all in the preceding courses.

The courses of lectures offered in this department are as follows:

General Jurisprudence, by William S. Pattee, LL. D., Dean.

Political Science, by William W. Folwell, LL. D., Professor of Political Science.

International Law, by Charles B. Elliott, LL. B., Judge of the District Court for Hennepin County.

Constitutional Jurisprudence and History, by Hon. James O. Pierce, ex-Judge of the Circuit Court at Memphis, Tenn.

Taxation, by Edwin A. Jaggard, LL. B., of the St. Paul bar.
Minnesota Practice.

The subject, Minnesota Practice, is designed especially to familiar-

ize those who are to follow their profession in Minnesota, with the practice in the district and supreme courts of this State.

Those who enter this course as candidates for the degree must have already received the degree of bachelor of laws, from this or some other law school. Those who spend the entire year in the work prescribed for this course, and pass a satisfactory examination upon the subjects taken, will be entitled to the degree of master of laws. Any person who possesses the requisite legal learning may, however, enter this course as a special student and pursue any or all of the studies offered. Tuition in this course is \$10 per term or \$30 per year and diploma fee of \$10.

LIBRARIES.

The department 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 department by the generous action of the Bar Association of Minneapolis in granting to the students the free use of its extensive and ample library located in Temple Court. It contains all the American reports, state and national, and also the English text books and reports, so necessary for the student in his study of fundamental jurisprudence.

Beside the University and Bar Association libraries, the State library containing everything which a student would have occasion to consult, is located at the Capitol, in St. Paul, and is thus within easy reach of the students.

The general library of the University contains about thirty 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.

The library is open to students and the public from 8 a. m. to 9 p. m. every day of the University year, except Sundays and legal holidays. Books may be borrowed for home reading, to be kept seventeen days. Reference works and other rare and costly volumes are not allowed to be taken from the library, but may be consulted in the reading room.

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

are open during the entire day, and the University library is open also in the evening.

METHOD OF INSTRUCTION.

The sessions for the day students begin at 2 o'clock p.m. and those for the evening students at 7:15 o'clock p.m. and continue from one and a half to two hours.

The method of instruction is not confined to either lectures or recitations, but such a combination of both is adopted as is best calculated to interest the student and secure for him a thorough, accurate and comprehensive knowledge of the principles and rules of law. And in addition thereto such a use of the reports is made as will familiarize the student with the leading cases upon the various subjects upon which he receives instruction.

EXAMINATIONS.

Written examinations will be held at the close of each subject during the junior and middle years, and no student who fails to pass a satisfactory examination in any of his studies will be advanced to the next higher class.

A student thus failing, however, may have another examination during the first week of the next year upon those subjects wherein he failed, and if it prove satisfactory he shall be advanced accordingly. Such student may, however, enter the advance class if he has not been conditioned in more than two subjects, and provided he makes up those subjects by taking them in the regular classes where they are taught.

COURTS.

The department is located within easy reach of both the federal and state courts. The United States courts are in session in St. Paul and Minneapolis during the greater part of the school year. The supreme court of Minnesota, the district courts of Ramsey and Hennepin counties, and the municipal courts of St. Paul and Minneapolis are open and in session almost constantly, and afford all the opportunity for witnessing the trial of actual cases which the student will have either time or desire to improve.

MOOT COURT.

A moot court is organized the third term of junior year. As fast as the student becomes acquainted with the primary rights of persons, cases are prepared for his consideration, whereby he may apply the principles of law with which he has become familiar.

There is also established in the senior year a system of moot courts

corresponding to the justice, the district and the supreme courts of Minnesota, wherein the student may become familiar with the practice and the rules of the courts respectively.

It is the aim of the department to acquaint the student with the practice as well as the theory of the law, and to this end the subjects of pleading, evidence, rules of practice adopted by our state courts, methods of securing provisional remedies, appeals from one court to another, the writs of habeas corpus, certiorari and others of frequent use, conveyancing, drawing contracts and other like practices which comprise the daily work of the general practitioner, will, during the senior year, receive special and careful attention.

Some member of the faculty will preside over each of these courts, associating with him such members of the class as he shall from time to time select. Briefs will be prepared and other steps taken so far as possible, which practice requires in the actual conduct of cases.

THE LECTURERS.

All the lecturers in the department are lawyers actively engaged in the practice of their profession. They come to the class-room direct from the bar, bringing with them fresh experiences and the spirit of actual contest. They all possess a high ideal of what a lawyer should be and do, and the student who enters here is expected to come with the fixed purpose of attaining a high degree of excellence in his legal acquirements, and to respond in earnestness and fidelity to the faithful efforts of his instructors in his behalf.

THE LITERARY SOCIETY.

The students of the department, juniors and seniors, have joined in organizing a literary society for the purpose of general improvement and for cultivation in the practice of extemporaneous speaking. They hold weekly meetings and derive great benefit from their exercises.

ELECTIVES FROM OTHER DEPARTMENTS.

Students of this department will be admitted under proper regulations, to exercises in the other departments or colleges of the University, without extra charge, and so far as does not interfere with their law studies, they are urged to avail themselves of this opportunity to attend lectures and recitations in the other departments. Such elections should be made only after consultation with the Dean. The following subjects are suggested as being particularly suitable: international law, constitutional history and political science.

DEGREES.

The degree of bachelor of laws will be conferred upon all students who pursue the full course in this department, and pass an approved examination. The degree will also be conferred upon those, who, having attended another law school for the period of one year, shall also attend for one year in this department and pass a like examination.

ADMISSION TO THE BAR.

The legislature of Minnesota in the year 1891, recognized the Law Department of the University of Minnesota in the following enactment, whereby students graduating therefrom are entitled to admission to the bar without further examination.

AN ACT to establish a uniform standard of admission to the bar of this State, and to punish persons violating the provisions of this act.

Be it enacted by the Legislature of the State of Minnesota:

SECTION 1. As soon as possible after the passage and approval of this act the Justices of the Supreme Court of this State shall appoint from the members of the bar of Minnesota, learned in law, one person from each congressional district now or hereafter created, to constitute a state board of examiners in law.

SEC. 2. The term of office of said board shall be as follows:

Three shall be appointed for one year, two shall be appointed for two years, and two shall be appointed for three years, and their successors shall receive their appointment in like manner for terms of three years each; but in case of a vacancy occurring by death or otherwise, there shall be appointed in a like manner a person to serve through the unexpired term of the member to whose place he is appointed.

SEC. 3. The said board shall elect a president, secretary and treasurer; shall have its headquarters at the Capitol of the State; shall have a common seal; and the president and secretary shall have the power to administer oaths; the said board shall at least three times in each year hold public examinations for admission to the bar of the State, which examinations shall be both written and oral, in such place in this State as the Supreme Court shall direct, and at such times as the said board shall determine; the said board shall keep a record of all its proceedings, and also a record of all applications for admission to the bar, and shall enroll in a book kept for that purpose, the name of each person admitted as an attorney at law.

SEC. 4. The said board shall, as soon as practicable thereafter, report the result of all examinations to the Supreme Court, with such recommendations as to said board shall seem just, and the Supreme Court shall, after considering said report and said recommendations, enter an order in each case authorizing or directing said board to reject such applicant or to issue to him a certificate of admission to the bar.

SEC. 5. The said board shall receive from each person applying for examination the sum of five dollars (\$5.00) as a fee therefor, and all fees received by said board shall be deposited with the treasurer of said board and applied toward the expenses and compensation of the respective members of said board.

SEC. 6. There shall be paid out of the treasury of said board to each examiner appointed as aforesaid, a compensation not exceeding ten dollars (\$10.00) per day and his actual necessary expenses in going to, holding and returning from any such examinations.

SEC. 7. No person shall hereafter be admitted to practice as an attorney and counsellor at law, or commence, conduct or defend any action or proceeding in any of the courts of record of this State, in which he is not a party concerned either by using or subscribing his own or the name or names of any other person or persons, unless he has complied with and been admitted under and pursuant to such rules as the Supreme Court of this State shall prescribe; provided that the provisions of this act shall not apply to or affect persons admitted to the bar of this State under pre-existing laws.

Provided, THAT THE GRADUATES FROM THE LAW DEPARTMENT OF THE UNIVERSITY OF MINNESOTA SHALL, UPON PRESENTATION OF THEIR DIPLOMA FROM SAID UNIVERSITY TO THE SUPREME COURT, OR ANY OTHER DISTRICT COURT OF THIS STATE, AT ANY TIME WITHIN TWO (2) YEARS FROM THE DATE OF SUCH DIPLOMA, BE ENTITLED TO A CERTIFICATE OF ADMISSION TO THE BAR WITHOUT ANY EXAMINATION OR FEE WHATSOEVER; AND SUCH COURT SHALL THEREUPON ENTER AN ORDER AUTHORIZING AND DIRECTING THE CLERK OF SAID COURT TO ISSUE TO SUCH GRADUATE A CERTIFICATE OF ADMISSION TO THE BAR, UPON PROOF SATISFACTORY TO SAID COURT THAT SUCH GRADUATE IS A CITIZEN OF THE UNITED STATES, A CITIZEN AND RESIDENT OF THE STATE OF MINNESOTA; THAT HE IS TWENTY-ONE (21)

YEARS OF AGE, OF GOOD MORAL CHARACTER, AND UPON HIS SUBSCRIBING SUCH OATH AS IS NOW PROVIDED BY STATUTE FOR PERSONS UPON THEIR ADMISSION TO THE BAR.

SEC. 8. Any person who shall appear as an attorney or counselor at law in any action or proceeding in any court of record in this State to maintain or defend the same except in his own behalf when a party thereto, unless he has been admitted to the bar of this State, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than fifty (\$50) nor more than one hundred dollars (\$100), and it shall be the duty of the respective county attorneys in this State to prosecute violations of this act; but the District Courts of this State shall have sole original jurisdiction of this offense.

Provided. That any attorney or counselor residing in any of the other States or Territories wherein he has been admitted to practice law, and who shall attend any term of the Supreme or District Courts of this State for the purpose of trying or participating in the trial or proceedings of any action or proceeding therein pending, may be permitted to try or participate in the trial or proceedings in such action or proceeding without being subject to provisions of this act.

SEC. 9. Chapter ninety-three (93) of the general laws of one thousand eight hundred and eighty-nine (1889) and sections three (3), four (4) and eight (8) of chapter eighty-eight (88) of the General Statutes of one thousand eight hundred and seventy-eight (1878), and chapter one hundred and four (104) of the general laws of one thousand eight hundred and eighty-three (1883) are hereby repealed.

SEC. 10. This act shall take effect and be in force from and after its passage.

LAW BOOKS.

Students will be expected to furnish themselves with such text-books as the faculty shall adopt for use in the recitation room. In all cases they will be such books as will be found necessary in the student's practice.

In addition to these, should any of the students desire to have at hand other standard works upon the subjects taught, a judicious selection could be made from the following list, and the faculty would be glad to aid them in making such a selection:

Contracts—Parsons, Anson, Metcalf, Pollock, Bishop.

Bailments—Schouler, Edwards, Story.

Sales—Benjamin, Blackburn.

Domestic Relations—Schouler or Reeves on Domestic Relations; Schouler on Husband and Wife; Bishop on Marriage and Divorce; Bishop on Married Women; Cord on Married Women; Macdonnell on Master and Servant; Simpson on Infants.

Corporations—Elliott on Private Corporations; Angell and Ames, Field, Morawetz, Taylor; Dillon on Municipal Corporations; Thompson on Liability of Stockholders.

Bills and Notes—Byles; Chalmers, Parsons; Daniels on Negotiable Instruments; Edwards on Bills and Notes; Bigelow's Leading Cases; Ames' Leading Cases.

Torts—Cooley, Bigelow, Addison; Wharton on Negligence.

Evidence—Greenleaf on Evidence; Best's Principles of Evidence; Stephen's Digest of Law of Evidence; Wharton or Starkie on Evidence; Rogers on Expert Testimony; Rosco's Criminal Evidence.

Real Property—Williams, Washburn, Tiedman, Boone, Willard.

Partnership—Lindley, Parsons, Bates, Pollock.

Wills and Administration of Estates—Redfield on Wills; Jarman on

Wills (Randolph & Talcott's or Bigelow's edition); Hawkins on Construction of Wills; Schouler on Wills; Williams on Executors.

Common Carriers—Hutchinson on Carriers; Thompson on Passenger Carriers; Redfield or Pierce on Railways.

Equity—Pomeroy's or Storey's Equity Jurisprudence; Snell's Bisham's or Adams' Equity.

Criminal Law—Harris, Bishop, Wharton, May, Washburn, Stephen's Digest of the Criminal Law; Stephen's History of the Criminal Law.

Pleading—Gould, Stephens, Chatty, Hurd; Bliss on Code Pleading; Story's Equity Pleading; Pomeroy on Remedial Rights.

Agency—Evans, Story, Wharton.

Damages—Sutherland, Sedwick.

Mortgages—Jones, Thomas.

Insurance—May on Insurance; Wood on Fire Insurance; Bliss on Fire Insurance; Arnold on Marine Insurance.

Shipping and Admiralty—Abbott, Conkling, Desty.

Easements—Goddard, Washburn.

Taxation—Cooley, Burroughs, Desty.

Medical Jurisprudence—Ewell, Wharton and Stille, Beck.

Constitutional History—Hallam's Constitutional History of England (1485-1760); May's Constitutional History of England (1760-1860); Yonge's Constitutional History of England (1760-1860); Stubb's Constitutional History of England; Bagehot's English Constitution; Gheist's English Constitutional History; Curtis' History of the Constitution of the United States; Bancroft's History of the United States; Von Holst's Constitutional History of the United States.

Constitutional and State Law—Pomeroy's Introduction to the Constitutional Law of the United States; Von Holst's Constitutional Law of the United States; Cooley's Principles of Constitutional Law; Cooley's Constitutional Limitations; Story's Commentaries on the Constitution of the United States; Sedgwick on Constitutional and Statutory Law; Jameson's Constitutional Conventions; Bishop's Written Law; Maxwell on the Interpretation of the Statutes; Farrar's Manual of the Constitution of the United States; Stearn's Concordance to the Constitution of the United States.

Jurisprudence—Holland's Elements of Jurisprudence; Austin's Lectures on Jurisprudence; Lorimer's Principles of Jurisprudence; Amos on the Science of Law.

International Law—Wheaton's Elements of International Law; Hal-

lis International Law; Davis' International Law; Story's Conflict of Laws.

Roman Law—Morey's Outlines on Roman Law; Hadley's Introduction to Roman Law; Mackenzie's Roman Law; Moyle's Justinian; Roby's Introduction to the Digest; Muirhead's Roman Law.

EXPENSES.

These depend largely upon the tastes and habits of the individual. Students find no difficulty in obtaining board among the people of the city. Good board can be obtained for \$4 per week. Students board in clubs at less expense.

For further particulars write to the President Cyrus Northrop, Minneapolis, or to the Dean W. S. Pattee, and all information necessary for the student will be furnished promptly. The Dean will be pleased to correspond with any one who is thinking of pursuing a course of legal study, and he will gladly aid any student in selecting the proper books. Letters addressed to him at Minneapolis, Minnesota, will receive prompt attention.

THE
DEPARTMENT OF MEDICINE

The Department of Medicine.

The Department of Medicine is composed of the following colleges:

The College of Medicine and Surgery.

The College of Homeopathic Medicine and Surgery.

The College of Dentistry.

The College of Pharmacy.

The colleges are distinct in the government of their internal affairs. Students from all of the colleges, except that of pharmacy, attend work in common in anatomy, chemistry, histology and physiology. Students of the college of pharmacy attend only the work in chemistry in common with the other students of the department. A special course in physiology is provided for them.

ENROLLMENT.

Students are assigned seats in the order of their matriculation. The matriculation fee and annual dues are payable in advance; the laboratory fees at the beginning of each laboratory course. After the student has paid his dues to the registrar, he is to report to the dean of the college where he desires to enter for classification, and again to the registrar for permanent enrollment. Students who fail to pass the entrance examinations will have all of their fees, except the matriculation fee, returned to them.

THE COLLEGE YEAR.

The seventh course of lectures will begin October 9th, 1894, and close the first Thursday in June, 1895.

ADMISSION.

The entrance examination will be conducted by the Deans of the several colleges and will begin Tuesday, Oct. 9th, at 10 o'clock a.m., at which time also, all students submitting credentials should present themselves.

Applicants for admission to any of the colleges are required to prove their fitness to enter—

1. By presenting the diploma of some recognized college.
- Or, 2, by presenting the diploma of a first-class high school, or the advanced course of a normal school of Minnesota, or of a school of any state equal in rank to the above-mentioned classes of schools. (It is provided, however, that if the applicant presenting such diploma has not pursued the subject of Latin he will be required to complete the Medical and Pharmaceutical Latin provided by the department.)
- Or, 3, by passing a written examination in the following:
 - a. English composition—not less than two hundred words upon some subject to be announced at the time of the examination. In grading this composition, spelling, punctuation, grammatical accuracy and the command of the English language—as shown in the construction of the sentences—will be taken into consideration.
 - b. Latin—the examination will test the applicant in the following: declension, conjugation, construction, rules for agreement, and the translation of easy Latin prose. Jones' First Latin Lessons will furnish the necessary preparation.
 - c. Algebra—elementary.
 - d. Physics—as much as is contained in Avery's or Gage's elementary text-books.

Students who intend to enter any of the colleges of the department are urged to secure, at least, a high school education or equivalent, before making application for admission.

SPECIAL STUDENTS.

Properly qualified students or practitioners may be admitted to any of the colleges as special students upon the payment of a fee of fifteen dollars in addition to the usual laboratory fee for each study pursued. Students who take work as specials and afterward decide to take the full course will receive credit for the work which they have completed.

FACILITIES FOR INSTRUCTION.

DIDACTIC WORK.

All the didactic courses given in the department are open to the regular students of any of the colleges, who wish to take special work, without further charge for instruction and examination. Permission to carry additional special work must be obtained from the dean of the college to which the student belongs.

LIBRARIES.

A new library building is in process of erection. This building will contain the general library of the University, of over thirty thousand volumes, beside the special libraries, among them the medical library of about twelve hundred carefully selected volumes upon professional subjects. This collection is excellently adapted for the general reference work for the students of the entire department. Beside these facilities the city libraries of the Twin Cities are open to all students of the University.

LABORATORIES.

Chemistry—The main laboratory occupies the west end of the laboratory building and has a floor space of about fifteen hundred square feet, well lighted on both sides. On each side of a central aisle are arranged working tables for seventy-two students, the number which can work at one time. Each working place is provided with three cupboards, allowing two hundred and sixteen students to work in three divisions. In the middle of the aisle are two hoods, having a total length of thirty-two feet of working space, providing ample room for operations giving off offensive odors. Convenient to the hoods and desks are sinks and water. The customary reagent bottles and apparatus are provided for one hundred and forty-four students in the courses of general chemistry, qualitative analysis and the analysis of the urine.

Adjoining the main laboratory is a preparation room with a floor space of two hundred and twenty-five square feet, supplied with apparatus and chemicals and designed for making reagents and distilled water.

In the second story is a store room for apparatus and chemicals, the office of the professor and the private laboratory, occupying a floor space, in all, of about three hundred and fifty square feet.

The chemical lecture room is situated in the main medical building. The lecture room itself is used in common with other branches. Separated from it by a rolling curtain is the lecture table and preparation room, which is well supplied with the usual experimental apparatus.

Histology and Embryology. This laboratory occupies three rooms in the eastern end of the laboratory building. (1) The general laboratory occupies a floor space of about eight hundred square feet and is excellently lighted by large windows on the north and east sides. The students' work tables are of oak and placed immediately beneath the windows. The laboratory is well equipped with Leitz and Bausch and Lomb microscopes, Thoma, Minot freezing and other microtomes, water baths, incubators, special forms of glassware, apparatus for injection, the reconstruction from sections of models in wax and other materials, and for other special methods of research. Each student is provided with a locker in which to keep his specimens and outfit of reagents, etc. (2) A special research laboratory and preparation room about sixteen feet square, lighted on two sides and opening into the general laboratory. It is well equipped with work tables, apparatus and preserved material for advanced and research work. (3) The professor's study and private laboratory, about fifteen feet square, well lighted and equipped including a large and comprehensive library relating to these

subjects, and one of the richest and most extensive collections of serial sections and vertebrate embryos in the country.

Beneath the laboratory is a large basement used for purposes of storage and the terrarium and aquaria of the laboratory. All the rooms are heated by steam and supplied with water and gas.

The laboratory of bacteriology consists of a well lighted room sixteen feet square, equipped with thermostats, steam and hot air sterilizers, special glassware and other apparatus for the cultivation and study of the various forms of bacteria. Cultures of the more prominent saprophytic and pathogenic forms of bacteria are maintained in the laboratory, thus offering opportunities for advanced and research work. This room adjoins the larger general laboratory where the class in bacteriology and also in pathology is conducted.

Physiology. The physiological laboratory of the department of medicine occupies rooms upon the second floor of the medical building and adjoins the amphitheatre. It is equipped with chemical reagents, glassware and apparatus for special studies and for the preparation of material for class courses in physiological chemistry; these courses being conducted in the chemical laboratory of the medical department. Microscopical work in physiological chemistry is done similarly in the laboratory of histology.

The physiological laboratory is also furnished with a line of instruments and apparatus for demonstrations in practical physiology, including vivisection tools, respiratory machine, moist muscle chambers, Du Bois-Raymond Coil, Ludwig's Kymograph, Spring Myograph, Frog Myograph, Marey's Cardeograph, Burdon-Sanderson's Recording Stethometer, Dudgeon's Sphymograph, batteries, galvanometer, rheostats, etc. The laboratory is easy of access to the main amphitheatre in which demonstrations are conducted. It has a spacious animal room, well warmed, lighted and ventilated, and fitted with frog tanks, animal cages and enclosures for the proper care of animals used in laboratory work.

Hospitals and Clinics. Students of the department have free access to the numerous hospitals and dispensaries of the two cities, which afford ample facilities for clinical instruction.

FEES.

The general fees are the same for all of the colleges of the department and are as follows:

Matriculation (payable annually).....	\$10.00
Annual dues.....	40.00
Histological laboratory.....	10.00
Physiological laboratory.....	5.00
Chemical laboratory.....	10.00
Diploma.....	10.00

No part of the laboratory fees are ever returned, and if at any time they should not be sufficient to cover the cost of material, damage by breakage and waste, an additional fee will be required before the student will be allowed to complete the work in the laboratory.

The special fees, peculiar to each college, will be found under the separate statement for the several colleges.

If a student is forced to discontinue work before the Christmas vacation, for sufficient reasons, his lecture fee will be returned; if he discontinues work for insufficient reasons the fees will be retained and credited, *pro rata*, on any succeeding course of lectures.

The matriculation fee will not be returned; laboratory fees will not be returned, except in case of discontinuance for sufficient reason, before the student has been assigned a place in the laboratory.

It is imperative that the students enter at the opening of the session in order to be admitted to the laboratories.

ADVANCED STANDING.

Students will not be admitted to advanced standing until all entrance work is complete. Students are required to attend at least four-fifths of the lectures and all of the laboratory work to be admitted to final examination in any study or be entitled to a certificate of attendance.

Students who fail to pass the studies of any year of the graded course will be conditioned and will be allowed to remove any didactic condition at the opening of the succeeding year. Upon removing these didactic conditions, or a majority of them, they will be allowed to enter upon the work of the next year, but every didactic and laboratory condition must be removed before they will be allowed to pass any final examination in the grade they have entered. Students who began their professional studies elsewhere may be admitted to advanced standing, but all persons who apply for admission to the advanced classes must pass an examination in the branches already pursued by the class to which they seek admission and furnish a satisfactory certificate of time spent in professional studies.

Examination of students from other colleges seeking advanced standing in any of the colleges of the department may be held at the convenience of the examiner during the first thirty days of the term.

The College of Medicine and Surgery.

THE FACULTY.

- CYRUS NORTHROP, LL. D., *President.*
 PERRY H. MILLARD, *Dean and Professor of the Principles and Practice of Surgery and of Medical Jurisprudence.*
 THOMAS G. LEE, B. S., M. D., *Professor of Histology, Embryology, Bacteriology and Clinical Microscopy.*
 GEORGE A. HENDRICKS, M. S., M. D., *Professor of Anatomy.*
 RICHARD O. BEARD, M. D., *Professor of Physiology.*
 CHARLES J. BELL, A. M., *Professor of Chemistry.*
 H. M. BRACKEN, M. D., *Professor of Materia Medica and Therapeutics.*
 CHARLES H. HUNTER, A. M., M. D., *Professor of the Theory and Practice of Medicine.*
 EVERTON J. ABBOTT, A. B., M. D., *Associate Professor of the Practice of Medicine.*
 J. W. BELL, M. D., *Professor of Physical Diagnosis and Clinical Medicine.*
 CHARLES A. WHEATON, M. D., *Professor of Clinical Surgery.*
 FREDERICK A. DUNSMOOR, M. D., *Professor of Operative and Clinical Surgery.*
 CHARLES L. GREEN, M. D., *Professor of Applied Anatomy.*
 PARKS RITCHIE, M. D., *Professor of Obstetrics.*
 A. B. CATES, A. M., M. D., *Clinical Professor of Obstetrics.*
 J. CLARK STEWART, B. S., M. D., *Professor of Pathology.*
 ALEX. J. STONE, M. D., LL. D., *Professor of Diseases of Women.*
 AMOS W. ABBOTT, M. D., *Clinical Professor of Diseases of Women.*
 A. McLAREN, A. B., M. D., *Clinical Professor of Gynecology.*
 JOHN F. FULTON, Ph. D., M. D., *Professor of Ophthalmology, Otology and Hygiene.*
 FRANK ALLPORT, M. D., *Clinical Professor of Ophthalmology and Otology.*
 C. EUGENE RIGGS, A. M., M. D., *Professor of Nervous and Mental Diseases.*
 W. A. JONES, M. D., *Clinical Professor of the Diseases of the Nervous System.*
 JAMES H. DUNN, M. D., *Professor of Diseases of the Genito-Urinary Organs.*
 CHARLES L. WELLS, A. M., M. D., *Professor of Diseases of Children.*
 JAMES E. MOORE, M. D., *Professor of Orthopaedic Surgery.*
 MAX P. VANDERHORCK, M. D., *Professor of Diseases of the Skin.*
 W. S. LATON, M. D., *Professor of Diseases of the Nose and Throat.*
 CHARLES A. ERDMAN, M. D., *Demonstrator of Anatomy.*
 H. L. STAPLES, M. D., *Instructor in Medical and Pharmaceutical Latin.*

LENGTH OF COURSE.

This college requires four years of medical study and attendance upon three courses of lectures before receiving the degree of doctor of medicine. Students entering the freshman class in the college year of 1895-96 and thereafter will be required to take four courses of lectures before

receiving the degree of doctor of medicine. Graduates of recognized universities and colleges will be admitted to advanced standing and permitted to complete their work in three years.

SPECIAL COURSES.

Special courses of instruction are afforded students and practitioners by the payment of the usual laboratory fees and fifteen dollars for each branch pursued. Work completed by special students will be credited in case the student subsequently pursues the regular course.

PROFESSIONAL EXAMINATIONS.

The following regulations govern the professional examinations:

Examinations will be conducted at the end of the first, second and third year's work. An examination will be held the first year upon the subjects of anatomy, chemistry, physiology, histology and materia medica; the examination in anatomy will be mainly confined to osteology and syndesmology; in chemistry the student will be expected to complete his work in general chemistry and qualitative analysis; the final examinations in anatomy, chemistry, physiology and materia medica will be conducted at the end of the second year. The examinations at the end of the third year, for those entering the graduating class, will be divided into five sections.

These examinations are held during the last two weeks of the regular session. Examinations are held the first week of the session for students conditioned in former examinations and for new students desiring advanced standing.

The standing of students is determined by term recitations and final written examinations. Attendance upon at least four-fifths of the lectures under each chair is required in order that the student be allowed to enter for final examination, or to receive a certificate of attendance.

Students are marked as "passed," "incomplete or conditioned" and "failed." Students failing in any branch will be required to repeat the work in this branch before coming up for a second examination. Ten per cent. of the senior class will be recommended to receive the degree M. D. "cum laude." The selection will be based upon the efficiency of the work of the student covering the period of the entire course.

STATEMENT OF YEARLY EXPENSES.

	FIRST YEAR.	
Matriculation		\$10.00
Annual dues		40.00
Anatomical laboratory		5.00
Qualitative analysis		10.00
Histology		10.00

\$75.00—\$75.00

SECOND YEAR.

Matriculation.....	\$10.00
Annual dues.....	40.00
Physiology.....	5.00
Anatomical laboratory.....	20.00
Toxicology and Urinalysis.....	10.00
	<u>\$85.00— 85.00</u>

THIRD YEAR.

Matriculation.....	\$10.00
Annual dues.....	40.00
Pathological laboratory.....	5.00
Diploma.....	10.00
	<u>\$65.00— 65.00</u>

Total for course.....\$225.00

The tuition fee for students classified as "specials".....\$25.00

Facilities for special laboratory courses in embryology, physiopy, bacteriology and water analysis will be afforded those desirous of taking special instruction. The fee is nominal.

GRADUATION.

Candidates for graduation and for the degrees conferred by the University upon graduates of this college, must possess the following qualifications: (1) They must be upwards of twenty-one years of age; (2) they must be of good moral character; (3) they must have spent four full years in the study of medicine; (4) they must have attended three full courses of lectures, the last of which, at least, must have been in this University, and the two former in this or some other recognized university or college of medicine, and (5) they must have sustained satisfactory examinations in the various branches of study, in accordance with the rules of the department.

DEGREE.

Graduates of this college will receive the degree of Doctor of Medicine, (M. D.).

COURSE OF STUDY.

I YEAR.	*II YEAR.	†III YEAR.	IV YEAR.
Embryology.	Bacteriology.	Theory and practice.	A continuation of
Anatomy.	Medical juris p r u d-	Clinical medicine.	practice and sur-
Chemistry.	ence.	Physical diagnosis.	gery, of at least
Histology.	Theory and practice.	Surgery.	two of the special
Physiology.	Clinical medicine.	Gynecology.	branches and the
Materia medica.	Obstetrics.	Pathology.	special course in
Laboratory work.	Diseases of children.	Neurology.	bacteriology, water
	Physical diagnosis.	Ophthalmology.	analysis, etc.
	Hygiene.	Dermatology.	
	Surgery.	Laryngology.	
		Clinical instruction	
		in all special	
		branches.	
		Electro-therapy.	
		Otology.	
		Genito-urinary,	
		Orthopædia.	
		Surgical anatomy.	
		Therapeutics.	

* A continuation of the studies of the first year, excepting embryology and histology.

† A continuation of the studies of the second year, excepting bacteriology, medical jurisprudence and hygiene.

COURSE OF INSTRUCTION.

The course of study in the college of Medicine and Surgery embraces the following subjects:

ANATOMY.

The study of anatomy is graded and extends through three years. Each class receives a separate course of lectures, and each class is examined at the close of the term upon its special work.

First Year—Lectures and recitations in osteology, syndesmology and myology; one course, two hours per week, 64 lectures.

Also attendance upon the lectures to the second year students.

Second Year—Lectures and recitations in descriptive anatomy, one course, two hours per week, 64 lectures.

Third Year—Lectures and recitations in topographical and surgical anatomy, one course, one hour per week, 16 lectures.

LABORATORY WORK.

First Year—Skeleton, joints, muscles. Bones and preparations are furnished for study.

Second Year—Dissection of the whole body, one course, fifteen hours per week (afternoons); 14 weeks.

Dissecting is done in the second year. The practical work in anatomy is done under the supervision of the professor of anatomy and direction of the demonstrator.

Text Books—Quain, 10th Edition; Gray, 11th Edition. Holden's Practical Anatomy; Darling and Ranny, Treve's Applied Anatomy, Owen's Manual.

Collateral Reading—Ranney's Applied Anatomy of the Nervous System, McClellan's Regional Anatomy, Chaveau's Comparative Anatomy, Gagenbaur's Elements of Comparative Anatomy, Wilder and Gage's Anatomical Technology, Flower's Osteology of Mammals.

PHYSIOLOGY.

The study of physiology is graded in the first and second years. Students of the first year attend two lectures or recitations each week. These lectures and recitations include the physiology of cell life; the blood; the muscular system; nervous tissues; the vascular mechanism; the digestive system; respiration; excretion and secretion.

Junior students attend two lectures or recitations each week. These are devoted, during the first few weeks of the term, to a review of the work of the first year. The remainder of the course is devoted to such

advanced topics as metabolism; nutrition; dietetics; reproduction, and the nervous system.

In the second year three hours of each week are assigned to practical physiology. During the first four months these hours are occupied in class work in physiological chemistry, which is conducted in the chemical laboratory. In the latter half of the year these hours are occupied in class demonstrations in experimental physiology conducted in the physiological laboratory or in the adjoining amphitheatre. Final examinations are held at the close of each year.

Text Books.—Foster's Physiology, 5th or 6th edition.

Collateral Reading.—Waller; Landois and Stirling; Chapman; Martin and Yeo.

CHEMISTRY.

First Year—Lectures on inorganic chemistry, laboratory, general chemistry and qualitative analysis.

Second Year—Lectures on medical chemistry, elements of organic chemistry, toxicology and laboratory work.

Text Books Recommended—Remsen, Inorganic Chemistry; Tyson, Examination of the Urine; Reese's Toxicology; Taylor on Poisons.

HISTOLOGY AND EMBRYOLOGY.

Lectures, recitations and laboratory work. Each student will receive carefully prepared specimens illustrative of the various tissues and organs of the body, which he will preserve for permanent use and from which drawings will be made. Didactic and practical instruction in embryology will also be given in connection with the work in histology. Practical instruction will be given in the methods of preserving and preparing material for microscopic examination. Special facilities are offered for advanced work and original research in histology and embryology.

Text Books—Piersot's Histology, Quain's Anatomy, 10th Edition, Minot's Human Embryology; Hertwig-Mark Text Book of Embryology.

If possible each student should provide himself with a microscope, which can be obtained complete for \$50 and upwards.

BACTERIOLOGY.

Lectures and recitations illustrated by microscopic preparations, and cultures of various pathogenic bacteria. Laboratory exercises in staining and diagnosing pathogenic bacteria. Opportunity will be offered in the laboratory for special research work.

Text Books—Schenk's Bacteriology, Sternberg's Bacteriology, Fraenkel's Bacteriology.

URINALYSIS.

Laboratory instruction with practical examination of the urine and other body fluids in their relation to disease, and as aids in diagnosis.

Text Books—Tyson, Practical Examination of Urine.

PATHOLOGY.

Demonstrations, recitations and laboratory work.

Gross pathology will be taught by lectures, oral and written quizzes on the text book, and demonstrated as far as practicable by autopsies made by members of the class under the supervision of the professor. A large number of valuable specimens which are accumulating in the museum will be utilized to illustrate diseased conditions.

Each member of the class will receive and mount permanently a series of 75 to 100 carefully prepared sections, illustrating tumors, inflammations and the more important lesions of the viscera.

Text Book—Delafield & Prudden's Handbook of Pathological Anatomy, 1892.

Collateral Reading—Ziegler's Handbook of Pathology (in press).

MATERIA MEDICA AND THERAPEUTICS.

The work in Materia Medica and Therapeutics covers a period of three years. Examinations are held at the end of each year on the branches of the respective years. A short course in medical botany is afforded the students of the freshman class. Materia medica is completed at the end of the junior year. A course of lectures is given the senior class upon therapeutics.

Text Books. Bracken's Outlines of Materia Medica.

Collateral Reading—Brunton's Pharmacology Therapeutics and Materia Medica, U. S. Dispensatory, The National Dispensatory, Hare's System of Practical Therapeutics, Hand Book of Local Therapeutics, by Allen, Harte, Havlingen and Harlan.

OBSTETRICS.

This subject is taught by didactic lectures, charts and demonstrations on the manikin. Excellent clinical facilities are afforded at the City Hospital in St. Paul and in the hospitals of Minneapolis. Each member of the senior class will be required to participate in one or more deliveries.

Text-books.—Lusk, Charpentier, Galabin.

SURGERY.

The didactic course consists of three lectures weekly during the entire session. A laboratory course is afforded, consisting of bandaging,

the use of surgical apparatus, the manufacture and care of antiseptic dressings, etc.

The clinical facilities in this branch are most ample.

Text-books.—American Text-book of Surgery, Robert's Practical Surgery, Senn's Principles of Surgery.

Collateral Reading.—Agnew's and Ashurst's International Encyclopedia.

PRACTICE OF MEDICINE.

Lectures, recitations and clinical instruction. Bedside instruction will be a special feature in the teaching of this branch.

Text-books.—Osler, Hilton Fagge.

Collateral Reading.—Flint, Reynold's System, Loomis, Niemeyer and Roberts.

DISEASES OF WOMEN.

Lectures, clinical instruction and attendance upon operations. The opportunities of practical instruction in this branch will be ample.

Text-books.—Thomas, Schroeder, Byford.

Collateral Reading.—Emmett, Hart and Barbour.

EYE AND EAR.

Lectures, clinical instruction and recitations.

Text-books.—Noyes, Nettleship (eye), Roosa (ear) and Williams.

Collateral Reading.—Juler, Stellwag, Soelberg, Wells and Politzer.

NERVOUS AND MENTAL DISEASES.

Lectures and clinical instruction. Special opportunities will be offered students in differential diagnosis and they will be made familiar with the technique of electro-therapy.

Text-books.—Edinger's Anatomy of the Central Nervous System; Gray's Nervous and Mental Disease; Gower's Nervous Diseases; Bramwell (cord); International System of Electro-Therapeutics, Bigelow; Spitzka, Savage, (insanity).

Collateral Reading.—Dictionary of Psychological Medicine, Hack Tuke; Mental Diseases, Clouston and Bevan-Lewis; Handbook of Insanity, Kirchoff; Ferrier's Functions of the Brain and Cerebral Localization; Nervous Diseases, Strumpell, Hirt, Horsley (The Brain and Spinal Cord), Ross.

GENITO-URINARY DISEASES.

Lectures and clinical instruction.

Text-books.—Thompson's Diseases of the Urinary Organs.

Collateral reading.—Van Buren and Keyes and Bumstead and Taylor.

DISEASES OF CHILDREN.

Lectures, didactic and clinical in their character, will be given upon this branch.

Text-books.—J. Lewis Smith, Eustace Smith, Meigs and Pepper, and Goodhart.

DISEASES OF THE SKIN.

Lectures and clinical instruction.

Text-book.—Hyde.

Collateral reading.—Duhring, Crocker and Fox.

LARYNGOLOGY.

Lectures and the use of the laryngoscope.

Text-book.—McKenzie.

Collateral reading.—Bosworth.

PHYSICAL DIAGNOSIS.

Lectures, section exercises, bedside and clinical instruction.

Text-books.—Loomis, Hudson, Vierordt, Musser.

Collateral reading.—Bramwell (heart); Fox (lungs).

ORTHOPÆDIC SURGERY.

Lectures and clinics.

Text-book.—Reeve's Practical Orthopædia.

Collateral reading.—Sayre's Orthopædic Surgery; Lovett on Diseases of the Hip Joint.

HYGIENE.

Lectures.

Text-book.—Parks.

Collateral reading.—Richardson's Preventive Medicine, Buck's Hygiene.

MEDICAL JURISPRUDENCE.

Lectures.

Text-books.—Reese and Tidy.

Collateral reading.—Taylor's Principles and Practice of Medical Jurisprudence; Wharton and Stille.

LABORATORY AND CLINICAL INSTRUCTION.

Laboratory work and clinical teaching is intended to be the dominant characteristic of the course in this college.

The student is taught the technique of the microscope, and does prac-

tical work in the preparation and recognition of both normal and diseased tissues in embryology; in bacteriology; in physiological chemistry; in inorganic and general chemistry; in chemical and microscopical urinalysis, and in anatomical dissections. Demonstrations in anatomy, physiology and chemistry accompany the didactic teaching. The laboratories are under the direct charge of the didactic professors.

The college draws from the University dispensary, in the medical building and from the larger hospitals of the cities of Minneapolis and St. Paul, its clinical material.

THE UNIVERSITY FREE DISPENSARY,

Is the outdoor branch of the college clinics. Since the removal of the department to the campus, it has been installed in commodious quarters in the basement of the new building. The daily attendance of patients is rapidly increasing. The dispensary staff consists of the clinical teachers of the faculty and of carefully chosen assistants. The senior class is divided into small sections which, in turn, attend the several divisions of the dispensary and aid in the examination of patients, the diagnosis of disease, the writing of prescriptions and the conduct of minor operations.

HOSPITAL CLINICS.

Saturday of each week is devoted to hospital clinics, conducted by the bedside or in the operating rooms of the hospitals of Minneapolis and St. Paul. The senior and junior classes alternate in the two cities. In Minneapolis the wards of the city hospital are frequently open to the students of this college and occasional surgical clinics are held in its operating rooms.

ST. MARY'S HOSPITAL.

St. Mary's Hospital has upon its regular staff four members of this faculty. Its management has seconded the efforts of the staff to make the hospital useful to medical students by providing an amphitheatre of modern construction, in which seventy-five spectators can be accommodated. The hospital also opens its wards for the bedside study of disease. Surgical and medical clinics are often held here upon the weekly clinic day.

ST. BARNABAS' HOSPITAL.

St. Barnabas' Hospital has also generously equipped an amphitheatre within which classes of fifty students can be gathered. Bedside instruction is given freely in its wards to the students of this college. Three members of the faculty are upon its attendant staff. Clinics are usually conducted in this amphitheatre on Saturdays.

ASBURY METHODIST HOSPITAL.

The attending and consulting staff of this new hospital is very largely composed of members of the faculty of this college. It has a commodious amphitheatre, seating one hundred and twenty-five spectators. Its wards are open to students for bedside instruction. It accommodates fifty patients. Weekly clinics of both surgical and medical character are held by the college clinicians.

ST. JOSEPH HOSPITAL.

The authorities of St. Joseph's Hospital have generously constructed an amphitheatre for the benefit of the students of the college, where an excellent course in clinical instruction will continue as in the past. This is the largest hospital in the northwest and affords most excellent surgical advantages. A large number of operations were made before the class in this amphitheatre during the last session of lectures. The number of occupied beds in this hospital averages over one hundred.

CITY HOSPITAL.

The east wing of this large structure is completed and occupied. Upwards of 1,500 patients were treated in the wards of this hospital the last year. Here are encountered a very large number of emergency cases so necessary in affording proper clinical instruction.

A new visiting staff has recently been appointed containing a generous representation of members of this faculty. The new house staff was recently appointed from among the graduates of this college. Through the kindness of the superintendent, Dr. A. B. Ancker, and the Board of Control, we are assured that students will be afforded the amplest clinical facilities.

ST. LUKE'S HOSPITAL

Has recently been completed and now occupies a new building, which possesses all the most desirable features of modern hospital architecture. It is one of the finest hospital structures in the west. It is furnished with an amphitheatre for the benefit of students and has a thoroughly modern operating room.

HOSPITAL APPOINTMENTS.

Through the kindness of the board of trustees of the hospitals for the insane, arrangements have been made whereby two of the graduates of this college will receive appointments, yearly as assistant physicians at each of the hospitals for the insane at St. Peter and Rochester. These four appointments are secured as the result of a competitive ex-

amination, conducted by the professor of nervous and mental diseases in this college. A large number of Internes are selected from members of the senior class for service in the hospitals of the two cities and the northwest.

NOTICE.—All correspondence relating to this college should be addressed to Dr. Perry H. Millard, Dean, University of Minnesota, Minneapolis, Minn.

College of Homeopathic Medicine and Surgery.

THE FACULTY.

CYRUS NORTHROP, LL. D., *President.*

ALONZO P. WILLIAMSON, A. M., M. D., *Dean, and Professor of Mental and Nervous Diseases.*

WILLIAM E. LEONARD, A. B., M. D., *Professor of Materia Medica and Therapeutics.*

GEORGE E. RICKER, A. B., M. D., *Professor of Clinical Medicine and Physical Diagnosis.*

ROBERT D. MATCHAN, M. D., *Professor of Principles and Practice of Surgery.*

WARREN S. BRIGGS, B. S., M. D., *Professor of Clinical and Orthopaedic Surgery.*

B. HARVEY OGDEN, A. M., M. D., *Professor of Gynecology.*

EUGENE L. MANN, A. B., M. D., *Professor of the Diseases of the Heart and Respiratory Organs.*

DAVID A. STRICKLER, M. D., *Professor of Otology, Ophthalmology and Rhinology.*

GEORGE E. CLARK, PH. B., M. D., *Professor of Theory and Practice of Medicine.*

ASA WILCOX, M. D., *Professor of Obstetrics.*

HENRY H. LEAVITT, A. M., M. D., *Professor of Pedology.*

LINCOLN E. PENNY, M. D., *Professor of Skin and Genito-Urinary Diseases.*

JOHN E. SAWYER, M. D., *Professor of History and Methodology of Medicine.*

..... *Professor of Clinical Gynecology.*

Instruction in the primary branches is received in common with the students of other colleges in the following department chairs:

GEORGE A. HENDRICKS, M. S., M. D., *Professor of Anatomy.*

RICHARD O. BEARD, M. D., *Professor of Physiology.*

CHARLES J. BELL, M. A., *Professor of Chemistry.*

PERRY H. MILLARD, M. D., *Professor of Medical Jurisprudence.*

JOHN F. FULTON, PH. D., *Professor of Hygiene.*

W. XAVIER SUDDUTH, A. M., M. D., D. D. S., *Professor of Oral Surgery.*

THOMAS G. LEE, A. M., M. D., *Professor of Histology and Bacteriology.*

J. CLARK STEWART, B. S., M. D., *Professor of Pathology.*

H. L. STAPLES, M. D., *Instructor in Medical and Pharmaceutical Latin.*

ANNOUNCEMENT.

The faculty in presenting its seventh annual announcement to the profession desires to emphasize the high standard of its curriculum.

By resolution of the Board of Regents the course of 1894 and 1895 will be the last in which only three years will be required. The course of study beginning 1895 will be extended to four years. When practicable students are requested to complete their literary or scientific college course before commencing the study of medicine.

Students who are graduates of other recognized colleges and universities will be admitted to advance standing upon showing sufficient proficiency in the studies of the lower classes to admit of such promotion.

All students before matriculation must demonstrate their fitness for

the professional study by evincing their possession of a fair degree of preliminary education.

DISPENSARY AND COLLEGE CLINICS.

The Dispensary, located at No. 1326 Washington Ave. S., within easy access of those whose means compel them to ask dispensary assistance, affords ample opportunity for the study of all forms of disease usually met in office practice. Patients present themselves in large numbers daily 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 ample opportunity to familiarize himself with the best methods of diagnosis and treatment of the various maladies, medical and surgical, with which the clinic abounds. Particular attention is directed to the fact that these college clinics are conducted daily throughout the entire year, and students and practitioners are cordially invited to attend them at all times.

COURSE OF INSTRUCTION.

The details of the four years' course have not been fully determined, so that we are unable to present in schedule form the studies to be presented to the students in each respective year, but in general it may be said that the first and second years will be devoted to familiarizing the student with the foundation studies of his profession; that the third year will be given to didactic work and acquiring skill in technique, and the fourth year will be devoted to practical and special work.

During the present course the studies will be divided as follows:

COURSE OF INSTRUCTION.

FIRST YEAR.	SECOND YEAR.	THIRD YEAR.
Embryology.	Bacteriology.	Gynecology.
Anatomy.	Medical jurisprudence.	Pathology.
Chemistry.	Theory and practice.	Neurology.
Histology.	Clinical medicine.	Ophthalmology.
Physiology.	Obstetrics.	Dermatology.
Materia medica.	Diseases of children.	Laryngology.
Laboratory work.	Physical diagnosis.	Clinical instruction in all branches.
History and methodology of medicine.	Hygiene.	Electro-therapy.
	Surgery.	Otology.
	Clinical surgery.	Genito-urinary.
	Clinical instruction.	Orthpædia.
	Materia medica.	Surgical anatomy.
		Materia medica.
		Therapeutics.

ANNOUNCEMENT.

In the organization of this college the Board of Regents of the University of Minnesota has aimed to secure the united efforts of the homeopathic practitioners of the state in the establishment of a college broad in its scope and complete in its teaching corps.

The college of Homeopathic Medicine and Surgery confidently appeals, therefore, to the profession of the northwest to second its efforts to educate thoroughly those students who wish to practice homeopathy.

Every practitioner fully appreciates the great advantage to be derived by the practical study of disease. The young physician who has depended upon his reading and attendance upon didactic lectures, to the exclusion of bed-side or clinical study, will find himself hampered and embarrassed at almost every step in his career. Practical points in practice are only acquired by slow degrees, and often at the expense of the patient's welfare or of professional reputation. Hence the importance of attending at least one course of lectures in a large city, where material for dissection and surgical demonstration is fresh and abundant, and where there are large hospitals and clinics constantly crowded with every variety of disease and surgical injury. The difference in the expense is but trifling, while the advantage in favor of the great metropolis incalculable. Minneapolis and St. Paul are not only great commercial centers, easy reached by a net work of railroads extending to all points of the compass, but are great medical centers towards which the diseased, maimed, halt and blind, wend their way in search of relief, thus filling the many hospitals with choice clinical material from all quarters of the great northwest. This college is prepared to offer unrivalled advantages to students in this respect.

The twin cities have been for twenty-five years—thanks to the men who have grown gray in the profession—a center of homeopathic patronage and interest. It has taken but a few years to build up in Minneapolis a hospital devoted to this system of practice which equals any in the northwest, while a similar institution in St. Paul, situated in the natural center for accidents—within two blocks of most of the railroads that enter the city, and surrounded by car shops and manufacturing industries, secures a large share of surgical cases.

Students will be admitted to both of these hospitals, as well as to the city hospitals, and will visit patients at the bed-side under the direction of the various professors, who are attending physicians at these institutions.

These advantages, with those furnished by the dispensaries of two

large cities, will give unsurpassed opportunities for special study, and will make practical clinical work a feature of the college.

Hospital appointments will be open to graduates through competitive examination.

Quizzes of the nature of a daily recitation will be given by each professor upon the subjects of the previous lecture.

Senior students will have opportunity to attend out-door patients, to assist in special and general surgical operations, and to attend at least one obstetrical case during the last course of lectures.

YEARLY EXPENSE ACCOUNT.

FIRST YEAR.

Matriculation.....	\$10.00	
Annual dues.....	40.00	
Dissecting.....	5.00	
Qualitative analysis.....	10.00	
Histology.....	10.00	
		\$75.00

SECOND YEAR.

Matriculation.....	\$10.00	
Annual dues.....	40.00	
Physiology.....	5.00	
Dissecting.....	20.00	
Toxicology and Urinalysis.....	10.00	
		85.00

THIRD YEAR.

Matriculation.....	\$10.00	
Annual dues.....	40.00	
Pathological laboratory.....	5.00	
Diploma.....	10.00	
		65.00
Total for course.....	\$225.00	
The tuition fee for students classified as "Specials".....		25.00

Facilities for special laboratory courses in embryology, physiology, bacteriology, and water analysis will be afforded to those desirous of taking special instruction. The fee is nominal.

PROFESSIONAL EXAMINATIONS.

The following regulations govern professional examinations: Examinations will be conducted at the end of the first, second, and third year's work. An examination will be held at the end of the first year upon the subjects of anatomy, chemistry, physiology, and materia medica; the examination in anatomy will be mainly confined to osteology and syndesmology; in chemistry the student will be expected to complete his work in general chemistry and qualitative analysis; the final examination in anatomy, chemistry, physiology and materia medica will be

conducted at the end of the second year. The examination at the end of the third year, for those entering the graduating class, will be divided into six sections:

1. An examination in the materia medica, practice of medicine, clinical medicine, and physical diagnosis.
2. Surgery, clinical surgery, operative surgery, and surgical anatomy.
3. Obstetrics, gynecology and pædology.
4. Ophthalmology, otology, and laryngology.
5. Orthopædia, dermatology, and genito-urinary diseases.
6. Pathology, bacteriology, and nervous and mental diseases.

MATERIA MEDICA AND THERAPEUTICS.

First-year students will have two lectures a week upon pharmacology and the toxicology and physiological materia medica of a few leading drugs and pass an examination thereon at the end of the year.

The instruction in pharmacology last year was kindly furnished by Mr. G. A. Babendrier, and will be repeated until further notice.

The remaining years will be devoted to the study of the chief drugs of the homeopathic materia medica, classified according to their scientific relations in the natural kingdoms, and their practical relations in applied medicine. In the weekly quiz, time will be devoted to the principles of homeopathic therapeutics as laid down in Hahnemann's writings, and in those of such teachers as Hering, Dunham, Farrington, etc.

Text-books: First year.—Hughe's *Pharmaco-Dynamics*.

Second and Third years.—Farrington's or Cowperthwaite's *Materia Medica*; Hahnemann's *Organon*.

Reference books.—Allen's *Hand-Book*; Hering's *Condensed Dunham's Lectures*.

CLINICAL MEDICINE AND PHYSICAL DIAGNOSIS.

The course of instruction in physical diagnosis consists of a series of didactic lectures, teaching the general principles upon which this science is based, with illustrations and demonstrations upon the healthy body; this is followed by clinical work, showing the practical application of these principles in diseased conditions at the dispensary and hospitals which furnish abundant material for this method of teaching. Outside dispensary work also furnishes the members of the graduating class with cases of acute diseases which they treat under the supervision of the professor of this department. In addition to physical examination and diagnosis the special aim will be to teach and to dem-

onstrate the practical application of homeopathic principles in therapeutics.

Text-books.—Lilienthal's Therapeutics; Lippe's Repertory; Farrington's Clinical Materia Medica; Vierordt's Medical Diagnosis; Abram's Manual of Clinical Diagnosis.

PRINCIPLES AND PRACTICE OF SURGERY.

A comprehensive course of lectures on general surgery will be given. Surgical pathology will be treated in a concise and comprehensive manner. Surgical operations and methods will be thoroughly demonstrated on the living and on the cadaver.

Text-books—Helmuth, Bryant, Erichson, Packard and Holmes.

CLINICAL SURGERY.

The diagnosis, prognosis and homeopathic treatment of surgical diseases will be taught practically. Surgical operations will be performed before the class. There will be two clinics and one lecture each week on surgical emergencies, minor surgery and orthopædia.

Text-books—Helmuth, Franklin, Gilchrist's, Surgical Therapeutics, Ranney's Surgical Diagnosis, Moullin, Gross, Sayer, Bradford and Lovett.

Reference books—International Encyclopedia of Surgery.

DIDACTIC GYNECOLOGY.

A systematic course of lectures upon the physiology and pathology of the female generative organs, with the etiology, symptomatology and treatment of their diseases will be given. Clinical instruction and bedside attendance will be a special feature.

Text-books—On Gynecology: Cowperthwaite, Ludlam. On Genito-Urinary diseases: Franklin, Berjeau, Otis and Keyes.

Collateral reading—Thomas, Emmet, Schroeder, Mann.

DISEASES OF THE HEART AND RESPIRATORY ORGANS.

A course of lectures on the diseases of the heart and respiratory organs, including the larynx and nose, will be delivered to students of the second and third years; it will be the aim of the lectures to show the logical sequence of etiology, pathology, symptomatology, diagnosis and treatment in these diseases, and to thoroughly equip the student to cope with these troubles in a scientific manner.

Text-books—Laryngology, Quins, Lenox Brown; heart and lungs, Arnt & Pepper's System of Medicine; Ingalls' Diseases of Chest, Throat and Nose.

OTOLOGY, RHINOLOGY AND OPHTHALMOLOGY.

It is the aim of this chair to teach by didactic and clinical lectures the anatomy and physiology of the ear and nasal passages, method in examining cases, points in differential diagnosis, pathology and general principles of treatment of the different diseases of the ear and nasal passages. Instruction in these branches will combine clinical and didactic lectures and will be made as practical as possible. Advanced students will be expected to make examinations and outline treatment in suitable cases.

Text-book—Ear—Houghton, Winslow; reference—Roosa. Nose—Ivins; reference—Sajous. Eye—Norton; reference—Fuchs.

MENTAL AND NERVOUS DISEASES.

It will be the aim of this chair to qualify the student to detect the earliest symptoms of insanity and diseases of the nervous system. In this course particular attention will be paid to the history, causes, modes of development, characteristic symptoms, pathological conditions and defining terms of the diseases of the brain and spinal cord. The sanitary, moral and medical treatment will be portrayed and elucidated.

Text-books—On Insanity—Worcester, Jahr, Spitzka, Clouston, Blandford.

Reference book—Tuke's Dictionary Psychological Medicine.

Text-books—On Nervous Diseases—Hart, Dana, Omerod, Herter, Hirt, Edinger, Structural Central Nervous System.

Reference book—Gowers.

Text-books—On Electricity—Steavenson and Jones.

THEORY AND PRACTICE OF MEDICINE.

Lectures on the theory and practice of medicine will be delivered to students of the second and third year.

The chief purpose of this chair will be to educate the student in systematic habits of investigation and treating disease in accordance with the homeopathic law of cure. The teachings of Hahnemann, Hering, Dunham, etc., will be carefully and thoroughly presented to the students, as well as illustrations of the practical application of such principles to every day life. As a part of such drill the student will be made familiar with the repertory and its use.

Text-books.—Rane's Pathology and Diagnosis, the Organon, Lippe's Repertory, Ruddock's Text-Book of Medicine and Surgery, Arndt's System of Medicine, Pepper's System of Medicine, Lomis' Prac-

tical Medicine, Bartholow's Practice, Osler's Practice of Medicine, Da Costa's Diagnosis.

OBSTETRICS.

It is sought to give the student a thoroughly practical course of instruction in this branch, assigning to clinical teaching more time than to purely didactic work.

Two hours each week are devoted to lectures on the science of obstetrics—such being illustrated by charts and drawings, by phantoms and pelvis, wet and dry preparations, and by demonstrations of fresh specimens, products of arrested gestation normal or otherwise, as such may be procured. It would be highly appreciated by the students and by the college, if physicians generally would send to the chair of obstetrics for such demonstration, interesting specimens as they are met in general practice. It is aimed to give a scientific basis of facts of anatomy of physiological and pathological processes of forces, active and reactive; the mechanics of parturition, etc., in order that the student may think for himself and understandingly deduce and apply the right methods to cover the conditions presenting.

The art of obstetrics is, first, the capability to recognize such conditions, and second, the skillful application of measures operative or otherwise, to meet such conditions.

The seniors will be given operative courses on the phantom and infant cadaver, being thoroughly drilled in diagnosing positions, applying in forceps, turning, etc. Furthermore, at the dispensary and at the homes of applying women, students are trained in inspection, palpitation (as diagnosing position of child by abdominal touch), auscultation (recognizing fetal heart sounds, etc.), bimanual digital examinations, and measuring the various pelvic diameters, etc., and generally at every opportunity to practice the eye and ear and finger, in seeing, and hearing and feeling.

Such examinations are made during the various months of gestation, as the women may apply—but always, when possible, before term—and they are repeated as often as practicable. Each senior will attend, at least, one confinement, at which the professor always endeavors to be present, that instruction and profit may be obtained to the fullest extent. The material promises to be ample.

Seniors are invited to many operative cases of a private practice, and in charity cases are allowed to assist and operate, consistent with the welfare of the patient.

If material can be secured, which is probable, operative courses on the cadaver will be given, including such operations as perineal and

cervical lacerations, symphyseotomy, cæsarian section, such operations being carried out with all the precisions of detail and care as of on the living.

Text-book.—Leavitt (H), Reynolds-Lusk.

PÆDOLOGY.

The course on this subject will consist of lectures, recitations and clinics. Special attention will be given to infant feeding and hygiene, Opportunities will be given to study at the bedside, the examthems and diseases of the respiratory tract.

Text-books.—Ashby and Wright.

Reference books.—Keating's *Cyclopedia of Diseases of Children*; Kassowitz, Henock, Fisher, Tookes.

SKIN AND GENITO-URINARY DISEASES.

This subject will be taught by didactic lectures, illustrated by cases from the dispensaries, particular stress being laid upon the teaching of pure homeopathy.

Text-books.—Kippay, Berjeau, Hyde, Otis, Keyes.

HISTORY AND METHODOLOGY OF MEDICINE.

A course of lectures will be delivered to the first year students on the history and methodology of medicine and dietetics. It will be the object of this course to fully acquaint the student with the history of medicine and the methods which have prevailed at various periods in the world's history, and the evolution of homeopathy. This chair will also present a course on dietetics, and careful rules will be laid down for the guidance of the student in the selection of food for the sick and also artificial food for infants.

ANATOMY.

The course in anatomy is graded. First year students are expected to attend all the lectures given in anatomy; they are given a separate course in osteology, syndesmology and myology. Examinations are held on these subjects at the close of the term. The lectures on descriptive, topographical and surgical anatomy are attended by first and second year students. Second year students recite upon these lectures and receive their final examinations at the close of the term. Dissecting is regarded as advanced work, and is done only in the second year. The practical work in the laboratory is under the supervision of the professor of anatomy and personal direction of the demonstrator. The laboratory work is supplemented by lectures and recitation.

Text-books.—Grey, 11th edition; Quain, 10th edition; Holden's Practical Anatomy.

Collateral reading.—Darling and Ranney, Owen's Skeleton and Teeth, Hane's Osteology of Mammals.

First year.—Lectures and recitations in osteology, syndesmology and myology. One course; two hours per week; 64 hours. Also attendance upon lectures on descriptive topographical and surgical anatomy one course of two hours per week; 64 lectures.

Second year.—Lectures and recitations in descriptive topographical and surgical anatomy; one course of 64 lectures. Laboratory work; dissection of whole body.

PHYSIOLOGY.

Students are required to study physiology, both in the first and second years. The course is partially graded. The students of both classes will hereafter attend the same series of lectures and recitations, but special teaching in advanced physiology will be given to students of the second year. The classes will be separately examined at the close of the term. The subject will be taught by recitations and lectures illustrated by practical demonstrations.

Text-books.—Foster and Yeo.

Collateral reading.—Chapman and Landois and Sterling.

CHEMISTRY.

First year—Lectures on inorganic chemistry. Laboratory—general chemistry and qualitative analysis.

Second year—Lectures on medical chemistry. Elements of organic chemistry, toxicology and urinalysis; laboratory work.

Text-books.—Remsen's Inorganic Chemistry. Tyson's Examination of the Urine. Reese's Toxicology. Taylor on Poisons.

MEDICAL JURISPRUDENCE.

Lectures.

Text-books.—Reese and Tidy.

Collateral reading.—Taylor's Principles and Practice of Medical Jurisprudence, Wharton and Stille.

HYGIENE.

Lectures.

Text-book.—Parks.

Collateral reading.—Richardson's Preventive Medicine, Buck's Hygiene.

HISTOLOGY AND BACTERIOLOGY.

Lectures and laboratory work. The student will be taught to mount normal tissues and specimens containing bacteria. The course of normal histology and bacteriology will cover a period of not less than twelve weeks. If possible, the student should provide himself with a microscope.

Text-books.—Piersot's Histology; Quain's Anatomy, tenth edition; Schenk's Bacteriology; Sternberg's Bacteriology; Fraenkel's Bacteriology.

Collateral reading.—Cornil and Ranvier.

PATHOLOGY.

Pathology and morbid anatomy will be taught by lectures, recitations, and work in the dead-house. The technique of the autopsy will be carefully dwelt upon, so that each student can learn to take a correct post-mortem examination. Diseased processes will be illustrated by fresh alcoholic specimens, that theories of disease may be as much matters of demonstration as the nature of the subject will permit.

All communications pertaining to the College of Homeopathic Medicine and Surgery should be addressed to the Dean, A. P. Williamson, M. D., No. 602 Nicollet Avenue, Minneapolis, Minn.

The College of Dentistry.

THE FACULTY.

CYRUS NORTHROP, LL. D., *President.*

W. XAVIER SUDDUTH, A. M., M. D., D. D. S., *Dean and Professor of Embryology, Pathology and Oral Surgery.*

THOMAS E. WEEKS, D. D. S., *Professor of Operative Dentistry and Dental Anatomy.*

CHARLES M. BAILEY, D. M. D., *Professor of Prosthetic Dentistry, Metallurgy and Orthodontia.*

WILLIAM P. DICKINSON, D. D. S., *Professor of Therapeutics and Clinical Professor of Operative Dentistry.*

INSTRUCTORS.

GEO. A. HENDRICKS, M. S., M. D., *Professor of Anatomy.*

RICHARD O. BEARD, M. D., *Professor of Physiology.*

CHARLES J. BELL, A. B., *Professor of Chemistry.*

HENRY M. BRACKEN, M. D., *Professor of Materia Medica.*

THOMAS G. LEE, A. M., M. D., *Professor of Histology and Embryology, Bacteriology and Clinical Microscopy.*

FREDERICK B. KREMER, D. D. S., *Clinical Instructor in Prosthetic Dentistry and Crown and Bridge Work.*

J. DUDLEY JEWETT, D. D. S., *Lecturer on Anesthesia and Chief of the Anæsthetic Clinic.*

THOMAS B. HARTZELL, D. M. D., *Instructor in Comparative Dental Anatomy, Physical Diagnosis, and Assistant in Oral Surgery Clinic.*

GEO. S. MONSON, D. M. D., *Instructor in Prosthetic Technics and Orthodontia.*

HENRY L. STAPLES, A. M., M. D., *Instructor in Medical and Pharmaceutical Latin.*

OSCAR A. WEISS, D. M. D., *Assistant in Operative Technics.*

CAROLINE B. EDGAR, D. M. D., *Assistant in Operative Clinic.*

MARY V. HARTZELL, D. M. D., *Assistant in Operative Clinic.*

JAMES M. WALLS, *Assistant in Crown Technics.*

ALFRED OWRE, *Assistant in Operative Technics.*

ANNOUNCEMENT.

The Department of Medicine of the University of Minnesota offers three distinct progressive courses of study to dental students, which may be taken consecutively or separately as may be desired.

The first, which is the regular course in the college of Dentistry, covers three terms of eight months each, in three separate calendar years. Classes are graded as first, second and third year. Students

who successfully complete this course are given the degree of D. M. D. (Doctoris in Medicina Dentaria), which entitles them to come before the State Board of Dental Examiners for a license to practice dentistry in the State of Minnesota. This degree is recognized by all states that admit to practice on diploma.

The second course is in the nature of an optional fourth year, and may be taken by undergraduates immediately following the regular three-years' course. Students taking the four years' work, with an average standing of 75 per cent. in the studies of the fourth year, will receive the degree of D. M. D. *cum laude*.

This course is open to graduates of the college of Dentistry of the University of Minnesota and other colleges of recognized standing, also to reputable practitioners, under certain restrictions, who have not had the advantages of college training. The latter are not eligible to graduation, but will be given a certificate upon the completion of any three of the subjects laid down in this fourth year and upon the successful completion of a majority of the entire year's studies will be given a "Post-Graduate" certificate, bearing the seal of the University. The studies comprised in this course are regional anatomy; dietetics, hygiene; bacteriology; urinary analysis and toxicology; oral and general surgery; jurisprudence; physical diagnosis; practice of medicine and therapeutics; advanced crown and bridge work; continuous gum-work; inlays; orthodontia and metal plate work; special methods of operating and original work in biology. These studies need not all be taken consecutively in any one year, but may be pursued in short courses of six weeks or three months each, which are arranged with special regard to encourage the attendance of busy practitioners who can not well afford to leave their practices for a full course in any one year.

The third course leads to the degree of M. D., and with the two preceding courses makes five years' study that may be taken consecutively or at the convenience of the student. The studies of this year comprise obstetrics; diseases of children; theory and practice; clinical medicine; physical diagnosis; surgery; gynecology; pathology; neurology; ophthalmology; dermatology; laryngology; clinical instruction in all special branches; electro-therapy; otology; genito-urinary; orthopædia; surgical anatomy; therapeutics.

It is most earnestly advised that all students, who can spare the time and means, take the full course and obtain the two degrees.

The central idea upon which this institution was founded is that dentistry is a branch of the healing art and as such should be practiced as a specialty in medicine. In order to do this the practitioner must

possess a medical education, and our curriculum has been broadened so as to include the fundamental principles that underlie the practice of medicine and has substituted dentistry for its other specialties. The change in the degree last year was made with this idea in view and has met with universal approval. There has been a feeling extant for some years that there was need of a degree which would more nearly express the position of dental practitioners as oral surgeons. It seemed that the degree so long given by Harvard met this want and more fully described the position of the graduates of this institution where the students in dentistry and medicine are placed upon the same footing in so large a proportion of the work which is taken in common, even at the present, and will be more and more so as the course is advanced in succeeding years. In this connection special attention is called to the fact that while a thorough course in theory is required, practical work is not neglected. The technical courses are very complete and the clinical facilities are unsurpassed.

The time actually to be spent in the prosthetic laboratory and infirmary for the ensuing year will reach an aggregate of two thousand hours, divided as follows: first year, five hundred sixty hours; second year, six hundred hours, and third year, eight hundred hours. Attendance upon laboratory work and infirmary practice is compulsory, a daily record being kept by the clerk, and one of the requirements for graduation necessitates attendance upon all laboratory work. Another special feature of this institution is that in laboratory work and infirmary practice, students at all times operate under competent instructors, the professors themselves serving as demonstrators, and every stage of each operation receives due criticism and marking. Students thus make more rapid progress with less labor than where they are turned over to undergraduates or inexperienced assistants. Each operation is a recitation and the student is thus able to trace his progress from the daily record.

In addition to the above, a "Preliminary Course" is provided for students who are not prepared to pass the regular entrance examination. The studies required in this are English Composition, Latin, Algebra and Physics. In addition to these, the student may take histology, dental anatomy, human and comparative, operative and prosthetic technics with the regular first year class. All advanced work done in this year will count in the regular course and will make succeeding years much easier, thus affording time for special work in and out of college hours.

COURSES OF INSTRUCTION.

ANATOMY.

FIRST YEAR.—Lectures and recitations in osteology, syndesmology and myology. One course; two hours per week; 64 hours. Also attendance upon lectures on descriptive, topographical and surgical anatomy, one course of two hours per week; 64 lectures, together with the dissection of the whole body. The practical work in the laboratory is under the supervision of the professor of anatomy and personal direction of the demonstrator. The laboratory work is supplemented by lectures and recitations. Students recite upon these lectures and receive their final examinations at the close of the term on the didactic work and also upon the work in "practical" anatomy done in the laboratory.

Text-books.—Quain, 10th edition; Gray, 11th edition; Holden's Practical Anatomy; Treve's Applied Anatomy; Owen's Manual.

Collateral reading.—Darling and Ranney; Owen's Skeleton and Teeth; Flower's Osteology of Mammals; McLellan's Regional Anatomy.

PHYSIOLOGY.

Students are required to study physiology, both in the second and third years. The course is partially graded. The students of both classes will hereafter attend the same series of lectures and recitations, but special teaching in advanced physiological chemistry will be given to students of the third year. The classes will be separately examined at the close of the term. The subject will be taught by recitations and by lectures illustrated by practical demonstrations.

Text-books.—Foster and Yeo.

Collateral reading.—Chapman and Landois and Sterling.

CHEMISTRY.

Second Year.—Lectures on inorganic chemistry. Laboratory—general chemistry and qualitative analysis.

Third Year.—Lectures on medical chemistry and laboratory instruction, with practical examination of the urine and other body fluids in their relation to disease, and as aids in diagnosis.

Text-books.—Remsen's Inorganic Chemistry; Tyson, Practical Examination of Urine.

MATERIA MEDICA.

First Year.—Lectures, practical demonstrations in the laboratory, and recitations. A final examination will be given in materia medica at the end of the year.

Text-books.—Brunton, Bracken, Gorgas' Dental Medicine.

HISTOLOGY.

First Year.—Lectures, recitations and laboratory work; each student will receive carefully prepared specimens illustrative of the various tissues and organs of the body, which he will preserve for permanent use, and from which drawings will be made. Didactic and practical instruction in embryology will also be given in connection with the work in histology. Practical instruction will be given in the methods of preserving and preparing material for microscopic examination.

Text-books.—Piersot's Histology; Quain's Anatomy, tenth edition; Minot's Human Embryology; Hertwig-Mark Text-Book of Embryology.

EMBRYOLOGY.

First Year.—A special course of twelve lectures will be given on embryology, and fully illustrated by photo-micrographs, which will be thrown on the screen by aid of the stereopticon. This course is introductory to the subjects of anatomy, physiology and histology, and will consist of a full consideration of the following subjects: A general study in the development of the chick and other embryos, the theory of reproduction, ova, spermatozoa, segmentation and the development of the three layers of the blastoderm, cellular morphology, including a comparative study in the biological cell and the nature of protoplasm, a comparative study in blood corpuscles and development of the blood, with a full consideration of the function of the third-blood corpuscle; the products of the epiblast, including the development of hair, nails, horns, hoofs, sudoriferous and sudoporous glands, and the enamel organ of the teeth.

The products of the mesoblast, showing the development of the connective tissue group, including the subject of calcification of bone, dentine and enamel—illustrative of the latter, many slides will be used in the comparative study of hard tissues, and lastly, the development of the teeth will be fully considered by aid of a full line of photo-micrographs from human porcine and other embryos.

DENTAL PATHOLOGY.

Second Year.—The teaching in this department will begin with a consideration of the terminology belonging to the subject, followed by a full presentation of lesions of the vascular system; inflammation, local and general; the causes that lead to the decay of teeth and nature of the process; the food and other habits of different nations in relation to the etiology of decay, also pathological dentition, Pyorrhœa alveolaris, pulpitis, pulp nodules, secondary dentine, periodontitis, alve-

olar abscess, caries of the jaw and necrosis, dependant upon a diseased condition of the teeth. The lantern will be used frequently in illustrating these lectures.

ORAL SURGERY AND HYGIENE.

Third Year.—The subject of oral surgery will be taught clinically and didactically. The large amount of clinical material presenting at the infirmary, furnishes ample opportunity for practical demonstration. Students are required to take charge of cases and carry them through under the advice of the professor in charge. Anæsthetics are administered in the clinic and full instruction by thoroughly competent assistants as to the methods of examining the patients, and the use of ether and gas is given. The members of the senior class are permitted, under direction, to administer and extract under anæsthetics. The didactic lectures will include a full consideration of all the surgical lesions of the oral cavity and associate parts, including oral tumors and the reflex neuroses connected with the fifth pair of nerves; fracture of the maxillae; cleft palate and hare lip; the several forms of ulcerations of the mouth, including syphilis and tuberculosis; caries and necrosis of the jaws from constitutional causes; adenoid growths and nasal polypi in their relation to oral surgery; suppuration of the antrum; ulitis; epulic growths; fungoid pulp; ranula; exostosed and fused teeth; ankylosis and dislocations; implantations. Obturators—Interdental and other forms of dental splints.

In the study of hygiene, personal and office, the latest modern appliances will be used. The importance of this subject cannot be overestimated when it is understood that decay of the teeth, suppuration of the pulp and other tissues, alveolar abscess, pyorrhœa alveolaris, and perhaps other of the diseases of the teeth and associate parts with which dentists have to deal, are the direct result of unhygienic conditions of the oral cavity. Full practical instruction in the process of fermentation, suppuration and infection in general will be provided. The student will be made conversant with the modes of cultivating germs and the manner of their growth; methods of disinfection and antiseptics to be used in the oral cavity. The care of instruments and the danger of infection by their use when not kept in an aseptic condition will be fully dwelt upon.

BACTERIOLOGY.

Third Year.—Lectures and recitations, illustrated by microscope; preparations and cultures of various pathogenic bacteria; laboratory

exercises in staining and diagnosing pathogenic bacteria; opportunity will be offered in the laboratory for special research work.

Text-books. — Schenk's Bacteriology; Sternberg's Bacteriology; Fraenkel's Bacteriology.

ORAL SURGERY AND HYGIENE.

Fourth Year.—Several short courses in oral surgery will be given during the year, and the time will be arranged so as to accommodate practitioners who may desire to avail themselves of these opportunities for graduate study. Arrangements have been made with several clinicians connected with the different hospitals of the city to give special clinics to matriculates in this course. An abundance of material representing all the different forms of diseased conditions of the mouth and associate parts is daily to be found in the infirmary service, which will be assigned to students for treatment under direction of the professor of oral surgery and his assistant.

Clinical lectures on the cases presenting will be given from time to time. The cases presenting, cover: alveolodental abscesses; caries and necrosis of the maxillary bones; diseased conditions of the antrum; pyorrhœa alveolaris; dislocations and ankylosis; facial neuralgias; tumors of the mouth and associate parts; hare lip; cleft palate; implantation cases and fractures.

THERAPEUTICS.

Third Year.—In the course in dental therapeutics, instruction will be imparted by means of recitations and lectures, giving special attention to the first named. No intelligent use can be made of medicinal or remedial agents without an understanding of the fundamental principles of anatomy, physiology, pathology, chemistry and diagnosis, and the studies of this year presupposes such knowledge obtained in the previous courses. The teaching, therefore, will be to the end that the student may be enabled to rightly interpret the therapeutical indications and employ the appropriate remedies. Abundant opportunities are afforded during the course for putting into actual practice in the infirmary, under the careful guidance of the professor in charge, the instructions given in the class-room. By this means judiciousness and independence in the choice and employment of remedies is inculcated.

The following is a general outline of the subjects which will be considered: counter-irritants—rubefaciens, vesicants; caustics and escharotics, potential and actual—chemical, medicinal and the galvano-cautery; emollients and demulcents—hot fomentations, poultices, glycerine, isin-glass, etc.; protectives—collodion, gutta percha, plasters, etc.; stimu-

lants—diffusible and aromatic; local sedatives and anodynes, astringents; styptics and hæmostatics; oils—the volatile or essential and the fixed; antizymotics; antiseptics; disinfectants; deodorants, etc.; the dental obtundents; the various methods of pulp devitalization— medicinal, mechanical and electrical; the physical remedies, such as light, electricity, heat, cold, etc; the mechanical remedies, such as leeches, cupping, scarification, friction, massage, etc.; mouth washes and their use; and dentifrices.

Fourth Year—The field for graduate study in the branch of dental materia medica and therapeutics is a peculiarly fertile and inviting one. So many new remedies have been recently recommended or suggested, and it remains to establish or disprove as far as possible the claims made for them. This will be done both by exhaustive studies of the agents themselves and by their use in actual practice in the clinic.

Encouragement and assistance will be given in prosecuting original researches, with a view of embodying the results in theses upon the work accomplished. Laboratory experiments will also be performed for the purpose of detecting impurities and adulterations and for differentiating between drugs of similar nature or appearance. The general subjects of antiseptics and disinfectants and their relation to dental practice will be discussed in detail, and the potency or relative value of the volatile or essential oils, as well as the various other agents used under this head, will receive special attention.

OPERATIVE DENTISTRY.

In this department the work is thoroughly graded. No student will be excused from any of the lectures, technics or operations of the course, or advanced to a higher grade until he has demonstrated his proficiency.

The infirmary is at all times under the direct supervision of either the clinical professor of operative dentistry, or the chief of clinics, who gives personal instruction and advice to each student. Undergraduates never fill positions other than those of assistants.

First Year—The instruction in operative dentistry in this year is largely composed of technics. The first semester is devoted to the study of dental anatomy, in which the definition, terminology, notation, form and arrangement of the human teeth will be fully considered, also the macroscopic and microscopic characteristics of sections, including the study of the relation of enamel to dentine and pulp canal. Outline drawings of the principal surfaces of the teeth will be made and a tooth of each denomination, from a miscellaneous lot, will be selected and mounted on wax for future study.

In the study of structural anatomy teeth from each side of the maxillæ will be selected and mounted upon wooden blocks. They will then be filed down until the pulp chamber and canals are exposed and a careful study of their form made. Afterwards six silhouette prints of six teeth of each denomination, superior and inferior, in different aspects will be made and carefully studied.

The didactic instruction will be in nature of "chalk talks" and recitations from Black's Dental Anatomy. The standing of the student will be determined by marks given on the cutting of sections, printing silhouettes, drawings and recitations. The second semester will be devoted to a course in operative technics. The teeth selected in the course in dental anatomy will be mounted in a special articulator and studied in relation to classification, location and causes of cavity formation and the preparation of the same for filling. A study of the various filling materials and their insertion in the cavities already prepared. The various means of mechanical treatment of partially or wholly exposed pulps by protection or capping will be demonstrated, also canal treatment in which methods for gaining entrance, removal of pulps, cleansing and filling pulp canals will be fully dwelt upon. Students are required to perform these operations themselves under close supervision until they have fully mastered the technique. Daily recitations will be given and written quizzes will be held at the completion of each division of a topic. The completed operations will also be handed in, and the student will receive credit for the skill and proficiency shown during the course. Those students who show sufficient advancement in this technic course, will be afforded opportunity, toward the close of the term, to enter the infirmary and put into actual practice the principles there learned. The infirmary is kept open until the first of July each year, and as many first year students as can, are urged to avail themselves of the opportunity to gain skill in practice.

Second Year. Instruction in this year will be both didactic and clinical. Lectures will be given and recitations held upon the following subjects: deposits and their removal; extraction of teeth; separation of teeth; exclusion of moisture; mechanical principles of force and resistance; contour, contact, and occlusion; reviews upon cavity preparation and filling materials.

INFIRMARY PRACTICE.

Second Year. The operative clinic is under the direct supervision of the clinical professor of operative dentistry who will give personal instruction in all those details which go to make up the routine of everyday office practice, including everything from the reception of the pa-

tient, through the minutiae of a discriminating diagnosis to the preparation and filling of the several classes of cavities in the teeth, in accordance with principles previously mastered, and the indications for each case in hand, with such one of the various materials used for the purpose as is most suitable. The judgment of the student will be carefully cultivated, and the reasons for any course determined upon will be fully explained. The management of children, while receiving dental ministrations, together with the personal relations which should exist between patient and operator will be inculcated by precept and practice.

At the close of the year the requisite markings upon lectures recitations, technical and practical operations together with a satisfactory written examination are required to qualify for the third year.

OPERATIVE DENTISTRY.

Third Year. The teaching in this year is largely practical, consisting of a series of clinics by a corps of clinical instructors and by the occupant of the chair, together with such didactic work as he shall deem necessary from time to time to perfect the subject. The work in the infirmary is under the direction of the chair of oral surgery. The instruction will be in the nature of differential diagnosis. The different forms of pathological lessons that pertain to daily office practice, such as pulpitis from exposures, etc., pericementitis, alveolar abscess, caries and necrosis of the alveolar process, pyorrhœa alveolaris, suppuration of the antrum. The several forms of ulcerations, stomatitis and reflex neurosis will be treated by the student, who will carry the case on to completion, including the restoration of the teeth to usefulness by filling, crowning or bridging, as the case may require. All operations will be marked and the record so made together with a written examination on the didactic work will form the final test in this branch.

Fourth Year—In this year special attention will be given to the more advanced and difficult methods, affording the student opportunity for employing a greater variety of filling materials than is permitted in the regular course.

To the practitioner every facility will be given that he may experiment, receive instruction in and practice the methods which especially interest him. Those who desire to study canal and enamel form will be allowed to print silhouettes from the large classified collection of sections belonging to this chair.

The plan of instruction is as follows: didactic lectures upon each division, analyzing it into its basal principles; clinical demonstrations, illustrating each operation; practice in the infirmary; experiments and tests wherever these are practicable and advantageous.

In filling teeth, instruction will first be given in special cavity preparation, including the "auxiliary dovetail"; this is followed by clinical demonstrations in the use of the different preparations and combinations of gold, such as mats and cylinders, sponge, crystal and plastic-gold, platinum and iridium gold; gold in combination with tin, and gold veneering of cement fillings. Experiments will be made covering the spreading and cohesive qualities of gold. Instruction in the use of matrices will be very thorough.

In plastics, the course will include experimental study of both cements and amalgams, including the various methods of combining with each other or with another material.

Pulp treatment.—An experimental and practical course in the treatment of teeth whose pulp chamber has been penetrated, including the removal of recently devitalized, and putrescent pulps, cleansing and filling the canals, clinical treatment of abscess, etc. The experimental work will include studies of canal form, filling with various materials and testing the results, with practical study of materials used.

Bleaching of discolored teeth will follow the filling of the canals of pulpless teeth. Besides the clinical lectures and practical work in the infirmary, experiments will be made with the various agents employed.

PROSTHETIC DENTISTRY.

First Year.—The instruction afforded in this year will, in the main, consist of a thorough course of technics; a sufficient number of lectures will be given to fully explain the principles underlying this special branch. Charts, models and practical demonstrations will be freely used to illustrate the work being done in the laboratory. In the technic course the student will begin with the working of steel and will be taught how to hold a file so as to obtain the greatest service with the least expenditure of force; having learned to file, next will come the making of broaches for use in the operative clinic, then the shaping, hardening and tempering of instruments, the instruments being such as are required for use in the clinic in the school.

In taking impressions the tray will be described, its proper shape and adjustment demonstrated; and a full and complete drill in obtaining an impression of the upper and lower jaw with plaster. Then the use of modeling composition is explained, an impression obtained of an edentulous upper and lower ridge; models correctly made, trimmed, and the plate line marked.

The pattern plate is now fitted, and accurately trimmed, waxed for bite and for proper restoration of the facial contour; it is now placed in the articulator and the teeth arranged in true, normal occlusion,

using plain teeth. The cases are then waxed properly, and the upper separated from the articulator and carried through the successive operations of flasking, packing, vulcanizing and finishing, pink rubber being used in front, properly festooned, as though to be worn in the mouth.

When satisfied of the student's proficiency thus far, he will be given a broken plate and instructed how to handle cases for repair, both of teeth and base.

Passing to gum-section teeth, the student will be taught how to make clean tight joints, with which the vulcanite technics for this year will end.

In metal work.—Beginning with the model, its proper shape and size will be taught, tempering of the moulding sand, moulding the model and casting the dies. Passing to the plate, its proper shape, annealing and swaging for a full upper denture. The same process for a partial lower case; the front teeth being in place, the plate properly reinforced, then both plates rimmed and finished, the process of soldering being taught by demonstration.

Lower cast metal plates will be taken up from the same beginning; the making of the model, the pattern plate, the flasking, pouring, and finishing the plate as if for use.

The instruments made in the course in steel technics, will remain the property of the student. Should any of the technic work of this year not be completed in the time allotted for it, it can be taken up the following year, but all the technic work outlined above must be finished before the close of the second year.

Second Year.—The student will at once be given charge of patients needing service; there is an abundant clinic and full opportunity will be furnished for practically testing his knowledge.

In connection with this clinical practice by the student, a course of lectures from the clinical instructor of prosthetic dentistry will be given, beginning at taking impressions and following through the successive steps to the finished plate. This course will consider these operations from the clinical standpoint, and in addition to such aids as may be derived from charts and models, will be enforced by practical demonstrations in the clinic.

In addition to this course of clinical lectures, the regular course taking up the consideration of the whole subject with its underlying principles, methods and processes, will be continued as in former years. The technic course will be continued; comprising work in the more difficult operations, each successive step presenting either the application of a different principle, or of the same principle under more difficult condi-

tions. The steel technic will be continued, and in connection with the orthodontia technic.

The orthodontia technics will comprise drawing of wire, rolling band metal, making and soldering tubing, making taps, and forming some of the more complicated appliances, that the student may afterwards be able to construct any appliance which he may need to use in his practice.

The third year will be used for proving the student's knowledge. In technics he will need to make, without aid from the instructors, such plates as may be assigned him, in conformity with the instructions received during the two previous years.

In addition, so much work in cast aluminum as may be decided on, sufficient to test his efficiency in such work, under the immediate direction of the instructor.

Attendance upon the general prosthetic clinic will be continued. As far as practicable the more difficult and special cases will be assigned to this year. A full course of lectures is given in which all classes of irregularities are considered and the probable causes fully discussed, together with a careful consideration of methods of treatment. In addition to these lectures, an orthodontia clinic has been instituted, and each student will be assigned cases and taught their proper treatment as they may present themselves.

The lectures and work in metallurgy will be continued, as in former years, and will include the melting of metals, pouring and laminating, by the students themselves. All material used in the technic courses, excepting such as is specified in their tool list, will be furnished free by the University. This includes the platinum used in the porcelain-enamel work and the material for their orthodontia technics.

Fourth Year—The graduate work under this chair will be presented in four courses of about six weeks each.

Classes in general metal technics will be commenced on Oct. 23d and on Jan. 8th. These courses will comprise instruction and work in all the various operations needed in making swaged or cast metal plates, full and partial.

Nov. 12th a class in orthodontia technics will be started. This course will comprise instructions in manipulating metal in the making and adjusting the various appliances for regulating teeth. Any practitioner taking this course, having a case upon which he wishes to operate, will be assisted in adjusting a suitable appliance, if he will bring with him a model of the upper and lower teeth properly articulated.

CROWN AND BRIDGE WORK.

The growing importance of this subject has necessitated giving it a separate classification, and a special effort will be made to make it one of the most attractive studies in the curriculum. The subject will be taught by lectures, technical courses and practice in the infirmary.

Second Year.—The student will be required to construct a crown of each approved kind in use, and one bridge, combining in itself a shell-crown, a Richmond-crown, a porcelain-faced dummy, a metal-shell dummy, and an extension-bar carrying a porcelain-faced tooth. The metals used in the Technic course will be brass or bronze—advanced students will be given practical crown cases toward the last of the term.

Third Year.—The lectures on crown and bridge work will comprehend a full consideration of the principles underlying this branch of dental art. The various instruments and materials employed will be exhibited and their application fully explained. A large number of casts and practical cases will be used to illustrate the subject.

In this year students will be assigned the care of cases presenting in the infirmary, and will be required to construct under direction a sufficient number of cases to demonstrate their knowledge of principles and technical proficiency.

Fourth Year.—Instruction will be given in the methods of treating special cases by use of fixed and removable bridges. Instruction will be given in the making of bridges with removable porcelain faces, telescope crowns, jacket crowns for peg teeth, also porcelain bridge-work and inlays. The student will find ample opportunity for practical work in this line in the dispensary service. Special attention will be given the student in working out his own ideas in this line of dental art.

COMPARATIVE DENTAL ANATOMY.

Instruction in comparative dental anatomy will be given by lectures and recitations. The course will begin with a consideration of the dental mechanism of invertebrates, followed by comparison of the higher form of invertebrates with the lower forms of vertebrates, giving special attention to the development of the teeth with relation to the peculiar needs of the animal.

The study of the teeth of vertebrate animals will be comprehensive—taking up their evolution, morphology and distribution, together with methods of attachment and replacement—commencing with the teeth of fishes, passing to the amphibia and reptilia and on to the dental armament of the mammalia.

* The work will be illustrated by prepared specimens, models and

casts of each class, as far as possible. The influence of evolution and development of the teeth, with relation to causation of irregularities of position will be made a special feature of the course.

PHYSICAL DIAGNOSIS.

The subject of physical diagnosis will be taught didactically and practically. The course will have direct bearing upon the subject of anæsthesia and will be as complete as its importance demands.

REGISTRATION.

Registration and entrance examination for the preliminary course will be held in the Academy building, corner of Harvard and Delaware streets southeast on the Interurban line, at 9:00 A.M., September 4th, 1894. Students are urged to be present at the opening of the session, although they may enter at any time up to January. The course in prosthetic technics begins in the Medical College building October 10, 1894.

LABORATORIES.

Many of the laboratory courses are held in the afternoon. These are also open to preliminary and University students who may anticipate the regular work, without interfering with their studies.

CLINICAL INSTRUCTION.

Clinical instruction will embrace all practical subjects relating to dentistry.

GRADUATION.

The degree of Doctor of Dental Medicine will be conferred upon those who possess the following qualifications:

(1) They must be at least twenty-one years of age; (2) of good moral character; (3) they must have spent three full years in the study of dentistry and attended three full courses of lectures, of which at least the last must have been spent in this college, and the first two years in this or some other recognized college of dentistry; (4) they must have sustained satisfactory examinations in the various branches of study required for graduation.

TEXT-BOOKS.

First Year.—Quain's Anatomy, Bracken's Materia Medica, Black's Dental Anatomy, American System of Dentistry.

Second Year.—Foster's Physiology, Remsen's Chemistry.

Third Year.—Gorgas' Dental Medicine, Loomis' Physical Diagnosis.

Collateral Reading.—Haskell's Manual; Garretson's Oral Surgery; Guilford's Orthodontia; Stanton's Physiognomy; Green's Pathology.

FALL TERM.

The infirmary will be opened September 4th. Students conditioned in practical work, as well as any others that may desire, can enter at this time and make up such conditions. All such work done during September will count on the regular term work.

FALL QUIZ.

Daily quizzes in anatomy, physiology, histology, chemistry and materia medica will be held during the month of September with the view of preparing students for the conditioned examinations the second week in October.

EXAMINATIONS.

Examinations will be held at the end of each year, in the studies of that year, for advancement to the next grade.

Students who fail to pass at the regular examination in the spring, will be allowed an examination at the opening of the next winter's session, except in the case of candidates for graduation.

Two entrance examinations are held annually, the Saturday preceding commencement and the first week of the year.

Announcements will be furnished upon application to W. X. Suduth, Dean, 329 Delaware street southeast, Minneapolis, Minn.

The College of Pharmacy

THE FACULTY.

- CYRUS NORTHRUP, LL. D., President.
 FREDERICK J. WULLING, PH. G., Dean; *Professor of the Theory and Practice of Pharmacy and Pharmaceutical Chemistry.*
 PERRY H. MILLARD, M. D., *Professor of Medical Jurisprudence.*
 HENRY M. BRACKEN, M. D., *Professor of Materia Medica.*
 *Professor of Pharmacognosy.*
 CHARLES J. BELL, A. M., *Professor of Chemistry (General and Medical).*
 GEORGE B. FRANKFORTER, PH. D., *Professor of Chemistry (Organic).*
 CHARLES F. SIDENER, B. S., *Assistant Professor of Chemistry.*
 CONWAY MACMILLAN, M. A., *Professor of Botany.*
 CASWELL A. BALLARD, *Instructor in Botany.*
 THOMAS G. LEE, B. S., M. D., *Professor of Bacteriology.*
 GEORGE D. HEAD, B. S., *Assistant in Bacteriology.*
 RICHARD O. BEARD, M. D., *Professor of Physiology.*
 JOHN F. FULTON, PH. D., M. D., *Professor of Hygiene.*
 H. L. STAPLES, A. M., M. D., *Instructor in Medical and Pharmaceutical Latin.*
 *Instructor in Mineralogy.*

ANNOUNCEMENT.

In the organization of this college the Board of Regents has aimed to secure the co-operation of the pharmacists of the state. The character of instruction is of high order and every effort is made to comply with the demands of the profession in the northwest in the maintenance of a course of instruction of the highest grade. The college is located on the University campus, in the new building, and is one of the colleges of the Department of Medicine. The new buildings and laboratories are on a par with those of the best in this country and their equipment adequate.

The work of the college, as outlined in the following pages, is conducted in lectures, quizzes and laboratory exercises. Students will find their time so fully occupied that no time for service in drug stores will be found. The work is of a nature that no student could accomplish it in the short term of five or six months. Students who may feel unable to apply themselves diligently enough to complete the work in two years may divide the work in a manner to complete it in three years. Practicing pharmacists, who may be desirous of taking certain branches of study, may avail themselves of any of the college facilities, but their studies and time will be subject to regulation as special students.

SCOPE OF INSTRUCTION.

- PHARMACY—*General*—Metrology; nomenclature; pharmaco-technology; dispensing.
Inorganic—Non-metals; metals; gravimetric analysis; alkalimetry; acidimetry
 pharmaceuticals.
Organic—Organic drugs; assay; pharmaceuticals.
- CHEMISTRY—*Inorganic*—General, complete through non-metals and metals; chemical philo-
 sphy; pharmaceutical; analytical; qualitative; quantitative (volumetric and
 gravimetric); toxicological; inorganic poisons.
Organic—General, elementary, descriptive and experimental; pharmaceutical,
 qualitative, quantitative. (volumetric, gravimetric); toxicological. organic
 poisons.
- BOTANY—*Structural*, or organography; comparative anatomy and embryology; histological,
 microscopical; physiological; systematic.
- MATERIA MEDICA—*Inorganic*—Non-metals; salts of metals; new remedies.
Organic—Vegetable drugs; new remedies.
- PHARMACOGNOSY—*Organic*—Descriptive; microscopical.
- PHYSIOLOGY—*Human*—Elementary descriptive.
- BACTERIOLOGY—*Elementary*—Descriptive; practical.
- MATHEMATICS—*Pharmaceutical*—Chemical.
- URINALYSIS—*Complete*—Chemical; microscopical.
- LATIN—*Elementary*—Medical; pharmaceutical.
- HYGIENE—*Lectures*.
- MEDICAL JURISPRUDENCE—*Lectures*.
- MINERALOGY—*Elementary*—Pharmaceutical.
- PHYSICS—*Pharmaceutical*—Chemical.

The courses are comprehensive and thorough, especially adapted to the higher education of pharmacists. In the majority of them the instruction enters into the minutest details, and the most effective modern methods of teaching are employed in all, including laboratory work. The studies are graded and are progressive throughout.

PHARMACY, THEORETICAL AND PRACTICAL.

The *Junior Course* will begin with preliminary lectures considering the history and development of pharmacy, the rank which pharmacy occupies among other professions, pharmacy laws, text-books, and works of reference. The pharmacopœia and dispensaries will receive detailed attention. Measures and weights, the balance—its construction and varieties, and methods of weighing, specific gravity, in detail, will follow.

The pharmaceutical laboratory will be under the direct charge of the dean. The time of instruction is so arranged that the student becomes familiar with the subjects of the lectures from practical work immediately following and relating to them, thereby fixing facts and scientific principles in the student's mind in a manner that does not depend upon the student's capacity for remembering merely stated facts. A student can better remember that which he did than that which he heard.

Among the practical subjects that will receive attention, are the following: Drug grinding and powdering, comminution, contusion, tritura-

tion, elutriation, levigation, sifting, fineness of powders according to the United States Pharmacopœia.

Collection of drugs, drying, curing, cutting, garbling, etc.

Heat—its sources and uses in pharmacy, its determination, latent and sensible heat; thermometers—the various scales, testing and comparing thermometers, combustion of solids, liquids and gases in various kinds of furnaces, stoves and burners; application of heat in drying ovens; steam, hot-air and water ovens; drying closets, dessicators, blow-pipes, crucibles; baths for controlling and equalizing heat; water, salt, sand, oil, glycerine, parafine, hot-air-baths; evaporation—spontaneous, rapid, slow, in vacuo; ebullition—boiling-points. fusion; sublimation, calcination, granulation, dehydration, torrefaction, roasting, reduction, oxidation, carbonization, deflagration, ignition, etc.

Solutions—chemical, pharmaceutical, simple, complex, saturated; circulatory displacement.

Dialysis—construction of dialyser; osmosis, endosmosis, exosmosis, crystalloids and colloids.

Maceration—expression, infusion, decoction.

Percolation—history, theories, various methods, forms of percolators, exhaustion, repercolation, continuous percolation, etc.

Filtration—filtering medii, filtration of chemical solutions, oils, syrups, rapid filtration, filtration in vacuo, hot filtration, upward filtration, colation.

Decantation—the syphon and its uses; guiding-rods.

Distillation—simple, fractional, destructive, kinds and varieties of stills.

Crystallization—water of crystallization, deliquescence, efflorescence.

Granulation—methods of effecting, etc.

Precipitation—separating, weighing, drying precipitate.

Practical pharmacy.

Inorganic, U. S. P.

Senior Course.—This course will begin with the consideration in detail, of the pharmacy, of organic drugs principally, though the inorganic will not be wholly omitted. It will embrace a careful study of every important galenical preparation, with the methods of preparation, physical characteristics, reactions, impurities, adulterations and sophistications, etc.

A study of incompatibility will be one of the special features of this course; it will be viewed from a pharmaceutical, chemical and physiological standpoint.

Among the important subjects that will be treated of are the following:
Plant exudations: gums, resins, balsams, gum-resins, oleo-resins; etc.
Cellulin and its various products.

Destructive distillation of wood: acetic acid series.

Carbohydrates: their relationship and characteristics.

Fermentation products: alcohols, ethers, chloroform, nitrous ether, chloral, spirituous liquors, etc.

Organic acids: the official salts and preparations of tartaric, salicylic, benzoic, citric acid and others.

Fixed oils and fats: their preparation, composition and purification; various methods of examination; chemical properties and relations; liquid and solid fats.

Waxes and animal fats.

Volatile oils: their preparation, physical and chemical properties, composition; adulterations and their detection; botanical and chemical classification.

Alkaloids: physical and chemical properties; the various methods of extraction and identification; classification, alkaloidal reagents, etc.

Glucosides: difference from alkaloids; full consideration of properties and extraction.

Animal drugs and products: all the animal drugs will be taken up in detail.

Practical pharmacy: the preparation of pills, solutions, mixtures, cachets, ointments, plasters, suppositories, powders, emulsions, lozenges, etc. Arrangement and appliances of dispensing department.

The Prescription: The study of the prescription, of incompatibilities, reactions, solubility, etc. New remedies will be studied and an exposition of their chemistry and pharmacy will be presented.

The laboratory work in pharmacy will follow each lecture and have direct reference to the subjects treated of at the lecture. The preparation of the official standard solutions will be fully illustrated. The course includes a thorough study of the pharmacy of the following metals and their salts and preparations: Sodium, potassium, ammonium, lithium, barium, calcium, zinc, magnesium, lead, copper, aluminum, mercury, silver, arsenic and antimony, bismuth, iron, manganese, gold, platinum, etc. The course includes a thorough application of the U. S. P. tests for identity, impurities, and strength of official preparations. Considerable time is given to quantitative work, volumetric and gravimetric, including analysis of nostrums, butter, alcoholic liquors and proximate organic analysis if time permits.

Text-books—U. S. P., U. S. D., Remington's Pharmacy, National D.

PHARMACOGNOSY.

This important subject is taught in the senior year and is taken up in the following order:

Roots.—Sarsaparilla (Mexican, Para and Honduras), senega, saponaria, gentiana, fraseria, taraxacum, chicory, pyrethrum, inula, lappa, apocynum, stillingia, petroselinum, sumbul, asclepias, phytolacca, althæa, belladonna, bryonia, calumba, rheum, glycyrrhiza (Spanish and Russian), hydrangea, methysticum, ipecacuanha, gillenia, gelsemium, pareira, ceanothus, krameria.

Rhizomes.—Aspidium, zingiber (Jamaica, East Indian and African), zedoaria, galanga, curcuma (Madras and Java), calamus, veratrum, iris versicolor, cypripedium, convallaria, polygonatum, sanguinaria, dioscorea, geranium, bistorta, podophyllum; valeriana, arnica, serpentaria, spigelia, hydrastis, caulophyllum, cimicifuga, leptandra, menispermum, berberis, xanthorrhiza.

Tubers and Bulbs.—Jalapa, aconitum, colchicum, arum, scilla.

Woods.—Quassia Hæmatoxyton, santalum rubrum and album.

Barks.—Cinchona (Rubra and Flava); magnolia, liriodendron, prunus virginiana, viburnum (of root and stem), hamamelis, salix, cornus, berberis, Quercus, granatum, frangula, cascara sagrada (false and true), quebracho, coto, juglans, xanthoxylum, mezereum. Gossypii Radix, Eonymus (of root and stem); quillaia, ulmus, sassafras, angustura, cascarilla, cinnamomum (Ceylon, Saigon and cassia) wintera.

Herbs and Flowers.—Santonica, caryophyllus, lavandula, sambucus, calendula, carthamus, arnica, matricaria, anthemis, pyrethri flores (Dalmatian and Persian), brayera, chondrus, cetraria, fucus; cannabis indica, pulsatilla, scoparius, eupatorium, erigeron, grindelia, tanacetum, artemisia, absinthium; lobelia, mentha piperita, mentha viridis, melissa, majoranum, origanum, thymus, serpyllum, hedeoma, marrubium, cataria.

Leaves and leaflets.—Rosmarinus, boldus, pilocarpus, laurus, myrcia, eucalyptus, chequen, uva-ursi, senna (Alexandria and India), erythroxylon (Bolivian and Truxillo), belladonna, stramonium, hyoscyamus, digitalis, matico, salvia, hamamelis, tussilago, castanea, eriodictyon, chinaphila, gaultheria, buchu (long and short), aconitum, conium.

Fruits.—Juniperus, humulus, piper (longum, nigrum and album), cubeba, pimenta, rhamus catharticus, cocculus, rhus glabra; capsicum, colocynth, cassia fistula, chenopodium, xanthoxylum, illicium, cardamomum, lappa, granati fractus cortex, coriandrum; conium, anisium, ajowan, petroselinum, carum, carota, fœniculum (Roman and German), cuminum, anethum.

Seeds.—Physostigma, amygdalus (dulcis and amara), pepo, dipteryx (English and Dutch), theobroma, cola, abrus, fœnum græcum, rapa, sinapis (alba and nigra); nux vomica, ignatia, gynocardia, delphinium, staphisagria, ricinus, tigllium, curcas, stramonium, hyoscyamus, papaver, sabadilla, colchicum, cardamomum, granum paradisi, areca.

Miscellaneous.—Guarana, lactucarium, aloe (Socotrina, Barbadosensis and Capensis), catechu, gambir, kino (Malabar and Pallas) saccharum lactis, acacia, tragacantha; mastiche, sandaraca, colophonium, damar, copal, guiacum, draconis, benzoinum, cambogia, galbanum, ammoniacum; scammonium, myrrha, ergota (Spanish and German), sassafras, medulla, galla (Allepo and Chinensis), cantharis, mylabris, kamala, lupulinum, lycopodium, amyllum (wheat, corn).

Text-books.—U. S. P.; Maisch's *Materia Medica*.

GENERAL CHEMISTRY.

This is a course in general chemistry given in the department of medicine. In the presentation of the subject practical work in the chemical laboratory follows the lectures and relates to these. This system is one which gives the student confidence in his work from the beginning and the better enables him to keep step with the rapid progress of the instruction.

The course is graded through the junior and senior years, with three lectures and two afternoons laboratory work weekly during the entire first year and during half of the second year. The second half of the senior year is devoted to lecture work only, the laboratory work concluding in the first half.

Text-book.—Remsen's *Inorganic Chemistry*.

QUANTITATIVE CHEMISTRY.

The course in quantitative analysis extends through the entire senior year. It is graded and begins with simple gravimetric determinations of certain acids and metals, followed by determinations of several ingredients of the same compound, and by complex analysis. Volumetric methods are next learned and applied, then gravimetric and volumetric are employed together. Complete analysis of water is included in this course. The course is didactic and practical and occupies from six to ten hours per week. The work may be increased or decreased at the discretion of the dean of the college.

Text-book.—Harsley's *Quantitative Analysis*.

ORGANIC CHEMISTRY.

This course begins in the second half of the senior year and extends through the remainder of the year. The course includes both descript-

ive and experimental lecture and laboratory work. Eight hours per week are devoted to this subject. The organic chemistry of pharmacy is taught in connection with the course in pharmacy and pharmaceutical chemistry.

PHARMACEUTICAL CHEMISTRY.

Inorganic and organic pharmaceutical chemistry is taught in both the first and second years. As it is so important a part of the curriculum it receives attention both in special lectures and in the laboratory. The principles of chemistry acquired in the other course in chemistry are here applied directly to pharmacy. The chemistry necessary to the thorough comprehension of the Pharmacopœia is expounded and applied in this course.

Text-book—Wulling's Pharmaceutical Chemistry.

TOXICOLOGICAL CHEMISTRY.

The study of this subject follows the course in general chemistry in the senior year. This course includes the chemistry of organic and inorganic poisons. Toxicology proper is included in the course in materia medica.

Text-books—Reese's Toxicology; Taylor on Poisons.

BOTANY.

The course in botany receives the careful attention which is due to a subject of such importance to the pharmacist. It is a junior study and occupies four hours weekly of the students' time throughout the college year. The course is a thorough one, including microscopy and a large amount of laboratory work.

The University is very admirably equipped in its botanical department. The latter occupies a suite of rooms, including lecture rooms, herbarium and seminar room, students' general laboratory, physiological laboratory, special laboratory, dark room and plant house. The herbarium contains over 90,000 specimens, and the library about one thousand five hundred volumes of carefully selected works in all lines of botanical investigation. The department receives regularly about sixty special botanical periodicals.

Text-books.—Bastin's College Botany, etc.

MATERIA MEDICA.

The work in organic and inorganic materia medica, which includes some therapeutics and toxicology, extends throughout the two years, and occupies two hours weekly. It is taught by lectures, frequently illustrated with specimens belonging to the collection of the college.

Pharmacodynamics, including the study of the antidotes for poisonous drugs, receives detailed attention in this course. The study of the identity, quality and characteristics of drugs, which is usually included in materia medica, shares fuller attention in the course in pharmacognosy.

Text-books.—U. S. P., Maisch's *Materia Medica*, U. S. D., and National Dispensatory, Bracken's *Materia Medica*.

ELEMENTARY PHYSIOLOGY AND ANATOMY.

This subject is taught to the juniors in the latter part of the junior year in a special course of lectures; The study of the action of drugs and their effect upon the system cannot be intelligently carried on without some knowledge of the structure and functions of the various organs.

BACTERIOLOGY.

The course in bacteriology is given to the seniors in the second half of the college year, and consists of lectures and recitations illustrated by microscopic preparations and culture of various pathogenic bacteria. There is also laboratory exercise in staining and diagnosing pathogenic bacteria. Opportunity will be afforded in the laboratory for special research work.

Text-books.—Schenck's *Bacteriology*, Sternberg's *Bacteriology*, Frankel's *Bacteriology*.

MATHEMATICS.

Students in this college will receive careful drill in the subject of pharmaceutical mathematics during the two years.

URINALYSIS.

This course comprehends both qualitative and quantitative determinations of the constituents of normal and pathological urine, and a microscopic examination of urinary deposits. Seniors attend this in the latter half of the year. The instruction is given partly in the chemical and partly in the histological laboratory.

Text-book—Tyson's *Examination of the Urine*.

HYGIENE AND SANITARY SCIENCE.

A course of from six to ten lectures is provided in this subject. Required of seniors.

Text-book—Parks.

MEDICAL AND PHARMACEUTICAL JURISPRUDENCE.

A course in this is provided and seniors are required to attend.

LATIN.

A special course is provided in medical and pharmaceutical Latin, which all students are earnestly advised to attend. Latin is one of the entrance requirements and this course has been introduced especially for students who are proficient in the other entrance requirements, but not in Latin. The attendance upon the lectures is obligatory for such, and optional for those who have fulfilled the entrance requirements in Latin. The latter will profit by taking this course as it is specially adapted to pharmacists. One hour weekly is given to the study during the school year.

MINERALOGY.

A course of lectures embracing the minerals and ores which are the sources of the metals and salts used in pharmacy will be provided.

PHYSICS.

Students are required to be familiar with elementary physics before entering this college. The physics involved in the various chemical and pharmaceutical processes, will, however, be fully elucidated as occasion suggests or requires, and considerable attention will be given the subject incidentally, principally in the pharmaceutical laboratory.

PHARMACY LAW.

Several lectures will be given to senior students on the pharmacy laws of the state.

LIBRARY.

The students of this college have free access to all the library facilities of the University. The library contains, in addition to about fifteen hundred volumes of a technical nature, the more important medical and pharmaceutical periodicals.

SPECIAL STUDENTS.

Students who are deemed properly qualified by the Dean may be permitted to pursue two branches of study. Such students who afterward decide to take the full course will receive credit for the work they have completed.

LENGTH OF COURSE.

The complete course extends over two years, of eight months each. Students may arrange their work so as to take the course in three years. It is quite possible that a three years' course may be required of students of this college in the near future.

PROFESSIONAL EXAMINATIONS.

Examinations are held during the last two weeks of the regular session and are supplementary to the written recitations and quizzes that are held at frequent intervals during the term, and with them form the basis of final determination of fitness for promotion or graduation. Students are rated through the year, and all students who have a standing of eighty per cent., or more, in any branch, will not be required to take the final examination in that branch.

DEGREE.

This college confers the degree of Doctor of Pharmacy, Phm. D., upon its graduates.

REQUIREMENTS FOR GRADUATION.

Regular attendance at lectures, quizzes and laboratory exercises. Students will not be permitted to present themselves for final examination unless they have been in attendance upon at least four-fifths of the required number of exercises.

Every person upon whom the degree of Doctor of Pharmacy is conferred must be of good moral character and must have complied with the following requirements:

1. The candidate must be twenty-one years old.
2. And must have had four years' practical experience with a person qualified to conduct the business of a dispensing pharmacy. The four years may include the time spent in college; but attendance in the laboratories will not be accepted in place of actual experience in a dispensing pharmacy. If a student has not had the requisite amount of experience, or has not attained the age of twenty-one years, a certificate of examination will be issued to him, if he passes all examinations satisfactorily, which certificate may subsequently be exchanged for a diploma when all necessary conditions shall have been fulfilled.
3. The candidate 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.

Those who fail to appear for examination after having paid their diploma fee, or those who do not pass satisfactorily, will be permitted to present themselves at any subsequent examination, upon paying an additional fee of five dollars and complying with all other requirements.

FEES.

The fees of this college are the same as in the other colleges of the department. The only special fees are for the pharmaceutical labora-

tory \$15, quantitative chemistry \$5, and organic chemistry \$5. The laboratory fees are to cover cost of material, breakage, damage and waste. If, at any time these charges amount to more than the amount of the fee, a second fee will be required. Places will not be assigned in the laboratories, until the laboratory fees are paid.

GENERAL STATEMENT.

Students will be permitted to use crude drugs for the making of preparations, provided such material is approved by the Dean of the college as suitable to demonstrate the lesson in hand. Finished products from such material, if of satisfactory quality are at the disposal of the student, unless made with the tax-free alcohol belonging to the college.

Students are earnestly requested to be present at the beginning of the college year. Special students, however, may enter at any time; they will not be rated in their work, nor will they be examined unless they make a special request therefor. All the facilities for work in the University are open to the students of this college, subject to the approval of the dean. When a student has elected work in another college he will be required to complete such work. Opportunity is afforded to do advanced work in all the branches. Text-books may be obtained after coming to the University.

State Board of Pharmacy.—The Board meets at the college in January, April, July and October of each year.

For information concerning students' societies, scholarships, university publications, living expenses, etc., see the general catalogue of the University.

Address all communications to the Dean, F. J. Wulling, University of Minnesota, Minneapolis, Minn.

Students.

I. GRADUATE STUDENTS—91.

CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY—23

Abbtmeyer, Charles, <i>B. A., Luther College.</i>	East Farmington, Wis.
English Philology and Literature: French and German.	
Angus, William, <i>B. A., '93.</i>	Garfield.
American Public Economy—Taxation; History.	
—Avery, Elizabeth Huntington, <i>M. A., '93, Iowa College.</i>	Hampton, Iowa.
History—The Political History of the United States.	
Berkey, Charles Peter, <i>B. S., '92, M. S., '93.</i>	Farmington.
Mineralogy.	
—Blanchard, Mary Lizzie, <i>B. L., '88.</i>	Zumbrota.
English Philology and Literature: German.	
Buck, Benjamin Frank, <i>Carleton College.</i>	Detroit.
Science of Government; Private Economy; Public Economy, International Law.	
Cotton, Rev. R. H., <i>B. S., '77 and M. A., '79, London University.</i>	St. Anthony Park.
Philosophy, Ethics.	
Crafts, Leo Melville, <i>B. L., '86; M. D., '90 Harvard, Hospital, '91.</i>	Minneapolis.
Experimental Psychology, History of Philosophy, Criminology.	
Danner, Harry R. <i>B. A., '91, Rutgers.</i>	Minneapolis.
Political Science.	
Elftman, Arthur Hugo, <i>B. L., '92, M. S., '93.</i>	Minneapolis.
Lithological Geology.	
Friedmann, Rabbi Aaron, <i>German Gymnasium; B. L., '93, University of Cincinnati.</i>	Minneapolis.
Philosophy, History of Ethics.	
Kennedy, Joseph, <i>B. S., '86.</i>	University, N. D.
Political Science, Constitutional History.	
Lhamon, Rev. W. J., <i>M. A., '86, Butler University.</i>	Minneapolis.
Philosophy of History.	
Massey, Freedom Chester, <i>B. A., '93.</i>	Hamline.
Norman Dialect, Study of the Romance Languages and their development from the Latin.	
Medlar, Rev. W. H., <i>B. D., '85 Yale.</i>	Lake City.
Constitutional History.	
Merrill, John Ernest, <i>B. A., '91.</i>	Minneapolis.
Ethics, Metaphysics, Psychology.	
Nichols, Rev. Harry Pierce, <i>B. A., '71 Harvard.</i>	Minneapolis.
Sociology—studied in the light of history.	
Sanford, John A., <i>B. A., '82 Brown University.</i>	Minneapolis.
Greek.	
Sardeson, Frederick William, <i>B. L., '91; M. S., '92.</i>	Minneapolis.
Paleontology.	

—Sewall, Hannah R. Political Science.	St. Anthony Park.
Sudduth, W. Xavier, <i>M. L.</i> , '89, <i>Ohio Wesleyan University</i> . Zoology, Botany, Physiology, Paleontology.	Minneapolis.
Zelny, Anthony, <i>B. S.</i> , '02; <i>M. S.</i> , '03. Physics.	Minneapolis.
Zelny, John, <i>B. S.</i> , '02. Physics.	

CANDIDATES FOR THE DEGREE OF MASTER OF ARTS—17.

—Andrews, Hattie Louise, <i>B. A.</i> , '90. English, Greek, Latin, Political Economy.	Minneapolis.
Anderson, Martha Scott, <i>B. L.</i> , '00, <i>Ohio Wesleyan University</i> . History, English, French.	Minneapolis.
—Bailey, Clara Edith, <i>B. A.</i> , '02. Greek, French, Mathematics, German.	Minneapolis.
Bryant, Julius Clarence, <i>B. A.</i> , '78. Latin, History.	St. Paul.
Carlson, Rev. Andreas, <i>A. B.</i> , '86, <i>Augustana College</i> . History, Latin, Greek, Philosophy.	Minneapolis.
Christianson, Christian H., <i>B. A.</i> , '00. Psychology, Latin, English, Greek.	Bath.
—Glass, Martha Ruth, <i>University of North Dakota</i> . Latin, Greek, History, English.	Minneapolis.
Krantz, Rev. John A., <i>B. A.</i> , '83, <i>Augustana College</i> . History, Latin, Greek, Philosophy.	Minneapolis.
—Peters, Elizabeth Alma, <i>B. A.</i> , '03. Greek, Latin, Pedagogy.	Minneapolis.
—Potter, Franc Murray, <i>B. A.</i> , '03. Latin, Greek, Sanskrit, History.	Minneapolis.
—Potter, (Mrs.) Jane Bliss, <i>B. A.</i> , <i>Michigan University</i> . English, Latin, Greek.	Minneapolis.
Powell, Rev. John Walker, <i>B. A.</i> , '03. Greek, Philosophy of Religion, Ethics, Latin.	Kimball.
—Sanford, Mrs. John A. History.	Minneapolis.
Sethre, John Olaf, <i>B. A.</i> , '03. Modern European Politics, History of Philosophy, Greek, Latin.	Minneapolis.
Thorstensen, Thorsten K., <i>St. Olaf College</i> . Latin, Greek, English, Roman Law.	Hanley Falls.
Trask, John J., <i>B. A.</i> , '01, <i>University of North Dakota</i> . Physics, Mathematics, Latin.	Rushford.
Webster, William Franklin, <i>B. A.</i> , '86. Latin, French, Greek, Italian.	Minneapolis.

CANDIDATES FOR THE DEGREE OF MASTER OF SCIENCE—8.

Avery, L. B., <i>B. S.</i> , '83, <i>Tabor College</i> . Physics.	Mayville, N. D.
Carel, Hubert Charles, <i>B. S.</i> , '03. Chemistry, Physiology, Bacteriology, Geology.	St. Paul.
Frost, William Dodge, <i>B. S.</i> , '03. Botany, Zoology, Geology, Chemistry.	Minneapolis.
Gross, Otis Carsley, <i>B. S.</i> , '00. Animal Biology, Mathematics, Physical Science, Pedagogy.	Minneapolis.
Hanft, Frank William, <i>B. S.</i> , '01. Calculus, Quaternions, English, Philosophy.	Minneapolis.

Robertson, William, <i>B. S.</i> , '85, <i>Carleton College</i> .	St. Anthony Park.
Chemistry, Physics, Botany, German.	
Shanks, John Benjamin, <i>B. Ph.</i> , '93, <i>University of Michigan</i> .	Fairmont.
History of Philosophy, Co-ordinate Geometry, Psychology, Calculus.	
Warren, William John, <i>B. S.</i> , '78.	Minneapolis.
Physics, Chemistry, Astronomy, Pedagogy.	

CANDIDATES FOR DEGREE OF MASTER OF LITERATURE—3.

—Comfort, Sarah Catherine, <i>B. L.</i> , '90.	Minneapolis.
English, French, German, History.	
—Cross, Nellie Malura, <i>B. L.</i> , '91.	Minneapolis.
English, Gothic, German, Zoology.	
Gryttenholm, Sigurd, <i>Royal University of Norway</i> .	Wittenberg, Wis.
Norwegian, German, English, History.	

CANDIDATE FOR DEGREE OF CIVIL ENGINEER—I.

Trask, Birney Elias, <i>B. C. E.</i> , '90.	Minneapolis.
Bridge Engineering, Mechanics, Astronomy, Mathematics.	

CANDIDATES FOR DEGREE OF MECHANICAL ENGINEER—2.

Felton, Ralph Potter, <i>B. M. E.</i> , '92.	Minneapolis.
Wellington's Railroad Location, Political Science, Currency Question.	
Gill, James Herbert, <i>B. M. E.</i> , '92.	Minneapolis.
Shaft Governors and Valve Friction, Chemistry, Electrical Engineering, Design of Experimental Engine.	

OTHERS DOING GRADUATE WORK—12.

—Austin, Mabel, <i>B. S.</i> , '93.	Minneapolis.
Entomology and Botany.	
—Bebb, Rose Anne, <i>B. L.</i> , '91.	Minneapolis.
Cook, John Henry, <i>Ohio Wesleyan University</i> .	Minneapolis.
Flaten, Nils, <i>B. A.</i> , '93.	Minneapolis.
French.	
Fling, Harry Ridgeaway, <i>Bowdoin College</i> .	St. Paul.
Histology.	
Holtz, Fred Leopold, <i>B. S.</i> , '92.	Minneapolis.
Chemistry, Botany.	
—Leavenworth, Mrs. F. P., <i>B. A.</i> , '81, <i>Indiana University</i> .	Minneapolis.
German.	
Mann, Eugene L., <i>B. A.</i> , '83, <i>Hobart College</i> , <i>M. D.</i> , '86, <i>Hahnemann</i> .	St. Paul.
Potter, J. B.	Minneapolis.
Old and Middle English, Economics.	
Spear, George Hancock, <i>B. L.</i> , '93.	Minneapolis.
Political Science.	
—Wilkin, Matilda Jane Campbell.	Minneapolis.
English.	
Wilson, George L., <i>C. E.</i> , '77, <i>Yale</i> .	St. Paul.
Physics, Electrical Engineering.	

CANDIDATES FOR THE DEGREE OF MASTER OF LAWS—25.

Ayers, Fred, <i>LL. B.</i> ,	Minneapolis.
Barton, Elijah, <i>LL. B.</i> , <i>U. of Mich.</i>	Minneapolis.
Chute, Louis Prince, <i>A. B.</i> , <i>LL. M.</i>	Minneapolis.
Cooley, Clayton R., <i>LL. B.</i>	Minneapolis.

Danner, Harry Ross, <i>A. B., LL. B.</i>	Minneapolis.
Dever, Charles S., <i>LL. B.</i>	Minneapolis.
Dullam, George Francis, <i>LL. B.</i>	Minneapolis.
Fowler, Charles H., <i>LL. B.</i>	Minneapolis.
Geddes, Charles Daniel, <i>LL. B., Columbia.</i>	Minneapolis.
Gruenberg, John, <i>LL. B.</i>	Minneapolis.
Hermann, Arthur Ludwig, <i>LL. B.</i>	Minneapolis.
Hutson, Frank Alfred, <i>LL. B.</i>	Minneapolis.
Iverson, Samuel G., <i>LL. B.</i>	St. Paul.
Lawley, Frank Davis, <i>LL. B.</i>	Minneapolis.
MacBeath, Samuel Blair, <i>LL. B.</i>	Minneapolis.
McDermott, Thomas J., <i>LL. B.</i>	St. Paul.
McMillan, Elvero Lewis, <i>LL. B.</i>	Minneapolis.
Mayland, Andrew Unius, <i>LL. B.</i>	Ashland.
Megaarden, Phillip Tollef, <i>LL. B.</i>	Minneapolis.
—Morton, Nora L., <i>LL. B.</i>	Minneapolis.
Neff, Porter Joseph, <i>LL. B.</i>	Minneapolis.
Peterson, Carl Fred Ernest, <i>LL. B.</i>	Minneapolis.
Tyler, Albert De Forrest, <i>LL. B.</i>	St. Paul.
Webb, Robert W., <i>LL. B.</i>	St. Paul.
Webber, Clarence Albert, <i>LL. B.</i>	Minneapolis.

II. UNDERGRADUATE STUDENTS.

COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

SENIORS—74.

CLASSICAL SECTION—18.

Anderson, Frank Maloy, Minneapolis	Martin, Harrison Burke, St. Paul
Briggs, John Gallup, Jr., Cheney	May, Albert Edward, Minneapolis
Cates, Alton Morrill, Minneapolis	Northrop, Cyrus, Jr., Minneapolis
Dewart, John Harry, Northfield	Paquin, Samuel Savil, Motley
Greenwood, Carl de Forris, Garden City	—Pratt, Roberta, Minneapolis
Helliwell, Arthur Llewellyn, Minneapolis	Van Valkenburg, Jesse, Canby
Kiehle, Frederick Andrews, Minneapolis	Whitman, Clarence Leroy, Owatonna
Larson, Augustus Theodore, Alexandria	Williams, Archie Elton, Minneapolis
—McMillan, Bertha Laura, Minneapolis	—Wright, Ella Theoline, Rushford

SCIENTIFIC SECTION—37.

Anderson, Alexander Pierce, Red Wing	Green, Frank Evard, Bernadotte
Ballard, Caswell, Aden, Zumbrota	Harding, Everhart Percy, Waseca
Barney, Frank Hadwen, Minneapolis	Hoveland, Henry Bert, Zumbrota
Bauer, George Neander, Minneapolis	Jackson, Robert Lyon, Minneapolis
Bisbee, Edgar Charles, Madelia	—Leavitt, Clara Kezia, Minneapolis
—Bradford, Mary Grace, Empire	Leavitt, Frank Wesley, Minneapolis
—Burgess, Georgia Annie, Minneapolis	Litzenberg, Jennings Crawford, Minneapolis
Carver, Walter M., Tracy	Lord, Lewis Percy, Owatonna
Clark, Theodore, St. Cloud	—McDonald, Hope, Minneapolis
Coe, William Tatnall, Minneapolis	—Mace, Blanche Alma, Hastings
—Craig, Marion Jeanie, St. Paul	Manson, Frank Melville, Minneapolis
Crecelius, John Augustus, Milan, Ohio	Manuel, Malvern Hill, Bellingham
—Everts, Catherine Jewell, Minneapolis	Muir, William Cyrus, Hunter, N. D.
—Fleming, Hattie Evelyn, Minneapolis	Pattee, Charles Sumner, Minneapolis
—Freeman, Emma Catherine, St. Paul	—Robbins, Edith Anstis, Robbinsdale

Rockwell, Thomas A., Oshkosh, Wis.
 Sheldon, Edmund Perry, Minneapolis
 Shepherd, Reuben Spencer, St. Charles
 Strathern, Fred Paul, Rich Valley

Sumner, Francis Bertody, Minneapolis
 Topping, Charles Henry, Litchfield
 Wollan, Thomas Carl, Starbuck

LITERARY SECTION—19.

Andrist, Charles Martin, Roscoe
 Bagley, Horace Easton, Melbourne, Iowa
 Barto, William Allen, St. Cloud
 —Bates, Lulu Marilla, St. Louis Park
 —Beebe, Inga, Minneapolis
 —Bradford, Jessie Allen, Minneapolis
 —Burnes, Clara Thornton, Hopkins
 —Byrnes, Agnese Paula, Minneapolis
 —Cole, Eugenia Louise, Minneapolis
 Dever, Charles S., Mabees, Ohio

—Frankenfield, Laura Elizabeth, Minneapolis
 —Huntoon, Ruth Abigail, Minneapolis
 —Pabodie, Alice Clarissa, Baraboo, Wis.
 Poehler, Walter Charles, Minneapolis
 —Shepard, Alice Lee, Minneapolis
 Simonton, William Adair, Sauk Centre
 Smith, E. Fay, St. Paul
 —Steele, Mary Gertrude, Minneapolis
 —Zimmerman, Una Isabel, St. Paul

JUNIOR CLASS—107.

CLASSICAL SECTION—26.

Aspden, Herbert Henry, Excelsior
 Baldy, Fred Carroll, Minneapolis
 Boodin, John Elof, Boulder, Colo.
 Caldwell, Alexander Woods, St. Paul
 Clark, Leroy Eaton, Minneapolis
 Clifford, Elmer L., Lake City
 Day, Ernest, Minneapolis
 Elwell, Talmage Robert, Minneapolis
 Fowler, Charles Hitchcock, Minneapolis
 Gilfillan, Fred James, St. Paul
 Godward, William Alexander, Elbow Lake
 Goodwin, Godfrey Gummar, St. Paul
 Green, Eugene Kirby, Brooklyn Centre

Hastings, Walter Henry, Minneapolis
 Huhn, Carl, Minneapolis
 —Jackson, Catharine, Minneapolis
 Loe, Daniel O., Grand Meadow
 Mathews, Edward William, Jr., Cambridge, O.
 Peterson, Erick Anton, Red Wing
 Rice, David Perry, Rockland, Mass.
 Rogers, Clarence R., Minneapolis
 Teigen, Nels Thomas, Minneapolis
 Truesdell, Lynn George, Owatonna
 Twing, William Fuller, Minneapolis
 Wells, Benjamin Samuel, Duluth
 —Wright, Blanche Ahmida, Minneapolis

SCIENTIFIC SECTION—44.

Allen, Harry Winslow, Red Wing
 Barrington, John Wilson, Minneapolis
 Barrows, Clarke, Minneapolis
 Buckley, Daniel, Farmington
 Clark, Howard S., Madison, S. D.
 Cook, Roy Jay, Minneapolis
 —DeKay, Cornelia, Red Wing
 —Dutcher, Kate Ethel, Austin
 —Espy, Lila Wood, St. Paul
 —Fisher, Lizzie May, Minneapolis
 Fowler, Harry A., Minneapolis
 —Fox, Henrietta Gertrude, Minneapolis
 Guilford, Harry Morrill, Minneapolis
 —Hatch, Lillian, Lake City
 Hodgson, John Edward, Hamline.
 —Holbrook, Anna Henshaw, Minneapolis
 Johnston, George Smith, Minneapolis
 —Lagerstrom, Lydia Theodora, Minneapolis
 Lange, D., St. Paul
 Lyon, Willard Crosby, Fargo, N. D.
 McAndrew, John Edward, Iroquois, S. D.
 Metcalf, Clair French, Lincoln, Neb.

Miller, Clarence Benjamin, Pine Island
 Mitchell, William DeWitt, Winona
 Moffett, James Burch, Minneapolis
 Moore, Albert Hall, Minneapolis
 Murfin, Arthur M., Sleepy Eye
 Nickerson, Harry Barnard, Elk River
 Northway, Robert Stanley, Minneapolis
 Olson, Carl Oscar Alexius, Minneapolis
 —Peterson, Jonina Rose, Newark, S. D.
 —Peterson, Joan Thorunn, Newark, S. D.
 Pope, Jesse Eliphalet, Fontanelle, Iowa
 Ramaley, Francis, St. Paul
 Reed, Charles Anthony, Hastings
 Reed, Edwin Thomas, River Falls, Wis.
 Rees, Soron P., Stillwater
 Schwager, Lewis, Bethany
 Soule, Stephen Barber, Minneapolis
 Stout, Wilfred Oakley, St. Paul
 Taylor, William John, Minneapolis
 —Thomas, Mabel Hickman, Mankato
 —Tilden, Josephine Elizabeth, Minneapolis
 White, McLaughlin, Minneapolis

LITERARY SECTION—37.

- Austin, Isabella McHugh, Minneapolis
 —Bedient, Louise, Kasson
 Boraas, Julius J., Hader
 —Bradford, Bertha Rose, Minneapolis
 —Brewer, Jeanette J., Minneapolis
 —Brewer, Mary Tuttle, Minneapolis
 —Burnett, Ida A., Pipestone
 Campbell, Walter Henry, Alexandria
 —Case, Mary Maude, St. Peter
 Dalrymple, Wm. Ferguson, St. Paul
 Devereaux, Thomas, Minneapolis
 —Doherty, Agnes Elizabeth, St. Paul
 —Doherty, Mary Helena, St. Paul
 —Eaton, Rose Winnifred, Wells
 Ellithorpe, Clarence, Gem, S. D.
 —Felch, Susie, Elk River
 —Goodsill, Mary Isabel, Grant City, Mo.
 —Grant, Mrs. Avis Winchell, Minneapolis.
 —Hart, Emma Maria, Spring Valley
 —Hawley, Mary E., Minneapolis
 —Hayes, Helen Lyon, Minneapolis
 —Hoyt, Mary Ann, Minneapolis
 Johnson, Edward Martin, Sauk Centre
 —Kohler, Elizabeth Louise, Hastings
 —Lawrence, Margaret Laura, Minneapolis
 —McCormick, Agnes H., Minneapolis
 —McDonald, Margaret, Minneapolis
 —Moore, Lillian Randall, St. Paul
 —Morse, Minnie Frances, Minneapolis
 —Perkins, Eliza Annie, Minneapolis
 Stageberg, Olaf Olson, Dawson
 —Stone, Minnie Evangeline, Minneapolis
 Thompson, Robert Mitchell, Minneapolis
 Tone, Knut Hjalmar, Gilmar, Iowa
 Van Sant, Grant, Winona
 Webb, George Collins, Arcadia, Wis.
 —Wells, Isabel W., Plainview

SOPHOMORE CLASS—133.

CLASSICAL SECTION—30.

- Abernethey, William Shattuck, Minneapolis
 Adams, Charles Edward, Fargo, N. D.
 Anderson, Arthur Edward, Red Wing
 Anderson, Frank Leonard, Red Wing
 Barton, Edgar Reginald, Minneapolis
 Bratrud, Theodor, Spring Valley
 —Breckenridge, Julia Reed, Decorah, Iowa
 Brown, Thomas Reed, Minneapolis
 —Dickinson, Lucy Evelina, Minneapolis
 —Drew, Mary Ellen, Burlington, Vt
 Finlayson, George Albert E., Crookston
 Flanagan, Charles Gibbons, Mankato
 Garrity, Harry, Faribault
 Gould, Chester Nathan, Owatonna
 Hempstead, Clark, Minneapolis
 Hewitt, Edwin Hawley, Red Wing
 Keyes, Charles Frederick, Higbee, Pa
 Lofstrom, Emery Elmer, Litchfield
 Morley, Frank Johnson, Minneapolis
 Sasse, Frank George, St. Charles
 —Simmons, Rose Anthony, Hastings
 Simpson, Marcus Julius, Long Beach, Cal.
 —Smith, Mary Chadbourne, Minneapolis
 Sperry, Frederick James, Wasioja
 —Tennant, Grace Mabel, Minneapolis
 Thayer, H. Milton, Excelsior
 Tirrell, John Mahlon, Minneapolis
 —Walker, Alice Elinor, Amesbury, Mass.
 —Webb, Alice Catherine, Minneapolis
 Wingate, Charles Benjamin, Minneapolis

SCIENTIFIC SECTION—55.

- Anderson, Oscar, Zumbrota
 —Baker, Helen May, Brownton
 —Beach, Elizabeth, Faribault
 Berg, John Nelson, Minneapolis
 —Blaisdell, Helen Elizabeth, Minneapolis
 Brooks, Harry Bayard, Renville
 —Butler, Alice Louise, Faribault
 Case, Martin Williams, St. Peter
 Chapman, Herman Haupt, St. Paul
 Condit, Wm. Henry, Columbus, O.
 Cox, Norman J., Wasioja
 Dalrymple, John Stewart, St. Paul
 Davies, John Milton, Courtland
 Day, Reuben Noble, Minneapolis
 —Felton, Hattie Hortentia, Minneapolis
 —Felton, Mary E., Minneapolis
 Field, Peter, Meroa, Iowa
 —Foss, Elizabeth Hankenson, Minneapolis
 Galloway, Lee, Faribault
 George, James Woodward, Rockford
 Gregory, Joel Ernest, St. Paul
 Gruenberg, Benjamin, Minneapolis
 Hartman, William David, West Superior, Wis.
 —Holtz, Eleanor, Minneapolis
 Keene, Ralph Kendall, Mankato
 —Kirtland, Rhodella, Minneapolis
 Lawrence, William Hamilton, Wabasha
 Lewis, John Hoover, Dean
 —Long, Jessie, Minneapolis
 McDermott, Thomas Ignatius, Stillwater
 —Mantor, Flora May, Willmar
 Matteson, Herman Howard, Minneapolis

- Maxwell, Asa Frank, Minnehaha Falls
 May, Alfred David, Leavenworth, Kan.
 —Miller, Grace Hannah, Minneapolis
 Mills, Frederick, Elk River
 —Mitchell, Mildred Whittlesey, St. Cloud
 —Mortenson, Mary E., Faribault
 Mosher, Wells John, Zumbrota
 Newell, Horatio S., Robbinsdale
 Perkins, Maynard Cyrus, Minneapolis
 Pickett, Victor Goodrich, Albert Lea
 —Ripley, Abigail, Minneapolis
 Ross, Hiram Earl, Sioux Falls, S. D.
 Savage, Frank Joseph, St. Paul
 Scott, Daniel A., Faribault
 —Siegler, Lillian, Spokane, Wash.
 —Stevens, Jessie Eliza, Minneapolis
 Thompson, Reuben Celius, Preston
 Wakeman, Harry Emmett, Willmar
 Wendell, William Fuller, Minneapolis
 Weatherson, Charles Edkin, Dundas
 —Weston, Florence Mabel, Chelsea, Mass.
 Winchell, Alexander Newton, Minneapolis
 —Winton, Adelaide Ann, Minneapolis

LITERARY SECTION—38.

- Austin, Ella May, Minneapolis
 Bartholomew, Fred Roscoe, Chariton, Iowa
 Beaven, Arthur Hubert, Minneapolis
 —Bell, Maud H., Minneapolis
 —Bennett, Francis Louise, Minneapolis
 —Bollinger, Katherine, St. Paul
 Breeding, Ben. Noble, Minneapolis
 —Davidson, Mary Isabella, Minneapolis
 Donahower, Harry L., St. Peter
 Ellingson, George Henry, Sogn
 Farmer, Ernest M., Spring Valley
 Foster, Wesley Sherman, Dover
 —Fullerton, Caroline A., Minneapolis
 —Gibbs, Elsie C., Monticello
 —Goodnow, Elizabeth, Minneapolis
 Haugan, Otto Martin, Red Wing
 —Hendrix, Julia M., Minneapolis
 —Hillman, Ada Belle, Minneapolis
 —Holland, Mary Allen, Minneapolis
 —Hungerford, Josephine Louise, Min'p'ls
 —Iverson, Ella Eva, Minneapolis
 —Levens, Nellie, Albert Lea
 —Mars, Mary Lucie de, Minneapolis
 —Maxwell, Clara Edith, Minneapolis
 —Nelson, Nora L., Kasson
 —Plummer, Lydia May, Minneapolis
 —Robb, Charlotte Estelle, Minneapolis
 —Robbins, Alice Greeley, Minneapolis
 Rönnig, Nils Nillson, Boe, Norway
 —Rosger, Emma F., Minneapolis
 —Sargeant, Helen D., St. Paul
 —Seeley, Blanche Marguerite, Minneapolis
 —Shepard, May Pillsbury, Minneapolis
 Simpson, Earl, Winona
 —Smith, Elsie Blanch, Minneapolis
 —Van Cleve, Mary Adams, Minneapolis
 —Weir, Mary Delia, Minneapolis
 —Woodward, Agnes Young, Minneapolis

TEACHER'S SECTION—10.

- Bell, Minnie Carrick, St. Cloud
 —Evans, Anna Creighton, Stillwater
 —Gozzard, Ada, Minneapolis
 —Hookey, Edith Hannah, Minneapolis
 —Johnston, Harriet Cecelia, Minneapolis
 —Luce, Lizzie, Minneapolis
 —Miller, Sarah Helen, Minneapolis
 —Phillips, Saidee Viola, Minneapolis
 —Pond, Fannie Wilson, Bloomington
 —Struble, Clara, La Moure, N. D.

FRESHMAN CLASS—197.

CLASSICAL SECTION—34.

- Anderson, Edwin Clark, Minneapolis
 Austin, Lloyd Barrick, Woodburn, Ore.
 Booth, Laurence N., Willmar
 Brill, Hascal Russell, Jr., St. Paul
 —Cadwell, Edith Irene, Le Sueur
 Chute, Richard Henry, Jr., Minneapolis
 Cody, Luther Morrill, Minneapolis
 Coleman, Melvin E., St. Paul
 —Cunningham, Beatrice Triphene, Brainerd
 Dunlap, George Crawford, St. Paul
 Faude, Frank Clement, Minneapolis
 Ferner, Roy Yalding, Hampton, Ia.
 Fisher, James, V. S., Minneapolis
 Glasoe, Paul Morrice, Spring Grove
 Guilford, Paul Willis, Minneapolis
 Hansen, George Alfred, Rushford
 —Higgins, Elizabeth Young, Minneapolis
 Jewett, Edmund Gale, St. Paul
 Kline, Robert E., Independence, Ia.
 —Near, Grace, South Hadley, Mass.
 Nelson, Ralph William, Benson
 Newkirk, Bert Leroy, Minneapolis
 Owens, David T., Greenleafon
 Putnam, William Rowell, Red Wing

Savage, Linneus T., St. Paul
 Schmidt, Paul Gerhard, Minneapolis
 Stevens, John Jr., Bangor, Me.
 Thorson, Peter Edward, Martell, Wis.
 —Updyke, Nina Thedosa, Glencoe

—Ward, Mary, Minneapolis
 —Wheeler, Eva Gertrude, Minneapolis
 —White, Annie May, Minneapolis
 —Whitney, Mabel Maud, Wadena
 Womack, Rosser Edward, St. Paul

SCIENTIFIC SECTION—80.

—Angle, Claribel, Minneapolis
 Artz, Emanuel Arthur, St. Paul
 —Austin, Helen Horace, St. Paul
 Baker, Axel Conrad, Rochester
 Baker, Harry Franklin, Minneapolis
 Bessesen, Nelson Daniel, Albert Lea
 —Blake, Lydia Mann, St. Anthony Park
 Burnap, Willard Lothrope, Mason City, Ia.
 Campbell, Harlan Smith, Alexandria
 Carlson, Carl Floyd Wohner, Stillwater
 —Chase, Alice Isabelle, Minneapolis
 Cook, Bert Arthur, Minneapolis
 Danner, J. LeMoyne, Jr., Stillwater
 Davis, Fred U., Branierd
 —Davis, Luella Monke, Madelia
 Dixon, Harry Lester, Northfield
 —Donaldson, Susanne Thorne, St. Paul
 Foss, August, Rushford
 Gjertsen, George Herbert, Minneapolis
 —Grant, Nellie Harriet, Peoria, Ill.
 —Gray, Janet, Minneapolis
 Hall, Harlan Wilcott, St. Paul
 Hanson, George, Cushing, Wis.
 Hastings, Robert Alexander, Minneapolis
 Higbee, Matt, Minneapolis
 Hines, Francis Wallace, Wells
 Hoorn, John Albert, Red Wing
 Horton, George Reed, Algona, Iowa
 Horton, Lawrence Eustace, Duluth
 —Hughes, Anna Marie, Minneapolis
 Hursh, William, Long Lake
 Johnson, John O., Hanska
 Johnston, George Henry, Minneapolis
 Kunze, William Frederick, Sleepy Eye
 Lee, Algernon Herbert, Minneapolis
 —Lee, Minnie Maud, Minneapolis
 Loye, Albert Bushnell, Minneapolis
 —Luger, Claire Victoria, Fargo, N. D.
 —MacDermid, Kate, Minneapolis
 —Mattison, Hannah Matilda, Minneapolis

Murphy, Gilbert Pendleton, Minneapolis
 Myers, David Ab., Prentice, Wis.
 —Newcomb, Mabel Valentina, Minneapolis
 Norton, Alfred A., Minneapolis
 O'Brien, Richard Dillon, St. Paul
 Olson, Willie C., Wells
 Parker, William James, Minneapolis
 Parry, Ivan Arthur, Mankato
 —Peabody, Eunice Diantha, Stanton, Wis.
 Partridge, Elbert Dudley, Fergus Falls
 Peterson, Adolph, Minneapolis
 Pickard, George Edwin, Minneapolis
 Pitts, Fred, Minneapolis
 Pratt, Sydney, Minneapolis
 Richard, Henry Raone, Little Falls
 Ring, Merritt Mellen, Owatonna
 Roberts, William Burchard, Minneapolis
 —Robinson, Mabel, Lenard, Florida
 —Roney, Katherine, Winthrop, Iowa
 Sharpless, Joseph Wallerton, Minneapolis
 —Simmons, Echo, Minneapolis
 Smallidge, Joseph Frank, Faribault
 Spicer, Russell Paul, Willmar
 Spratt, Charles Nelson, Minneapolis
 Sutton, Elsi Lyle, Minneapolis
 —Telfair, Nellie May, Minneapolis
 Thompson, Will T., St. Croix Falls, Wis.
 —Tibbetts, Helen Estelle, West Concord
 Towler, George H., Minneapolis
 —Towne, Myrtle Grace, Owatonna
 Uhl, Alfred W., Minneapolis
 Updyke, Stephen Gould, Jr., Glencoe
 Werner, Carl Gustaf Alexis, Minneapolis
 —Williams, Carrie E., Mankato
 Willius, Otto, St. Paul
 Wing, Iver Cornelius Johnson, Torrין Valley
 Wold, Carl Angell, Brandon
 Wood, Henry Pierce, Minneapolis
 —Woodman, Helen Celestra, St. Paul
 Wyman, Roy Lambertson, Minneapolis

LITERARY SECTION—64.

Armstrong, George Wallace, Minneapolis
 Austen, James Frederick, St. Paul
 —Bartlett, Jennie May, Stillwater
 —Belden, Agnes Emilie, Minneapolis
 —Brewer, Flora Elizabeth, Minneapolis
 —Burt, Bessie Louise, Minneapolis
 —Carlyon, Clara Jennie, Clear Lake, Ia.
 Castle, Harry Jaquess, St. Paul

—Clarke, Arvesta Lewis, Rich Valley
 —Cole, Ruth Barr, Minneapolis
 —Daniels, Mary, Minneapolis
 —Dunham, Lucy Bertha, Minneapolis
 —Durkee, Caroline May, St. Paul
 —Eaton, Jessie Gale, Minneapolis
 —Evans, Mary Sophronia, Minneapolis
 —Evans, Tamazine McKee, Minneapolis

- Findley, Mary Claire, Minneapolis
- Fish, Elizabeth Mabel, Minneapolis
- Fletcher, Nelle Camp, Minneapolis
- Frankel, Louis Rudolph, St. Paul
- Garfield, Wm. Henry, Glendive, Mont.
- Gould, Gertrude Helen, Minneapolis
- Haslehurst, Grace, Minneapolis
- Hawley, Anna McDonald, Minneapolis
- Head, Fred Samuel, Minneapolis
- Herschleb, Asa Edmund, Grand Rapids, Wis.
- Hill, Lincoln, Creston, Ill.
- Holmes, James Elliott, Moorehead
- Hooker, Mary Loomis, Minneapolis
- Kennedy, Katherine, Minneapolis
- Knoblauch, Henry, Minneapolis
- Long, Jessie Gale, Minneapolis
- Longfield, Frank Bertrand, St. Paul
- Luers, Herbert Field, Owatonna
- McClure, Charles, St. Paul
- McCormick, Ina Daisie, Minneapolis
- McDonald, Harriet, Minneapolis
- McGregor, Lulie, Minneapolis
- Mann, William Seward, Minneapolis
- Merrill, Harriet Anna, St. Paul
- Mills, Ernest B., Minneapolis
- Newgord, Thomas George, Minneapolis
- Otis, Willis Clarke, Janesville, Wis.
- Parry, Joseph Elwin, Minneapolis
- Plummer, Henry S., Minneapolis
- Poehler, William Adam, Henderson
- Potter, Marion, Minneapolis
- Powell, Florence Caroline, Minneapolis
- Quinby, Julia R., Anoka
- Roche, Elias, Granite Falls
- Redfield, Mary J., Minneapolis
- Rogers, Martha, Minneapolis
- Sawyer, Mabel Moore, Minneapolis
- Shafer, Laura Elizabeth, Minneapolis
- Sikes, Laura May, Minneapolis
- Snell, Agnes Frances, Minneapolis
- Sonsen, Stephen Herbert, Minneapolis
- Thompson, Adelaide M., Hastings
- Thompson, Bessie, St. Paul
- Upton, Thomas Park, Minneapolis
- Van Boyer, Henry, Minneapolis
- Weber, Amy Nellie, Ellington
- Weil, Jonas, Minneapolis
- Yancy, Ellen May, Minneapolis

TEACHERS' SECTION—19.

- Blom, Anna Josephine, St. Paul
- Bortnem, Andrew N., Brookings, S. D.
- Bowen, Bertha C., Minneapolis
- Bruce, Carrie, Minneapolis
- Buehler, Hettie Gertrude, Minneapolis
- Case, Lucy Roberts, Aberdeen, S. D.
- Clarke, Mary Elizabeth, Rich Valley
- Freeman, Blanche Frances, Minneapolis
- Hickson, Grace Gay, Gainesville, Texas
- Jenness, Frances, Minneapolis
- McCauley, Nellie, St. Paul
- Monson, Anna Gordon, Minneapolis
- Nabersberg, Rose Wilemina, St. Paul
- Officer, Alice Consett, St. Paul
- Söderberg, Izida Godomilla, Farsund, Norway.
- Stacy, Mamie Estes, Minneapolis
- Tibbetts, Gertrude Ermina, West Concord
- Tobin, Frances Marion, Minneapolis
- Woods, Elizabeth Hall, Wasioja

SPECIAL STUDENTS—168.

- Allee, Annie May, Minneapolis
- Bailey, Jennie Ellen, Minneapolis
- Bancroft, Ella Maxwell, Minneapolis
- Barnard, Mrs. M. M., Minneapolis
- Baxter, Susan Theresa, Minneapolis
- Bennett, Ellura, Minneapolis
- Best, Laura Bird, Minneapolis
- Blackmer, Rae, Albert Lea
- Blair, Mellie, Minneapolis
- Bosworth, Inez, Minneapolis
- Bowen, Florence N., Minneapolis
- Brackett, Chapin Russell, Minneapolis
- Brand, Archie Mack, Faribault
- Brooks, George Washington, Minneapolis
- Brennan, Laura E., Minneapolis
- Buck, Minnie Elizabeth, Minneapolis
- Burch, Frank E., Menomonee, Wis.
- Butler, Eloise, Minneapolis
- Caplin, Jessie Florence, Minneapolis
- Carlson, Henry, Albert Lea
- Casey, John Marius, Minneapolis
- Chamberlain, Mary Phebe, Minneapolis
- Chapin, Virginia Cole, Minneapolis
- Charnley, Ida F., Minneapolis
- Christian, Kate Lydia, Minneapolis
- Clark, Genevieve, Minneapolis
- Clark, Hattie Benton, Minneapolis
- Clark, Nina, Minneapolis
- Cochrane, Margaret M., Minneapolis
- Cahoon, Charlotte Deming, Newburyport, Mass.
- Comstock, Ada Louise, Moorhead
- Cox, Harriet Maria, Minneapolis
- Crandall, Georgia Carolina, Owatonna
- Darrow, Bertha Eliza, Moorhead
- Davidson, Helen, Minneapolis

- Sprague, Sarah Elmina, Fullerville, N. Y.
 Squires, Roy W., Minneapolis
 —Stahl, May Reese, Minneapolis
 —Stone, Angenette Ethelinda, Minneapolis
 —Strobeek, Alice James, Litchfield
 Teall, Gardner Callahan, Eau Claire, Wis.
 —Thompson, Nellie Viola, Minneapolis
 Thuirer, Clarence, Spencer, Iowa
 —Trumbull, Mary Emma, Minneapolis
 Van Cleve, Carl E., Minneapolis
 —Vander Bie, Hiltja, Minneapolis
 —Wales, M. Virginia, Minneapolis
 Walker, Fletcher Loren, Minneapolis
 Walker, Willis Jay, Minneapolis
 —Warden, May, St. Charles
 —Warrington, Mrs. Alice Christie, Minneapolis
 —Wentworth, Margery, Minneapolis
 —Whiteley, Florence Martha, Minneapolis
 —Whitney, Nellie Ardell, Minneapolis
 Williams, William, Badger, Iowa
 —Winslow, Clara Edna, Minneapolis
 —Wright, Anna Wilhelmine, Rushford
 —Young, Alice, Duluth

COLLEGE OF ENGINEERING, METALLURGY AND THE
 MECHANIC ARTS.

SENIOR CLASS—IO.

CIVIL ENGINEERING SECTION.

- Cunningham, Andrew Oswald, Walhalla, N.D.
 Gilman, James B., Minneapolis
 Johnson, Noah, Litchfield
 Weeks, William Charles, Minneapolis
 Wentworth, Romeyn Wallace, Minneapolis

MECHANICAL ENGINEERING SECTION:

Bray, George Eben, Excelsior

ELECTRICAL ENGINEERING SECTION.

Chalmers, Charles Henry, Lake City
 Pratt, Edward Electus, Minneapolis

MINING ENGINEERING SECTION.

Christianson, Peter, Bath
 Cutler, Henry Cleveland, Red Wing

JUNIOR CLASS—I8.

CIVIL ENGINEERING SECTION.

Atty, Norman Belmont, Minneapolis
 Bohland, John Adam, St. Paul
 Casseday, George Albertus, Rochester
 Chapman, Leslie Howard, Litchfield

MECHANICAL ENGINEERING SECTION.

Hastings, Benjamin, Willoughby, Ohio
 Lang, James S.
 Shepherd, Burchard Post, St. Charles
 Tilderquist, William Magnus, Vasa

ELECTRICAL ENGINEERING SECTION.

Adams, George Francis, Owatonna
 Bishman, Adam Edgar, Otisco
 Ford, Robert Edgar, Minneapolis
 Phelps, Clyde Samuel, Litchfield
 Rounds, Fred May, Minneapolis
 Schlegell, Frederick von, Minneapolis
 Tanner, Harry Louis, Minneapolis
 Weaver, Albert Clarence, Minneapolis

MINING ENGINEERING SECTION.

Hughes, Thomas Moffatt, Hudson, Wis.
 Wilkinson, Charles Dean, Minneapolis

SOPHOMORE CLASS—38.

CIVIL ENGINEERING SECTION.

Beyer, Adam C., St. Paul
 Bryan, Albert Reuben, Minneapolis
 Burch, Albert Morgan, Anamosa, Iowa
 Byorum, Henry Engvall, Minneapolis
 Cooley, Horace Greely, Minneapolis
 Ellis, Sydney Allen, Austin
 Evans, James Hare, Minneapolis
 Jones, Cloyd Paul, Sabin
 Long, Fred Winston, St. Paul
 Neil, Victor Adolph, Vasa
 Yale, Washington, Jr., Minneapolis

ELECTRICAL ENGINEERING SECTION.

Abbott, Arthur Laurie, Albert Lea	Hibbard, Truman, Minneapolis
Bestor, Frank C., Minneapolis	Holt, Pliny Eastman, Minneapolis
Blake, Robert Pennell.	Joslin, Max Atherton, Minneapolis
Burgner, Linneus Peter, Oberlin, Ohio	Savage, Edward Snoad, St. Paul
Chesnut, George L., Minneapolis	Stewart, Newton Prescott, Spokane, Wash.
Coleman, Lee Mason, Minneapolis	Walker, Frank B., Minneapolis
Dustin, Fred Garrish, Minneapolis	Wheeler, Herbert Merrill, Marshfield, Wis.
Erikson, Henry Anton, Fertile	Zimmermann, Frank, Rochester
Garland, Albert Eugene, Minneapolis	Zintheo, Clarence Janne, Minneapolis

MECHANICAL ENGINEERING SECTION.

Andrews, Woodbury Fisk, Minneapolis	Hilferty, Charles Dutton, Hastings
Cross, Charles H., Norman, Iowa	Iverson Lewis, West Lake
Hastings, Clive, Bermuda Islands	

MINING ENGINEERING SECTION.

Sterling, Thayer Dawson, Minneapolis	Tanner, Wallace North, Minneapolis
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FRESHMAN CLASS—50.

CIVIL ENGINEERING SECTION.

Barr, Harry Newell, Minneapolis	Pfau, James, Mankato
Chapin, Lewis Paul, Leominster, Mass.	Rhame, George Arthur, Minneapolis
Hewett, Frank, Minneapolis	Smith, Harry Benjamin, Dubuque, Iowa
Lee, Egbert A., Grand Meadow	Swen, Daniel Roy, St. Paul
McKinstry, William Richard, Red Wing	Wood, Dan Beedy, Minneapolis
Miller, William Lot, Winona	Wood, Frank D., Douglas Station
Nye, Carl Merryman, Moline, Ill.	Woodman, Howard Howe, St. Paul

MECHANICAL ENGINEERING SECTION.

Parry, James Jesse, Richfield	Silliman, Henry Dickinson, Hudson, Wis.
Joy, Samuel Joseph, St. Paul	Wales, Rowland Thompson, Minneapolis
Powell, Arthur Edward, Brooklyn Centre	

ELECTRICAL ENGINEERING SECTION.

Bell, Frank A., Jr., Duluth	McNamara, John Ambrose, St. Paul
Buck, Daniel, Eau Claire, Wis.	Markhus, Olaf Gottlieb, Willmar
Carswell, Robert Edward, Minneapolis	Maughan, Herbert Charles, Brainerd
Childs, Hubert Guy, Mapleton	Murray, James, Glencoe
Donaldson, Ezra Slack, Minneapolis	Myers, Mortimer A., Minneapolis
Hamilton, Herbert Clinton, Sandy Lake, Pa.	O'Leary, Arthur Frank, St. Paul
Hannay, John Robert, Fort Snelling	Olson, Jacob Severn, Grove
Hoffman, William Levi, Chippewa Falls, Wis.	Simmons, Harry Frank, Minneapolis
Kinyon, Fayette Cary, Owatonna	Snoad, Geo, Russell, Chicago
Lincoln, Robert Ernest, Fergus Falls	Towne, Burton Augustus, Minneapolis
Lonie, James Henry, Fremont	Wing, George Fox, Macon, Ga.

MINING ENGINEERING SECTION.

Becker, George, Minneapolis	Mooney, Francis Xavier, Minneapolis
Brackenbury, Cyril, London, Eng.	Smith, Erastus, Minneapolis
McIntosh, Joseph Bailey, Frederick, N. B.	Swenson, David Ferdinand, Minneapolis
Mills, Eugene Clarence, Chowen P. O.	Webber, Frank Walter, St. Paul

METALLURGICAL SECTION.

Rucker, William Colby, Chicago, Ill.

SPECIALS—31.

Adams, Alfred Ashby, Spencer, Iowa	Michelet, Ove, Minneapolis
Dakin Willard Wesley, Royalton	Myrdal, John, Minneapolis
Hjardemaal, Edward, Minneapolis	Porter, Edward Augustus, Minneapolis
Hugo, Victor, Duluth	Roti, Knut Mathew, Sioux Falls, S. D.
Jurgensen, Delbert Frederick	Salmonson, Ferdinand Edward, Minneapolis
Kjerland, Thorsten Nelson, Minneapolis	Scofield, E. H., Zumbrota
Krog, Peter, Minneapolis	Semmen, Edward, Bruce, S. D.
Lackor, Harry Daniels, Minneapolis	Sherburne, Walter Harmon
Laidlow, Chas. P.,	Stack, William E., Harvey, N. B.
Wood Lake	Staughton, Neville Dayton, Winona
Latham, William, Waseca	Swartz, Harry Miller, Fort Snelling
Lindman, Eric Frank, Minneapolis	West, William James, Soudan
Linton, James H., Minneapolis	Wheeler, Roy McMillan.
McCrea, Almeron Wallace, St. Paul	Whittlesey, Henry N.
McHugh, John George, Minneapolis	Will, Otto, Minneapolis
Magnusson, C. Edward, Stark,	Woodford, Geo. B., Winchester, Ky.

THE SCHOOL OF DESIGN—44.

—Beebe, Lida, Minneapolis	—Mabersberg, Ella, St. Paul
—Berg, Anna N., B. S., Minneapolis	Merrill, Frank H., Minneapolis
—Brockaway, Arletta, Minneapolis	—Morgan, Mrs. George H., Minneapolis
—Brown, Edith, Minneapolis	—Newcomb, Mary, Minneapolis
—Cauvet, Viola, Minneapolis	—Norris, Kittie, Sauk Center
—Clough, O. Leila, Minneapolis	—Pabodie, Eleanor, Minneapolis
—Crane, Almada, Minneapolis	—Parker, Marion Alice, Minneapolis
—Cutts, Winnifred, Faribault	—Phelan, Margaret, St. Paul
—Darling, Emily F., Minneapolis	—Porter, Gertrude M., Minneapolis
—Davis, Jayne, Hamline	—Robinson, Jane, Minneapolis
—Dennison, Florence Mary, Minneapolis	—Schutt, Hallie Edna, Minneapolis
—Elliott, Edith Winslow, Minneapolis	—Simpson, Mary, Minneapolis
—Erickson, Yerda, Minneapolis	—Smith, Marion, Minneapolis
—Evans, Eva Myrtila, Elgin	—Sprague, Mildred, Minneapolis
—Hathorn, Mary, Minneapolis	—Stevens, Margaretta A., Minneapolis
—Kelsey, Alice, Minneapolis	—Swenson, Georgine, Minneapolis
—Knowlton, Mary Francis, Minneapolis	Tasker, James, Minneapolis
—Leonard, Gertrude J., Minneapolis	—Taylor, Florence M., Minneapolis
—Lewis, Narcissa, Minneapolis	—Trufant, Nellie Stinson, Minneapolis
—Litzenberg, S. Jennie, Minneapolis	—Turner, Josephine E., Minneapolis
—McKusick, Elva, Minneapolis	—Van Stan, Clara, Minneapolis
—McKusick, May, Minneapolis	—Wells, Hattie Eliza, Minneapolis

COLLEGE OF AGRICULTURE.

SENIORS—1.

Hoversted, T. A., Holden

JUNIORS—2.

Sandsten, Emil P., St. Anthony Park Thompson, John, Cottage Grove

SOPHOMORES—2.

Pendergast, Warren W., Hutchinson Smith, William George, New Duluth

FRESHMEN—2.

Borchert, Frank Henry, Bird Island Winkjer, Petter Joel, Garfield.

SCHOOL OF AGRICULTURE.

GRADUATE STUDENTS—5.

Glover, Arthur J., Zumbro Falls
Mackintosh, Roger S., Langdon
Major, Ernest W., St. Anthony Park

Porter, Henry H., Great Falls, Montana
Shuman, Harry, Minneapolis

"A" CLASS—19.

Graduated March 30th, 1894.

Ames, Gordon, Litchfield
Bullis, Louis I., Winnebago City
Burnley, Harold E., Hudson, Wis.
Coulahan, Frank B., Renville
Enestvedt, Ole O., Belview
Flaten, Ove, Granite Falls
Haigh, Thomas A., Mankato
Kissack, James, Wadena
McGrath, James C., Good Thunder
Middlebrook, Elmer L.,

Peterson, Jens, Freeborn
Porter, George, Red Wing
Shaw, William F., St. Anthony Park
Suter, Harry, Welcome
Walter, F. F., Bellingham
Wesenberg, Fred, Duluth
Wheeler, W. A., Winnebago Valley
Wilson, James A., Lake City
Wood, Rollin M., Arvilla, N. Dak.

"B" CLASS—31.

Aldrich, George, Freeborn
Austin, George L., Fergus Falls
Briggs, Byron, Austin
Champion, A. F., Angas
Clark, J. F., Dodge Center
Clark, R. W., Northfield
Cowell, F. J., Waterford
Crippen, George, Cottage Grove
Field, Walter, Zumbro Falls
Gresman, W. R., St. Paul
Haecker, Archie L., St. Anthony Park
Hagen, E. N., Hagen
Hopkins, M. R., Bloomington
Kerr, R. F., Rushmore
Lane, Arthur, Cando, N. Dak.
Lawrence, Louis, Springfield

Ludlow, H. M., Worthington
Meadowcroft, Ira, London
Neild, W. D., Great Falls, Montana
Nelson, Arthur, Albert Lea
O'Hara, E. W., Zumbro Falls
Olson, John, Minneapolis
Phillipps, Aleck, Lake City
Porter, Edward, Red Wing
Preston, H. E., Rochester
Rasmussen, R. F., Hutchinson
Smith, A. E., Minneapolis
Trulson, F. B., Prescott, Wis.
Washburn, R. M., Monticello
Watson, Morris, Cottage Grove
Williams, Addison, Lansing

"C" CLASS—48.

Aiton, J. W., St. Peter
Anderson, A. W., Eden Prairie
Anding, Charles, Lake City
Bailey, J. V., Newport
Barlow, Edward, Barrett
Bassett, L. B., Rushmore
Becksted, J. C., Northfield
Brand, J. S., Faribault
Burghardt, Arthur, St. Anthony Park
Christenson, August, Milan
Clark, R. R., Janesville, Iowa
Craig, George, Brandon, Manitoba
Crippen, Frank, Cottage Grove
Cross, A. D., Childs
Currie, W. C., Euclid
Deebach, Elmer, St. Paul
Ferris, R. R., Hampton
Fink, Manvel, St. Anthony Park
Hageman, J. W., Cottage Grove

Halvorson, Oliver, Norway Lake
Hause, Charles, Mendota
Holmquist, D. M., Renville
Hoyt, B. F., St. Paul
Kato, Yashuharu, Minneapolis
Kohlmeier, H. F., Portland
Kohlmeier, J. H., Portland
Lamb, Walter, Alma City
Leitner, Louis, St. Anthony Park
Lindig, F. H., St. Paul
Link, Charles, Lake City
Lunn, Oscar, St. Paul
McNally, J. H., Portland
Morris, Edwin, Lake City
Muldrew, William, Brandon, Manitoba
Myaer, O. L., Star Prairie, Wis.
Nelson, Charles, Rosendale
Nygren, C. S., Lake City
Ormond, F. C., Rochester

Per Lee, Harry, Stillwater
Prendergast, R. A., St. Paul
Riley, E. H., Hammond
Seaman, M. F., Alma City
Stein, Harry, Stillwater

Strunk, L. R., Faribault
Walters, Thomas, Lake City
Walsh, Michall, Minneapolis
White, William, Twin Lakes
Wolner, Oscar, St. Anthony Park

PREPARATORY CLASS—26.

Agre, Hans, Sacred Heart
Agre, John, Sacred Heart
Alexander, A. E., Stanton
Anderson, Lewis, London
Borth, Frank L., Cottage Grove
Brand, Frank, Faribault
Conway, F. M., White Bear
Eliason, O. H., Sacred Heart
Hangen, I. A., Kenyon
Hellie, Edward F., Albert Lea
Johnson, C. J., Winnebago Valley
Knutson, Elmer, St. Anthony Park
Makee, Lendal, Portal, N. D.

Monson, Joseph, Ashby
Montfort, Archie, Litchfield
Nelson, Henry, Litchfield
Nelson, Theodore, Norseland
Neseth, B. B., Goodhue
Nygaard, Julius, Atwater
Oppegard, E. O., Sacred Heart
Osmundson, Albert, Mallory
Quam, Andrew, Holden
Snoeder, William, St. Paul
Skogberg, Herman, Sacred Heart
Sorkness, Carl, Colfax, Wis.
Thom, H. J., Rushmore

SPECIALS—15.

Belsheim, Martin, Sacred Heart
Bergan, C. K., Sacred Heart
Herrick, R. W., Minneapolis
Holt, Adolph, Minneapolis
Hulberg, M. O., New Market
Jenson, J. J., Zumbrota
Jergens, W. E., Biscay
Moy, W. B., Niverville, Manitoba

Negaard, Martin, Kerkhoven
Olstad, Carl, Hanska
Pfaff, W. A. E., St. Paul
Peterson, N. P., Olivia
Rothi, R. C., Minneapolis
Sunde, H. M., Minneapolis
Williamson, R. L., Sumter

DAIRY STUDENTS—59.

Bakke, R. E., Willmar
Carter, J. V., Twin Lakes
Cline, A. L., Caledonia
Comstock, A. E., Alma City
Dunham, Jesse, Oak Center
Ellerman, C., Owatonna
Fox, F. M., St. Paul
Fulton, N. H., Hawley
Gaasedelen, Peter, Holden
Gulman, George, River Falls, Wis.
Hanson, H. C., Evan
Hansen, H. C., Hartland
Hemenway, William, Zumbrota
Higbe, J. C., Concord
Hummel, August, New Ulm
Hunt, J. F., New Richland
James, G. J., Moscow
Johnson, O. C., Otisco
Jones, E. R., Cedarville
Juleen, J., St. Paul
Kaufman, E. E., Fargo, N. Dak.
Kittleson, William, Lansing
Klukow, H. C., Albert Lea
Lembke, F. T., Mansfield
Leslie, M. P., Waseca

Lund, Christ, Waseca
McIntosh, P., Woodlawn, Wash.
McWaide, F. J., Waseca
Malette, C. D., Garden Grove, Iowa
Miller, G. A., Dundas
Nelson, A. W., Elbow Lake
Norman, A. I., Dalton
Oversea, S. H., Dalton
Pattison, W. R., Vernon Center
Paulson, E. L., Lake Elizabeth
Peterson, Hans, Owatonna
Peterson, P. A., Lerdal
Phillipps, E. F., Columbus, Wis.
Prestrud, K. L., Holden
Rustad, L. A., Dalton
Sanderson, Oscar, Hayward
Sundgren, Carl, Starbuck
Sheehan, William, Bath
Sieber, L. F., Barnesville
Simpson, R. W., Holloway, Ont.
Sorenson, G. W., Waupun, Wis.
Sorenson, N. P., Waupun, Wis.
Stromme, Adolph, Elbow Lake
Sullivan, John, New Richland
Tande, Olaf, Minneapolis

Thompson, Arthur, Brownsdale
Torksberg, E. N., Stillwater
Trudell, John, Minneapolis
Walters, R. E., Lake City
Weaver, John, Lowry

Whitman, Frank, Steele Center
Wyatt, S. J., Minneapolis
York, S. A., North Brookfield, N. Y.
York, Ness, Willmar

DEPARTMENT OF LAW.

GRADUATE STUDENTS—25.

Ayers, Fred, <i>LL. B.</i> , Minneapolis	Iverson, Samuel G., <i>LL. B.</i> , St. Paul
Barton, Elijah, <i>LL. B.</i> , <i>U. of Mich.</i> , Minneapolis	Lawley, Frank Davis, <i>LL. B.</i> , Minneapolis
Chute, Louis Prince, <i>A. B.</i> , <i>LL. M.</i> , Minneapolis	MacBeath, Samuel Blair, <i>LL. B.</i> , Minneapolis
Cooley, Clayton R., <i>LL. B.</i> , Minneapolis	McDermott, Thomas J., <i>LL. B.</i> , St. Paul
Danner, Harry Ross, <i>A. B.</i> , <i>LL. B.</i> , Minneapolis	McMillan, Elvero Lewis, <i>LL. B.</i> , Minneapolis
Dever, Charles S., <i>LL. B.</i> , Minneapolis	Mayland, Andrew Unius, <i>LL. B.</i>
Dullam, George Francis, <i>LL. B.</i> , Minneapolis	Megaarden, Phillip Tollef, <i>LL. B.</i> , Minneapolis
Fowler, Charles H., <i>LL. B.</i> , Minneapolis	—Morton, Nora L., <i>LL. B.</i> , Minneapolis
Geddes, Charlie Daniel, <i>LL. B.</i> , <i>Columbia</i> , Minneapolis	Neff, Porter Joseph, <i>LL. B.</i> , Minneapolis
Gruenberg, John, <i>LL. B.</i> , Minneapolis	Peterson, Carl Fred Ernest, <i>LL. B.</i> , Minneapolis
Hermann, Arthur Ludwig, <i>LL. B.</i> , Minneapolis	Tyler, Albert De Forrest, <i>LL. B.</i> , St. Paul
Hutson, Frank Alfred, <i>LL. B.</i> , Minneapolis	Webb, Robert W., <i>LL. B.</i> , St. Paul
	Webber, Clarence Albert, <i>LL. B.</i> , Minneapolis

SENIOR (NIGHT) CLASS—20.

Albert, Charles S., <i>BB. L.</i> , <i>LL. M.</i> , <i>Columbia</i> , Minneapolis	Dresen, John G., St. Paul
Anderson, William Martin, Minneapolis	Gemmell, William H., St. Paul
Beeman, Edward Ruthven, Jr., St. Paul	Hertig, Wendell, Minneapolis
Burns, Fitzhugh, St. Paul	Higgins, W. M.
Clark, Homer Pierce, St. Paul	Hvoslef, John George, Minneapolis
Cleveland, Frank Hannay, St. Paul	Johnson, Frank A., St. Paul
Conroy, Thomas T., St. Paul	Kellogg, Frederick Lorenzo, St. Paul
Davis, Alfred Bernal, St. Paul	Lyon, Frederick Saxton, Minneapolis
Dickerson, William Lucas, St. Paul	Smith, John Alfred, Minneapolis
Dickinson, William F., St. Paul	Weeks, Charles Louis, Minneapolis

MIDDLE (NIGHT) CLASS—26.

Alair, Walter Ellsworth, St. Paul	Lee, Robert, Minneapolis
Alderson, Charles Francis, Minneapolis	Loughran, Henry Arthur, St. Paul
Appleton, George Holmes, Minneapolis	Maguire, Philip Josephus, <i>M. A. Bayles</i> , St. Paul
Brewster, William Bailey, St. Paul	MacDonald, William E., Minneapolis
Carroll, Walter N., Minneapolis	Prendergast, Louis W., St. Paul
Dickey, Charles E., Minneapolis	Richardson, Norman C., Minneapolis
Dickey, Joel M., Minneapolis	Sanders, M. T., St. Paul
Encell, Frank Elmer, St. Paul	Siemens, Julius Andrew, Minneapolis
Gardner, William H., St. Paul	Tappan, John Elliott, Minneapolis
Glover, Newton Lemuel, Farmington, Ia.	Tufts, Ben, Minneapolis
Hayes, Clarence Davis, St. Paul	Tuper, Arthur W., St. Paul
Hayes, Richard Murray, Minneapolis	Wilson, Mark Ernest, Minneapolis
Knight, William Kirk, St. Paul	
Lazarus, Jacob, St. Paul	

JUNIOR (NIGHT) CLASS—55.

Appleby, Stephen Cecil Montague, St. Paul
 Ahlborn, Louis C., Minneapolis
 Aiton, John, Minneapolis
 Belden, George Kimball, *B. S.*, Minneapolis
 Burness, Bernhard, Minneapolis
 Charleston, Charles John, Elsworth, Ia.
 Chamberlin, Sherman R., St. Paul
 Chinnock, Renville Austin, St. Paul
 Christello, Albert, Minneapolis
 Church, Arthur Bliss, Minneapolis
 Dennison, Charles M., Minneapolis
 Dolenty, Joseph Henry, St. Paul
 Dornberg, R. J., Minneapolis
 Drake, Frank, Minneapolis
 Dysinger, M. D., *D. D. S.*, *Minn. College Hospital*, Minneapolis
 Elliott, Joseph R., Minneapolis
 Emery, George Hyde, Minneapolis
 Ehrlichmann, Walter, Minneapolis
 Farnham, Frank Howard, Calumet, Mich.
 Forsell, Claus F., St. Paul
 Gahre, Frank H., Minneapolis
 Gartenlaub, Isidor, Minneapolis
 Gartenlaub, Max, Minneapolis
 Godfrey, Alvin K., Minneapolis
 Goldblum, Hal Sol, Minneapolis
 Gordon, George Francis, Minneapolis
 Haggerty, Francis J., St. Paul
 Hallinberger, M., Minneapolis
 Hoffert, Henry John, Jordan
 Jewett, William Parker, St. Paul
 Kane, Anthony A., Minneapolis
 Keefe, Daniel J., St. Paul
 Llewellyn, Frederick Thomas, *1st B. A. London*, Minneapolis
 Loy, William Gephard, Minneapolis
 Mackay, Douglas, Minneapolis
 Maul, Herman Daniel, Minneapolis
 Maul, Walter Henry, Minneapolis
 McMillan, Wm. Duncan, Minneapolis
 Meade, James Augustine, St. Paul
 Monsch, Henry, Minneapolis
 Pratt, Alber Fuller, *B. A.*, Anoka
 Revenes, James, St. Paul
 Shaw, George K.
 Shepherd, William Lyon, Ogdensburg, N. Y.
 Simons, Luman C.
 Smith, Rea H., Minneapolis
 Somerby, Charles Wood, Minneapolis
 Stalder, Robert Butschli, Minneapolis
 Steenson, Thomas C., Minneapolis
 Swan, Charles Edington, St. Paul
 Sylvester, Charles H., Madelia
 Thomas, DeAlton Stephen, St. Paul
 Wheeler, Howard, St. Paul
 Whitten, John Alexander, Portland, Me.
 White, Roby Carl, St. Paul

SENIOR (DAY) CLASS—94.

Adams, Arthur T., Elysian
 Avery, Edward Strong, Minneapolis
 Beek, Joseph H., St. Paul
 Berseth, Andrew M., *B. S.*, Colfax, N. D.
 Bradford, James Everett, *B. A.*, Minneapolis
 Brown, William Jasper, Rochester
 Burke, Edmund, *A. B. Carnesius*, St. Paul
 Burke, Walter James, Cavalier, N. D.
 Carley, James Allen, Plainview
 Carens, Robert Kenneth, St. Paul
 Clark, Briscoe Baldwin, *C. E.*, *U. of Va.*, Winchester, Va.
 Combs, Lee Augustus, Chester, Ia.
 —Conant, Edith Martha, Minneapolis
 Connor, Edward Michael, Minneapolis
 Cormany, Montgomery L., Minneapolis
 Covell, Louis Exley, Rochester
 Crossett, Herbert Horatio, St. Paul
 Cudhie, George, Willow City, N. D.
 Dahle, Olaus K., Wilmington
 Deutsch, Henry, Minneapolis
 Dittenhoeffer, Frank Herman, *B. A.*, Minneapolis
 Dolenty, Francis Xavier, St. Paul
 Drew, Charles Myron, *Ph. D.*, *Weslyn*, Minneapolis
 Drew, Edwin Clarence, Portland, Me.
 Esterly, Robert Ernest, *Ph. B.*, *Cornell*, Duluth
 Fridley, Don Phelps, Becker
 Gage, George F., Fulda
 Gardner, Harris Wells, St. Paul
 Gaston, Hugh Philander, St. Paul
 Gibson, George Porter, Atwater
 Gislason, Christian M., Minneota
 Glover, Harry Erastus, Spencer, Iowa
 Goldblum, Charles Ezekial, Minneapolis
 Gottry, Edward Clinton, Taylor's Falls
 Grady, Francis Augustus, *B. S.*, Elkton, S.D.
 Green, John A., St. Paul
 Grotte, Anthony, *B. A.*, Minneapolis
 Gruenberg, George Joseph, Minneapolis
 Hammer, Otis E., Minneapolis
 Hickey, James Raymond, Graceville
 Hodgman, William Henry, Winnebago City
 Hurd, Bradford Coryelle, *B. S.*, Minneapolis
 Kepner, Thomas Ervin, Rochester
 Kirwin, Peter Joseph, Greenleafton

- Kyle, John Patrick, St. Paul
 —Lane, Frankie, Oakland, Cal.
 Larson, Constant, *A. B.*, Alexandria
 Leach, Harlan Edward, *A. B.*, Spring Valley
 Leary, William Connor, *A. B.*, Minneapolis
 Loughran, Thomas Francis, St. Paul
 Ludeman, William Frederick, Ludemann
 Mackel, Alexander, Ada
 Madigan, James Edward, *B. S.*, Maple Lake
 Manley, James Anthony, Rushford
 McCaffery, Edward Patrick, Amsterdam, N. Y.
 McCarthy, Cornelius Dennis, Mankato
 McCaughey, John James, Mankato
 McMillan, Albert Walter, St. Paul
 McMillan, Fred D., Owatonna
 Mercer, Hugh Victor, Minneapolis
 Michelet, Simon T., Minneapolis
 Morgan, George H., (*1st Lieutenant, U. S. A.*) Minneapolis
 Mueller, Wilhelm, G. D., Minneapolis
 Nelson, Peter S., Minneapolis
 Ney, Chris M., St. Paul
 Nimlos, Thomas, Minneapolis
 Odquist, Carl Gustave, Houston
 O'Keefe, Patrick Henry, Hastings
 Otterness, George Henry, Willmar
 Oyen, Jacob W., Minneapolis
 Pettingill, Claude K., St. Paul
 Pillsbury, Alfred Fiske, Minneapolis
 Porter, George Frederick, Minneapolis
 Rice, Frederick Durkee, St. Paul
 Richardson, Ira, Waitsfield, Vt.
 Rockne, Anton Julius, Harmony
 Salmon, Thomas Homer, Minneota
 Sands, Walter Booth, Harlem, Montana
 Selover, William Arthur, *A. B.*, Minneapolis
 Somsen, Henry Northrup, Minneapolis
 Spencer, Louis N., West Superior, Wis.
 Vaaler, Roloff, Granite Falls
 Van Campen, Charles Howard, Rochester
 Wagner, Charles William, New Richland
 Walker, Edward Davis, *A. B.*, St. Paul
 Ward, DeForrest, Fairmont
 Wheaton, J. Frank, Hagerstown, Md.
 White, Frank T., Clear Lake
 Williamson, Alonzo Potter, *A. M.*, *Hamilton, M. D.*, *Hahnemann*, Minneapolis
 Wingate, William Snell, Minneapolis
 Yetter, Clarence Archie, Rochester
 Young, George Morley, Minneapolis
 Zuckerman, Samuel, Jr., Minneapolis
 Zuger, Alfred, Moorhead

JUNIOR (DAY) CLASS—90.

- Allbright, Clifton Arthur, Brainerd
 Andrews, Horace Sherman, Minneapolis
 —Austin, Ida Anna, Cottage-Grove
 —Baker, Lucy Lloyd, *B. L.*, Minneapolis
 Bartholomew, Lee Bradley, Chariton, Ia.
 Benson, Henry Nathaniel, *B. A.*, *Adolphus College*, St. Peter
 Bjornstad, Alfred William, St. Paul
 Brand, Archie Mack, Faribault
 Brand, Norton Franklin, Faribault
 Carr, Clarence G., *B. S.*, *U. of Rochester*, Minneapolis
 Cates, Alton Morrill, Los Angeles, Cal.
 Chute, Frederick Butterfield, *B. L.*, *Notre Dame, Ind.*, Minneapolis
 Cohen, Joseph W., Minneapolis
 Cooley, Fred Orlando, Duluth
 Cravens, John Edward, Middle Creek, Ills.
 Crozier, Robert Hepburn, Minneapolis
 Deilman, Charles, Wentworth, S. D.
 Dixon, James Kennedy, St. Paul
 Dolliff, Alfred Cookman, Wood Lake
 Dowling, Homer, *Ph. B.*, *Bucknell*, Mpls.
 Dunn, Charles Edward, Janesville, Wis.
 Fanning, Wm. David, Madelia
 Farr, Richard, St. Paul
 Felt, Oscar Alexander, Norseland.
 Foot, Fred Warner, Red Wing
 Fosseen, Manley Lewis, Minneapolis
 Gaiffus, Cortland Reuben, Rolla, N. D.
 Galbraith, John Alexander, *B. L.*, *St. Paul's Coll.*, St. Paul Park
 Griggs, Frank Hammond, *B. A.*, *Williams*, St. Paul
 Hammer, Henry M., Spring Valley
 Hartley, Heber Lindon, *B. A.*, Minneapolis
 Hazlett, Kirk, Sioux Falls, S. D.
 Heapes, William James, *M. A.*, *Allegany Coll.*, Baltimore, Md.
 Holman, William Jennings, Jr., Minneapolis
 Hultquist, Charles Constantine, Shafer
 Huntington, George Lincoln, Luverne
 Johnson, Victor Ludwig, Lindstrom
 Keefer, George Lenfesty, *B. A.*, St. Paul
 King, Cyrus Murdock, Fair Haven
 King, John Cochran, Howard Lake
 Kirwin, William Thomas, Spring Valley
 Kranz, John Valentine, Minneapolis
 McGregor, Benjamin F., Mapleton
 Mason, Alfred Findlay, St. Paul
 McNamara, J. A., St. Paul
 Merrill, George Coston, Minneapolis
 Mesick, Oliver Elton, Gettysburg, S. Dak.
 Morgan, Guy, Moorhead
 Morrison, Frank, Minneapolis
 Muir, William C., Hunter, N. D.

- Munson, Ida Joyce, Poume de Terre
 Murray, Frank H., St. Paul
 Niles, Edmund Merton, Diamond Bluff, Wis.
 O'Brien, James Edward, *B. A.*, Lake City
 Olsen, Samuel, Willmar
 Osborne, George Marshall, Minneapolis
 Pattee, Richard, Minneapolis
 Pattridge, Samuel Carr, Pleasant Grove
 Pettibone, Orrin H., Minneapolis
 Phillip, William Arthur, Hamilton, Ont., Can.
 Prescott, Robert John, Ashland, Wis.
 Privet, Walter Nichols, Caledonia
 Quevli, Nels, Windom
 Reinoehl, Walter Allen, *B. A.*, *Franklin and Marshall*, Lancaster, Pa.
 Roberts, Edwards Ambrose, Bangor, Me.
 Roise, Alexander, Willmar
 Rossman, Grant Bebee, Warren
 Shaughnessy, Michael Patrick, Henderson
 Smith, Emerson H., Fargo, N. D.
 Smith, John Gilmore, *B. D.*, *Auburn. N. Y.*, Appleton
 Smith, Wayland Henry, Lime Springs, Ia.
 Smith, John H., Minneapolis
 Sorenson, Luther Hersher, Minneapolis
 Southerland, A. Hans, St. Cloud
 Southworth, Walter Newton, Shakopee
 Spicer, Mason Willmar, Willmar
 Taylor, Benjamin Chandler, *B. S.*, Minneapolis
 Tennyson, Bert Gilbert, Tacoma, Wash.
 Thorpe, George Cyrus, Morris
 *Turner, William, St. Paul
 VanValkenberg, Jesse, Canby
 Wallace, Thomas Freeman, *B. A.*, Minneapolis
 Webb, Arthur M., Minneapolis
 Weiss, Harry, St. Paul
 Westphall, Gustave Adolph, Graceville
 Wells, Charles Henry, Minneapolis
 Williamson, William, Minneapolis
 Williams, Henry White, Minneapolis
 Williamson, Fred, Minneapolis
 Young, Albert Sims, Gotha

DEPARTMENT OF MEDICINE.

COLLEGE OF MEDICINE AND SURGERY—199.

SENIORS—39.

- Apleby, Thomas Ernest Walter Villiers, St. Paul
 Arslanides, Michael Theologos, *B. A. Anaxiologia College*, Caesarea, Asia Minor
 Bacon, Knox, St. Paul
 Bailey, John William, Northfield
 Ball, Charles Riggs, *B. A. Ohio Wesleyan*, St. Paul
 Beek, Richard Hudson, Larimore, N. D.
 Bolckom, George Washington, Honsdale, Pa.
 Boleyn, Emil Sydney, Bengal, India
 Bradford, Bernard Ira, River Falls, Wis.
 Butler, David R., Minneapolis
 Cotton, Henry, Prescott, Wis.
 Dodge, Albert Arthur, *B. S.*, Farmington
 French, Leigh Hill, Minneapolis
 Haas, Charles Andrew Lambertson, St. Paul
 Hanson, Marius, St. Paul
 Hartzell, Thomas Bradford, Beloit, O.
 Heath, Albert Cheney, *B. A. Dartmouth*, St. Paul
 Hesselgrave, Sherman Sedgwick, St. Paul
 Higgins, John Turner, *B. C. E.*, Hutchinson
 Holmes, Walter Benjamin, *B. S.*, Faribault
 Ilstrup, Francis, Minneapolis
 Jennison, John Egbert, Brighton
 Landeen, Frank Godfrey, Brandon
 Law, Arthur Ayer, Minneapolis
 Leavitt, Frederick, St. Paul
 Lee, William Philander, Sleepy Eye
 Muir, Edwin Stanton, Hunter, N. D.
 Oppliger, Gottlieb, Minneapolis
 —Pettit, Loretta Jane, Minneapolis
 Phillips, William Henry, Minneapolis
 Powell, Charles Bertram, Appleton
 Sherwood, George Edward, St. Paul
 Stebbins, Albert Madison, Glenwood
 Thrane, Marcus, Eau Claire, Wis.
 Turner, Arthur Lorenzo, Faribault
 Vigen, Jorgen Gunderson, Helle
 Wright, Arthur Brownell, St. Paul
 Wright, Franklin Randolph, Hutchinson
 Yoseph, Yoseph David, Oroomiah, Persia

JUNIORS—50.

- Ames, Samuel Patten, Minneapolis
 Angell, William Arthur, Minneapolis
 Arzt, Carl Philipp, St. Paul
 Barre, William de la, Minneapolis
 —Bassett, Mary Elizabeth, Hastings
 Beaudoux, Henry Alexander, St. Peter
 Benham, Edward Weston, Brownton
 Bennett, Charles Edward, Minneapolis
 Bray, Charles William, *B. A.*, Excelsior
 Campbell, George Elmore, Rochester
 Clayton, Leonard Easton, Perham
 Danner, Edgar William, *M. A. Yale*, Stillwater
 Darling, Walter Henry, Mankato
 Dohm, Charles Lawrence, St. Paul
 Farmer, John Coy, Spring Valley
 Gallup, Edwin Dorvin, Cheney
 Gates, Joseph A., Rochester
 Germs, Charles, Medo
 Goodrich, Judd, Minneapolis
 Harrington, Charles Daniel, Rich Valley
 Hart, Milan John, Dover
 Head, George Douglas, *B. S.*, Prospect Park
 Holst, John Burton, Clay Bank
 Hyslop, Fred R., Chester
 Koivupalo, Edward Henry, Calumet
 Knauff, Muhlenberg Keller, St. Paul
 Krch, George, St. Paul
 Liland, Ragnvald, Norway
 Lommen, Andreas Pederson, Spring Grove
 Meckstroth, Charles William, Le Sueur
 Millet, Melvin Calvin, Rochester
 Newman, Gustave Adolphus, Goodhue
 —Nuzum, Mrs. Helen Brown, Wheeling, W. Va.
 Platt, John Jay, St. Paul
 —Pretlow, Clotilde Ladd, Minneapolis
 Ranson, George, Dodge Center
 Reimstad, Swen Swenson, Minneapolis
 Ringnell, Frank Oscar, Sweden
 —Ryley, Marie Jean, Minneapolis
 Sawyer, Herbert Philander, Berlin
 Sewall, Ralph J., Minneapolis
 Sheppard, Fred, Lakeside
 Slipperrn, Halfden, Tacoma, Wash.
 Sorg, John Andrew, Hastings
 Sorkness, Paul, *B. S. University of Galesville*, Lake Park
 Steele, Charles Terrell, St. Paul
 Stephenson, John Linnæus, Monango, N. D.
 Tenney, Jacob S., Wabasha
 Walters, Eugene, London, Eng.
 Watson, Thomas, Ronaldson, Scotland

FRESHMEN—50.

- Baker, Ray Alonzo, Fergus Falls
 Beebe, Dan Goodwin, Minneapolis
 Birdsall, Albert Thornton, *B. L.*, New York City
 Bjelland, Adolph Odin, Albert Lea
 Brown, Harry, Belfast, Ireland
 Brown, Pearl Hubert, Minneapolis
 Burns, Frank Waller, Rochester
 Burns, Michael Alpheus, St. Paul
 Caine, Charles Edwin, Spencer Brook
 Campbell, Robert Allen, Alexandria
 Carlin, John Sigfried, Minneapolis
 Christenson, Charles Rasmi, Owatonna
 Cochrane, Thomas Percy, Eau Claire, Wis.
 Corbett, J. Frank, Minneapolis
 Crewe, John Edinton, Devil's Lake, N. D.
 Croumett, Herbert Benton, Star Prairie, Wis.
 Dennis, Warren Arthur, Sharon, Wis.
 Dinahan, Richard McPherson, New Haven, Conn.
 Drake, Fred Arthur, Rushford
 Earl, Robert Oscar, Minneapolis
 Edgerton, William Marshall, Sioux Falls, S. D.
 Fanset, John Jay, Milbank, S. D.
 Fischer, Gustav, New Ulm
 Fischer, Otto Ferdinand, Northfield
 Forsberg, George Edward, St. Paul
 Geiger, John, Osceola Mills
 Gerrish, William Albert, Minneapolis
 Gibbon, Luther Lewellin, Minneapolis
 Grant, Hedley Holmes, St. Paul
 Greeley, Liston Quincy, Waterman, Ill.
 Grivelley, Charles Theodore, Young America
 Halgren, Harry Alfred, Watertown
 Hamilton, Augustus, Eau Claire, Wis.
 Heinze, Charles Frederick, St. Paul
 Hill, Arthur Lyman, Fairmont
 Holbrook, John Snell, Northfield
 Houck, Oscar, La Crosse, Wis.
 Howes, Harold Clifford, Ashfield, Mass.
 Hunter, George Burdette, Minneapolis
 Jackson, Carrie Eugenia, Minneapolis
 Jewell, Thomas Percy, Star Prairie, Wis.
 Johnson, Asa Miller, Northfield
 Jones, Carlos Selly, Duluth
 Kenyon, Paul Emerson, *B. S.*, Minneapolis
 Krueger, Louis William, Mankato
 Lane, Robert, Minneapolis
 McLaughlin, William Ernest, Willmar
 Martinson, Martin Harry, Lake Park
 Mathisen, George, Evansville

Mayland, Lewis L., Aspelund
 Meighen, Jacob Wells, Mankato.
 Melcher, Adolph Edward, Cleveland, Ohio
 Merrill, James Edward, Minneapolis
 —Merrill, Rose Marie, Masouville, Ia.
 Mesker, George Henry, New Rome
 Michelet, Wilhelm L. C., Minneapolis
 Mitchell, Joseph Robert, Mayville
 Nelson, Louis Allen, St. Paul
 Palmer, Frank Clarence, Shell Lake, Wis.
 Palmquist, John Emil, Princeton, Ill.
 —Pendergast, Mary A., Hutchinson
 Pitblado, John David, Minneapolis
 Poehler, Franklin Theodore, Minneapolis
 Reeve, Edward Adolphus Farmer, Buxton,
 N. D. Warren, Frank Stombs, St. Paul
 Webb, William Willson, St. Paul

SPECIAL STUDENTS—8.

—Eastman, Frances A., Rose Creek
 McCaffrey, James Henry, Duluth
 McQuivey, Elmer Ellsworth, Minneapolis
 —Roberts, Mrs. Emma J., Minneapolis
 Roesel, Ernest, (M. D.), Perham
 Underhill, John Wesley, Alexandria
 —Williamson, Lutie L., Langdon, N. D.
 Wilson, Louis Blanchard, Pittsburg, Pa.

UNCLASSIFIED—22.

Biornstad, Gisle, Christiana, Norway
 —Blees, Mrs. Maria, St. Paul
 Brearley, Guy Thomas, Minneapolis
 Brown, George V. I., D. D. S., Duluth
 Daily, Milton, Le Roy
 Day, Walter Ashby, Minneapolis
 Fjelde, Hermann Olaus, Minneapolis
 Gilfillan, Robert Corse, Minneapolis
 Goodwin, Clarence Gilbert, Normal, Ill.
 Hall, Jay Mason, Austin
 —Jameson, Adeline, Neche, N. D.
 Leahy, Edward Daniel, St. Paul
 Leaycraft, Charles Allen, Minneapolis
 Lienau, Walter Reimer, Minneapolis
 McDermott, Peter Thomas, St. Paul
 Nelson, Frederick Carpenter, Minneapolis
 Nichols, A. E., Minneapolis
 Parrott, Byron Walter, Minneapolis
 Roadman, Ira, St. Paul
 Rochex, Joseph, St. Paul
 Strang, Charles Burney, Alexandria
 —True, Augusta Isabella, Cheney

COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY—17.

SENIORS—3.

—Frost, Bertha L., Hudson, Wis.
 Knapp, Miland Austin, Minneapolis
 —Gilman, Mrs. Addie Ford, Mazeppa

JUNIORS—3.

Beaty, James H., Lake City
 —Koch, Margaret, Lake City
 Kirkpatrick, William David, Minneapolis

FRESHMEN—11.

Balcom, George Goodrich, Grand Rapids,
 Mich.
 Beck, James Flourney, Minneapolis
 Bingham, Hiram Henry, Babcock, Wis.
 Hadden, John Davis, St. Paul
 Hamlin, George Baldwin, Minneapolis
 Moffatt, Albert Groves, Bathgate, N. D.
 Phelps, Alva Gilbert, St. Paul
 Reineke, George, Deerfield
 Shipman, Louis Dwight, Minneapolis
 —Terwilliger, Mrs. Inez Lucretia, Minneapo-
 lis
 Upton, Charles Burton, Wadena

COLLEGE OF DENTISTRY—43.

SENIORS—6.

Handy, John Paul, Long Prairie
 Lowe, Martin F., Fairmont
 Mero, Frank Harmon, Minneapolis
 Owre, Alfred, Minneapolis
 Walls, James Martin, St. Paul
 Whiting, Arthur Deming, Northfield

JUNIORS—12.

Babcock, Henry Crandall, Afton
 Boyesen, Aksel Trygve, Christiana, Norway
 Cobb, Frederick Emory, White Bear
 Demo, William Anthony, Hokah
 Kyle, Frank Horton, St. Paul
 Nelson, Mark Owens, St. Paul

Robinson, Frank Spaulding, Wabasha
 Sauer, Arthur J., St. Paul
 Sinclair, Edwin Lee, Byron
 Todd, George Silas, Chippewa Falls, Wis.
 Wagner, Frank Jacob, New Richland
 Watson, Nathan Levi, St. Paul

FRESHMEN—22.

Bach, Christian Albert, St. Cloud
 Beise, Henry Christian, Mapleton
 Benjamin, Winfred Garner, Hutchinson
 Birch, Frank Waverly, Faribault
 Brothers, Fletcher Marion, Osceola Mills
 Day, George Ransom, Farmington
 Eldred, Bert Henry, Rushford
 Griffin, Festus Manfred, St. Paul
 Hamilton, George William, St. Paul
 Hutchinson, Ralph Robert, Faribault
 Kelsey, Raymond Daniel, Minneapolis

Leonard, Claude Albert, Menomonee, Wis.
 —Madden, Winifred Josephine, Waseca
 Maguire, James Oscar, East Dubuque, Ill.
 Montgomery, Charles Purnell, Hamline
 Moody, Frank Emil, St. James
 Munro, Robert Annand, New Auburn
 Norris, Frank Mortimer, Tracy
 Pierce, Harry Alex, Oxford, N. H.
 Prescott, Elmer Eugene, Minneapolis
 Satory, Joseph, Wabasha
 Tiffit, Wallace L., Hutchinson

SPECIALS—3.

Davern, John, St. Paul
 Jones, George Herbert, Duluth

Sullivan, Edwin, Minneapolis

COLLEGE OF PHARMACY—25.

SENIORS—6.

Bolton, Miller Thompson, Plainview
 Hart, Alfred Benjamin, Minneapolis
 Haughseth, Enoch, Minneapolis

Hovorka, Thomas Wencelaus, New Prague
 Leubner, Bernhard Otto, Minneapolis
 Von Rohr, Winona

JUNIORS—14.

Burke, Richard Thomas, Cavalier, N. D.
 Chapple, Charles Loren, Beldenville, Wis.
 Cook, Theodore, Prescott, Wis.
 Farmer, Dan E., Spring Valley
 Fjelstad, Alex Haldor, Minneapolis
 Goodwin, Clarence Gilbert, Hudson, Wis.
 Haney, William Carroll, Henderson
 Hillard, Archie Harwood, Verndale

—Houlton, Alice, Elk River
 Itis, George Washington
 Johnson, Bernhard Carl Theodore, Minneapolis
 Nelson, John, Minneapolis
 Olsen, Isaac C., St. Croix Falls, Wis.
 Pepple, Ransom Franklin, Worthington

SPECIALS—5.

—Blanchard, Lucy H. Adams, Elk River
 Cady, Frank Edward, Flandrau, S. D.
 Root, William Henry, Staples

Sanderson, Stephen Francis, Minneapolis
 Sleight, Fred, Guelph, N. D.

SUMMER SCHOOL STUDENTS—UNIVERSITY SECTION—148.

—Aiton, Mrs. George B., Minneapolis
 —Berry, Gertrude, St. Paul
 —Best, Lillian B., Minneapolis
 —Blaisdell, A. Jean, Minneapolis
 —Blaisdell, Helen, Elizabeth, Minneapolis
 —Blaisdell, S. Lillian, Minneapolis
 —Bolton, Gracelia Esther, Stillwater
 —Bradley, Emily H., St. Paul
 —Brotherton, Cora, Waverly Iowa
 —Brown, Viola, Browtown

—Buehler, Elizabeth, Minneapolis
 —Buehler, Hettie E., Minneapolis
 —Bye, Mary Alice, Minneapolis
 —Caplin, Jessie Florence, Minneapolis
 Casey, John M., Minneapolis
 Cathcart, William Emerson, Litchfield
 —Chamberlain, Emma, Minneapolis
 —Chapman, Jeanie H., Minneapolis
 Childress, Arthur B., Dundas
 —Clark, Barbara S., St. Paul

- Clark, Hattie Benton, Minneapolis
 —Clarke, Mary Elizabeth, Rich Valley
 —Coffin, Mary A. M., Camden Place
 —Countryman, Lana M., Stillwater
 —Cox, Harriet M., Minneapolis
 —Cross, Nellie Malura, Minneapolis
 Curran, Emery O., St. Paul
 —Doherty, Agnes Elizabeth, St. Paul
 Donaldson, Ernest J., Chatfield
 —Dowling, Myrtle, Minneapolis
 Eaton, Benjamin Galen, Hamline
 —Fanning, Mamie G., St. Paul
 —Felton, Hattie H., Minneapolis
 Firkins, Oscar W., Minneapolis
 —Fisher, Anna A., Cedar Rapids, Ia.
 —Fleming, Hattie E., Minneapolis
 Flitner, Charles E., St. Paul
 —Folsom, M. Louise, Minneapolis
 —Freeman, Emma Catherine, St. Paul
 —Gibbs, Gertrude Ethel, Monticello
 —Gould, Jennie, St. Paul
 —Gray, Isabell, Philomath, Ore.
 —Green, Esther M., Minneapolis
 —Greene, Susan, St. Paul
 Gryttenholm, Sigurd, Wittenberg, Wis.
 Hanft, Hugo O., Minneapolis
 —Harrison, Josephine V., Forrest Home, N. Y.
 —Hawley, Elizabeth McKennan, Minn'pls.
 —Hawley, Mary E., Minneapolis
 —Hayden, Hattie, Minneapolis
 —Hayes, Bridget T., Minneapolis
 —Hendrix, Julia M., Minneapolis
 Hill Oliver, Red Wing
 —Hobbs, Evelyn A., Minneapolis
 —Holman, Susan Cecelia, Bird Island
 —Holmboe, Helen, Minneapolis
 —Holtz, Emma, Waverly
 —Hoyt, Mary A., Minneapolis
 —Jackson, Mary G., Minneapolis
 —Jackson, Sara, Minneapolis
 —Joslin, Ellen E.
 —Joslin, Mary E.
 Kelly, Edward James, St. Paul
 —Kirtland, Rhodela, St. Paul
 —König, Hermine R., Minneapolis
 Kvantz, Martin, Mankato
 Lange, Deitrich, St. Paul
 —Lawrence, Margaret, Minneapolis
 —Leavitt, Clara Kezia, Minneapolis
 —Lewis, Hettie W., Minneapolis
 —Lewis, Rose, Minneapolis
 Litzenberg, Jennings.
 —Litzenberg, S. Jennie, Minneapolis
 —Lucy, S. Bird, Kearney, Neb.
 McAndrew, James Edward, Minneapolis
 —McFarran, Clara Belle, St. Paul
 MacKey, John F., New Brighton
 —McMillan, Bertha, Minneapolis
 —McShane, Ellen, St. Paul
 —McShane, Lucy, St. Paul
 Manchester, Bertram, Lansing
 —Mark, Matha J., Minneapolis
 —Markhus, Ingerid, Wilmar
 Martin, Harrison Burke, St. Paul
 Mason, Charles W., Minneapolis
 —Michelet, Maren, Minneapolis
 Mills, Frank J., Minneapolis
 —Moran, Anna, Minneapolis
 —Morrow, Anna A., St. Paul
 O'Neill, Francis J., St. Paul
 —Otis, Pearl L. A., St. Paul
 —Parker, Florence E.,
 —Parker, Marion Alice, Minneapolis
 —Parker, Martha Adelaide, Minneapolis
 Pemberton, John, So. St. Paul
 —Perkins, E. Anna, Minneapolis
 —Perry, Florence, Minneapolis
 —Perry, Minnie Olive, Minneapolis
 —Pickit, Arlina Olive, Fergus Falls
 —Pinkham, Saidee Felicia, Minneapolis
 —Piper, Ida M., Merriam Park
 —Powers, Lulu, Minneapolis
 —Pratt, Helen C., Minneapolis
 —Pratt, Irene Sarah, Minneapolis
 —Pratt, Jessie Augusta, Minneapolis
 —Putnam, Anna T., Minneapolis
 —Putnam, Catherine E., St. Paul
 Raftery, Alphonse Lignora, St. Paul
 —Robbins, Edith Augustus, Robbinsdale
 —Rosger, Emma, Richfield
 Sage, Charles W., Minneapolis
 —Schellbach, Augusta, Mankato
 —Sewall, Margaret L., St. Anthony
 —Sherwood, Sanie Pauline, Minneapolis
 —Stevens, Jessie E.
 —Stevens, Margaretta A., Minneapolis
 —Stewart, Anna B., Minneapolis
 —Stickney, V. Anna, Minneapolis
 —Stratton, Mary, Belle Plain
 —Sullivan, Catherine E.
 —Sullivan, Nellie, St. Paul
 Swallow, William S., Minneapolis
 —Taylor, Edith B., Minneapolis
 —Taylor, Mary Harlan, Minneapolis
 Thayer, H. Milton, Ware, Mass.
 —Thompson, Maud, Minneapolis
 Thompson, Robert M., Minneapolis
 —Torrence, Kittie, St. Paul
 —Torrence, Lizzie, St. Paul
 —Trask, Abbie M., Rushford
 —Turner, Margaret Q., Minneapolis
 VanValkenburg, Jesse, Canby
 —Watts, Grace F.

Webster, Albert M., Mapleton
--Welles, Hattie E., Minneapolis
--West, Millie Mott, Minneapolis
--White, Ada E., Minneapolis
--Whitney, Jessie M., Minneapolis
--Whitney, Joella Elsie, St. Paul
--Whitney, Nellie A., Minneapolis
--Whitson, Laura, Minneapolis

Williams, Archie E., Minneapolis
--Williams, May, Minneapolis
--Winton, Adelaide, Minneapolis
Wollan, Carl T., Starbuck
--Woodworth, Ida Belle, Minneapolis
--Young, Alice, Lake View P. O.
Zeleny, Anthony, Minneapolis

Summary of Students.

THE GRADUATE DEPARTMENT.

	Men.	Women.	Total.
Candidates for the degree of Doctor of Philosophy.....	20	3	23
Candidates for the degree of Master of Arts.....	10	7	17
Candidates for the degree of Master of Science.....	8		8
Candidates for the degree of Master of Literature.....	1	2	3
Candidates for the degree of Civil Engineer.....	1		1
Candidates for the degree of Mechanical Engineer.....	2		2
Candidates for the degree of Master of Laws.....	24	1	25
Others doing graduate work.....	8	4	12
Total.....	74	17	91—91

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

		Men.	Women.	Total.
<i>Senior Class</i>	Classical Section.....	15	3	18
	Scientific Section.....	27	10	37
<i>Junior Class</i>	Literary Section.....	7	12	19—74
	Classical Section.....	24	2	26
<i>Sophomore Class</i>	Scientific Section.....	32	12	44
	Literary Section.....	11	26	37—107
	Classical Section.....	23	7	30
<i>Freshman Class</i>	Scientific Section.....	37	18	55
	Literary Section.....	10	28	38
	Teachers' Section.....		10	10—133
	Classical Section.....	25	9	34
<i>Special Students</i>	Scientific Section.....	57	23	80
	Literary Section.....	26	38	64
	Teachers' Section.....	1	18	19—197
Total.....	46	122	168—168	
Total.....	341	338	679—679	

THE COLLEGE OF ENGINEERING, METALLURGY AND THE
MECHANIC ARTS.

		Men.	Women.	Total.
<i>Senior Class</i>	Civil Engineering Section	5		5
	Mechanical Engineering Section	1		1
	Electrical Engineering Section	2		2
	Mining Section	2		2—10
<i>Junior Class</i>	Civil Engineering Section	4		4
	Mechanical Engineering Section	4		4
	Electrical Engineering Section	8		8
	Mining Engineering Section	2		2—18
<i>Sophomore Class</i>	Civil Engineering Section	11		11
	Mechanical Engineering Section	5		5
	Electrical Engineering Section	18		18
	Mining Engineering Section	2		2—36
<i>Freshman Class</i>	Civil Engineering Section	14		14
	Mechanical Engineering	5		5
	Electrical Engineering Section	22		22
	Mining Engineering Section	9		9—50
Special Students	31		31—31	
School of Design	2	42		44—44
Total	147	42		189—189

THE COLLEGE OF AGRICULTURE.

		Men.	Women.	Total.
Senior Class		1		1
Junior Class		2		2
Sophomore Class		2		2
Freshman Class		2		2—7
The School of Agriculture—Graduate Students		5		5
Class A	19			19
Class B	31			31
Class C	48			48
Preparatory Class	26			26
The Dairy School	59			59
Special Students	15			15—203
Total	210			210 210

THE DEPARTMENT OF LAW.

		Men.	Women.	Total.
Graduate Students		24	1	25—25
Senior Class—Day Section		92	2	94
Evening Section		20		20—114
Middle Class—Evening Section		26		26—26
Junior Class—Day Section		88	2	90
Evening Section		55		55—145
Total		305	5	310 310

THE DEPARTMENT OF MEDICINE.

THE COLLEGE OF MEDICINE AND SURGERY.

	Men.	Women.	Total.
Senior Class.....	38	1	39
Junior Class.....	46	4	50
Freshman Class.....	78	2	80
Special Students.....	5	3	8
Unclassified.....	19	3	22
Total.....	186	13	199

THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY.

Senior Class.....	1	2	3
Junior Class.....	2	1	3
Freshman Class.....	10	1	11
Total.....	13	4	17

THE COLLEGE OF DENTISTRY.

Senior Class.....	6		6
Junior Class.....	12		12
Freshman Class.....	21	1	22
Special Students.....	3		3
Total.....	42	1	43

THE COLLEGE OF PHARMACY.

Senior Class.....	6		6
Junior Class.....	13	1	14
Special Students.....	4	1	5
Total.....	23	2	25

SUMMARY OF TOTALS.

	Men.	Women.	Total.
Graduate Students.....	74	17	91
The College of Science, Literature and the Arts.....	341	358	679
The College of Engineering, Metallurgy and the Mechanic Arts.....	147	42	189
The College of Agriculture.....	210		210
The Department of Law.....	305	5	310
The Department of Medicine.....	264	20	284
The Summer School—University Section.....	34	114	148
	1375	536	1911
Duplicates.....	48	35	83
Total excluding duplicates.....	1327	501	1828

Appendix.

UNIVERSITY EXTENSION

The University of Minnesota was one of the first of American institutions to enter upon the work of University Extension. Before the work received its present name and models from England, the spirit of the new movement was embodied in the conduct of Farmers' Institutes which in the earlier years were carried on under the auspices of the University.

University Extension courses with the modern methods and name were undertaken in 1889-'90.

The rapid growth of the University itself has prevented the faculty from pushing University Extension.

This year, however, it was decided to meet the demands of the work, and a standing committee of the faculty was appointed to superintend it, and to invite the cooperation of the colleges, normal schools and high schools of the State.

The coming year similar courses of lectures will be offered and there is every prospect of the fuller organization of local centres and of the development of classes above the lectures. For circulars of information and announcement of courses, address Professor Willis M. West, secretary of the committee.

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