

ANNUAL REPORT

OF

THE BOARD OF REGENTS

OF THE

UNIVERSITY OF MINNESOTA,

To the Governor,

FOR THE

FISCAL YEAR ENDING DECEMBER 29th, 1878.

TRANSMITTED TO THE LEGISLATURE OF THE TWENTY-FIRST ANNUAL
SESSION, 1879.

MINNEAPOLIS:
JOHNSON, SMITH & HARRISON.
1879.

THE UNIVERSITY OF MINNESOTA,
OFFICE OF THE BOARD OF REGENTS,
December 27th, 1878. }

*To His Excellency, John S. Pillsbury,
Governor of Minnesota:*

SIR:—In compliance with the law I have the honor to forward herewith the annual report of the Board of Regents for the fiscal year ending this day.

Very respectfully,
Your obedient servant,
HENRY H. SIBLEY,
President.

THE BOARD OF REGENTS

appointed by the Governor by and with the consent of the Senate:

The Hon. HENRY H. SIBLEY, St. Paul.....	1879.
The Hon. THOS. S. BUCKHAM, M. A., Faribault.....	1879.
The Hon. PARIS GIBSON, M. A., Minneapolis.....	1880.
The Hon. MORRIS LAMPREY, M. A., St. Paul.....	1880.
The Hon. RICHARD CHUTE, Minneapolis.....	1880.
The Hon. WILLIAM R. MARSHALL, St. Paul.....	1881.
The Hon. A. A. HARWOOD,.....	Resigned.

and ex officio,

The Governor of the State,

The Hon. JOHN S. PILLSBURY, Minneapolis.

The Superintendent of Public Instruction,

The Hon. D. BURT, M. A., St. Paul.

The President of the University,

WILLIAM W. FOLWELL, M. A., Minneapolis.

OFFICERS OF THE BOARD.

Hon. HENRY H. SIBLEY, President.

Hon. PARIS GIBSON, Recording Secretary and Treasurer.

WILLIAM W. FOLWELL, Corresponding Secretary.

THE ANNUAL MEETING

of the Board is fixed by law for the second Tuesday of December, in each and every year.

OFFICERS AND EMPLOYEES.

FOR THE UNIVERSITY YEAR ENDING JUNE 6TH, 1878.

OFFICERS OF INSTRUCTION.

WILLIAM W. FOLWELL, PRESIDENT,
Social Science and Logic.

G. CAMPBELL, M. A., B. D., VICE PRESIDENT AND PROFESSOR,
Mental and Moral Philosophy.

JABEZ BROOKS, M. A., D. D., PROFESSOR,
Greek Language and Literature.

EDWIN J. THOMPSON, M. A., PROFESSOR,
Mathematics and Astronomy.

NEWTON H. WINCHELL, M. A., PROFESSOR,
Geology and Mineralogy.

CHARLES N. HEWITT, M. D., PROFESSOR, (non-res.)
Public Health and Hygiene.

MITCHELL D. RHAME, B. A., PROFESSOR,
Civil and Mechanical Engineering.

STEPHEN F. PECKHAM, M. A., PROFESSOR,
Chemistry and Physics.

JOHN G. MOORE, B. A.,* PROFESSOR,
North European Languages.

MOSES MARSTON, M. A., PROFESSOR,
English Language and Literature.

RICHARD W. LAING, LL. D., PROFESSOR,
History and French.

JOHN A. LUNDEEN, U. S. A.,
Military Science and Tactics.

CHARLES Y. LACY, B. Agr., ASST. PROFESSOR,
Theory and Practice of Agriculture.

LOUIS W. PECK, INSTRUCTOR,
Physics and Drawing.

MRS. AUGUSTA N. SMITH, PRECEPTRESS,
English and History.

JOHN C. HUTCHINSON, B. A., INSTRUCTOR,
Greek.

JOHN S. CLARKE, B. A., INSTRUCTOR,
Latin.

MATILDA J. CAMPBELL, B. L., INSTRUCTOR,
English and German.

Dr. Henry C. Leonard was employed during the Spring term to give instruction in Botany and Physiology.

Mr. C. W. Hall took the class in Historical Geology after the third week of the third term—relieving Prof. Winchell for the field work of the Geological survey.

EMPLOYEES.

JOHN B. EUSTIS, Farmer, *until April 1st.*

SAMUEL S. EUSTIS, Jr., Farmer, *after April 1st.*

GRAHAM C. CAMPBELL, B. A., Assistant Librarian.

CLARENCE C. HERRICK, Assistant in Museum.

FRED. C. BOWMAN, Assistant in Chemical Laboratory.

J. CLARENCE BRYANT, Janitor of Main Building.

GEO. A. WOOD, Janitor of Agricultural College, and assistant in the Plant House.

WM. H. SAVIDGE, Carpenter.

EVAN R. PRICHARD, Chorister.

WM. H. CHAMBERS, Fireman, Main Building.

All of the above employees are or have been students.

OFFICIAL CHANGES.

The only change in the Board of Regents was the re-appointment by the Governor, with the advice and consent of the Senate, of Regent Marshall, for the term of three years.

At the spring meeting of the Board the following new elections were made, to have effect from and after the beginning of the next ensuing university year:

Assistant Professor Chas. Y. Lacy was promoted to the rank of professor.

Instructor Louis W. Peck was elected assistant professor and the department of physics placed in his charge.

Mr. R. H. Tripp, of Michigan, was elected assistant professor to have charge of the Latin Language and Literature. This election has had the effect to relieve Professor Brooks of the care of the Latin department, which he has efficiently conducted in addition to his own work in the department of Greek since the death of Professor V. J. Walker, in 1875. The board have reason to believe that the department in question will maintain its high excellence under its new chief.

Early in the third term Mr. C. W. Hall, well known as a successful teacher in the State, and for some time past a student of the University of Leipsic, was employed on a temporary engagement to give instruction in the department of Geology. This was found necessary, in order to relieve Professor Winchell, that he might proceed at an earlier date than usual to the field work of the Geological Survey.

At the meeting of the Board of Regents on commencement day, the matter of the Geological survey was further considered, and the Board decided that it was desirable to relieve the State Geologist from the work of teaching, in order to enable him to carry on the necessary duties of the Survey, and adopted resolutions to that effect. In pursuance of this action, Mr. C. W. Hall was employed to assist Professor Winchell in the field during the summer and fall, and to take charge of the instruction in Geology and Mineralogy, Botany and Zoology during the second and third terms.

COMMENCEMENT.

At the sixth annual commencement, held June 6th, 1878, sixteen degrees upon recommendation of the faculties were conferred. The whole number of graduates to date is fifty-two; males, forty-four, females, eight. The whole number of degrees conferred to date is

fifty-seven, five males having taken degrees in both science and engineering.

This occasion was rendered memorable by the circumstance that the Senate of the State then in session at the capital formally adjourned, and in a body attended the exercises. At the dinner of the Alumni and their guests, served at the Nicollet House in the afternoon, addresses were delivered by several of the senators.

The attendance of the public was far greater than the assembly hall could comfortably accommodate. The performances of the candidates were very satisfactory and gratifying to the Board, and to the great concourse of citizens present on the occasion.

ATTENDANCE.

The following tables show the enrollment and classification of the students for the scholastic year ending June 6th, 1878:

SUMMARY—1877-8.

COLLEGE OR DEPARTMENT.	CLASS.	Gentlemen.	Ladies.	Totals.
Science, Literature and the Arts.....	{ Senior.....	11	3	14
	{ Junior.....	16	8	24
	{ Special.....	1	.....	1-39
Mechanic Arts.....	{ Senior.....	1	.....	1
	{ Junior.....	2	.....	2-3
Agriculture.....	Special.....	1	.....	1-1
Collegiate Department.....	{ First.....	15	12	27
	{ Second.....	35	11	46-73
	{ Third.....	48	29	77
	{ Fourth.....	63	47	110-187
	{ Special.....	42	26	68-68
Totals.....	.....	235	136	371

OR BY CLASSES ONLY.

Seniors—of all Departments.....	15
Juniors—of all Departments.....	26
Sophomores—First Class, Collegiate Department.....	27
Freshmen—Second Class, Collegiate Department.....	46-114
Preparatory, { Third Class, Collegiate Department.....	77
{ Fourth Class, Collegiate Department.....	110-187
Special.....	70-70
Total.....	371

The tables show an increase of sixty-eight, equivalent to twenty-two per cent. upon the attendance of the previous year. Some in-

crease was to have been expected as a result of the abundant harvest of 1877, but it is believed that a large proportion of the addition was secured through the system of local examinations, first put in actual operation in the summer of that year. Under the authority of the Board a committee of the general faculty visited a number of the leading villages and cities, and held examinations for admission of the same nature and extent as those usually held at the University. In all cases the hearty co-operation of the county superintendents, principals and boards of education was extended. The candidates enjoyed the advantage of being examined in their usual places of study, unembarassed by the distractions of a long journey and strange surroundings. Very many young people resorted to these examinations who could not afford the expense of a journey to the University under the risk of failure and rejection. The expense to the Board was considerable, as the Treasurer's report will show; but it was very small in comparison with the united expenses of three hundred candidates.

The repetition of the local examinations in the summer of 1878, has proved as acceptable as the former ones, but the extensive disaster to the harvest has kept away many successful candidates, as well as a number of old students. The present prospect is that the attendance for the current year will not be much above three hundred and fifty. Under circumstances as favorable as those of the previous year there can be no doubt that it would have exceeded four hundred.

The Board are of opinion that the system may prove serviceable and acceptable for the future.

BUILDINGS.

No new erections have been made. The buildings are in good condition. The principal item of repair is the tin roof on the new addition to the main building. The slate roof which was laid when the building was erected has proved unserviceable in spite of repeated efforts to keep it in repair.

Early in the year insurance upon both buildings and their contents for seventy thousand dollars was effected at very favorable rates for five years in good companies, as follows:

Date of policy.	Company insured in.	Location of Co	On what prop-erty.	Amounts.	
Oct. 24, 1877....	Com'l Union Assur- ance Co.....	London, Eng.	Main Building	\$5,000 00	
Oct. 24, 1877....	German American Ins. Co.....	New York....	" "	5,000 00	
Oct. 24, 1877....	Givard Fire and Ma- rine.....	Philadelphia..	" "	2,500 00	
April 1, 1878....	American Central....	St. Louis.....	" "	3,750 00	
April 1, 1878....	Glen's Falls.....	Glen's Falls N.Y.	" "	3,750 00	
March 28, 1878.	Continental Ins. Co..	New York.....	" "	5,000 00	
Jan. 4, 1878....	Hartford Fire Ins. Co	Hartford.....	" "	5,000 00	
Jan. 12, 1878....	St. Pau: Fire and Ma- rine.....	St. Paul.....	" "	5,000 00	
Jan. 12, 1878....	Home Ins. Co.....	New York.....	" "	5,000 00	
Jan. 23, 1878....	Franklin Ins Co.....	Philadelphia..	" "	5,000 00	
May 8, 1878....	Springfield Ins. Co..	Spr'g'd, Mass	" "	2,500 00	
May 8, 1878....	National Fire Ins. Co.	Hartford.....	" "	2,500 00	
Jan. 4, 1878....	St. Paul Fire and Ma- rine.....	St. Paul.....	Agricult'l Col.	\$5,000 00	\$50,000 00
Jan. 4, 1878....	Home Ins. Co.....	New York.....	" "	2,000 00	
Feb. 1, 1878....	Home Ins. Co.....	New York.....	" "	3,000 00	
Jan. 4, 1878....	St. Paul Fire and Ma- rine.....	St. Paul.....	Library and Musum.	\$2,000 00	10,000 00
July 10, 1878....	Phoenix Ins. Co.....	Hartford.....	" "	8,000 00	
Total.....					\$70,000 00

The remarks in the last report under the head of "Buildings" might be repeated, in view of the increased attendance. In many cases the class-rooms have been uncomfortably crowded, and the sections too large to be instructed in the most efficient manner. The Board desire to emphasize the necessity for additional accommodation, as the numbers of students increase.

MEANS OF INSTRUCTION.

The library has been augmented by the expenditure of the appropriation of \$1,000 made by the Board at the last annual meeting. The whole number of volumes is reported at 13,000. The library has been of great value to the faculty and students.

It is sincerely to be hoped that at no distant day the library may be enlarged so as to meet the wants of the institution.

The general museum has been materially extended by opening the "south room," in which a valuable collection of minerals is displayed. A vast amount of material gathered in the course of the Geological Survey still remains unclassified,

The additions to apparatus during the year were but few and in-
expensive. A small increase has been made to the collection in the departments of chemistry, agriculture, and the classical lan-
guages.

THE CAMPUS.

The Board feel it their duty to bring to the notice of your Excellency the subject of the enlargement of the campus, begun under the authority of the State, in compliance with the act for condemning private property for public purposes. These proceedings, begun years ago, should be closed at the earliest practicable day, in justice to the owners. The State must either provide the funds for paying in to the court the amounts awarded, or the proceedings must be abandoned and the project of enlargement given up.

The Board, therefore, respectfully renew their application for an appropriation of

THE GEOLOGICAL SURVEY.

For the earlier years of the enterprise it was deemed most advantageous to all concerned to confine the operations to the older and agricultural portion of the State. For some years past, however, there has seemed to be a reasonable demand that the mineral region supposed to lie in the north-eastern part of the State should be examined. In recognition of this demand the Board at the last annual meeting passed a resolution directing the State Geologist to visit this region during the succeeding summer. Prof. Winchell and Mr. Hall were accordingly occupied during the whole working season in exploring and examining the shore and parts of the interior of Lake Superior. Prof. Peckham was located for two months in Grand Marais, with suitable apparatus for assaying the precious metals. The reports of these officers are respectfully referred to for details of their operations. So far as any valuable discovery is concerned, the expectations of the Board have not been realized. Professor Winchell reports that "there is no actual mining being done in the State." The scientific results, however, are of great interest, and fully compensate for the expenses of the survey. The Geologists have identified the principal formations, and give directions for guidance to any seeking for silver, gold, copper or iron.

AGRICULTURAL COLLEGE AND FARM.

The report of Professor Lacy, detailing his experiments, is respectfully referred to for information.

At the agricultural fairs held in St. Paul, Minneapolis and Red Wing, in September last, a large and complete exhibit of the products of the farm was made by the professor in charge.

THE FRUIT FARM ON LAKE MINNETONKA.

It is proper to state that this enterprise originated with the members of the State Horticultural Society, who felt the need of having more systematic experiments in fruits than those conducted by themselves individually. Their deliberations led to the conviction that in connection with the Agricultural College these experiments could be most judiciously prosecuted.

Within a short time after the passage of the act referred to the Board undertook the duty prescribed. The tract of land of one hundred and sixteen acres, well-adapted to the purposes, has been secured.

Under the authority of the second section of the act you appointed Peter M. Gideon, of Hennepin county, to take charge of the farm and experiments. His work will show that a most promising beginning has been made.

FINANCES.

The report of the Treasurer of the University is herewith transmitted. All the items have been inspected and compared with the vouchers by the auditing committee, and the report has been approved and accepted by the Board.

The resources of the University consist of the income from sales of land granted by Congress, and appropriations of money by the State. The Treasurer's report exhibits the receipts and disbursements in detail.

The total accumulations of the productive fund derived from the sales of land and timber are reported by the State Auditor at \$416,187.74.

GENERAL OUTLOOK.

The Board respectfully report that the institution is in a satisfactory condition. The attendance, as already noted, for the academic year closing June last, was far in excess of that of any previous year.

The University is steadily and rapidly growing. The Board feel the importance of responding to the demands made by the people for the higher education of their children. To meet this requirement expenditures are inevitable, and many of the wants are immediate and pressing.

The reports of the President of University and other officers through him, are respectfully referred to for more definite information.

All of which is respectfully submitted.

TREASURER'S REPORT.

PARIS GIBSON, *Treasurer, in Account with the Board of Regents of the State University of Minnesota:*

CURRENT EXPENSE.

DR.

1877.			
Dec.	19,	To Cash from State Treasurer.....	\$3,000 00
1878.			
Jan.	4,	To Cash from State Treasurer.....	4,000 00
Jan.	28,	To Cash from State Treasurer.....	3,500 00
Feb.	28,	To Cash from State Treasurer.....	3,000 00
Mar.	12,	To Cash from State Treasurer.....	1,000 00
April	1,	To Cash from State Treasurer.....	3,000 00
May	1,	To Cash from State Treasurer.....	3,000 00
May	9,	To Cash from State Treasurer.....	1,000 00
May	31,	To Cash from State Treasurer.....	4,000 00
June	7,	To Cash from State Treasurer.....	1,300 00
June	22,	To Cash from State Treasurer.....	700 00
July	5,	To Cash from State Treasurer.....	3,500 00
July	30,	To Cash from State Treasurer.....	1,200 00
Aug.	22,	To Cash from State Treasurer.....	1,000 00
Aug.	27,	To Cash from State Treasurer.....	1,000 00
Sept.	21,	To Cash from State Treasurer.....	1,500 00
Sept.	26,	To Cash from State Treasurer.....	3,000 00
		To Transfer Museum acct. of '77 to Geological Survey..	603 03
Nov.	7,	To Cash from State Treasurer.....	2,000 00
Nov.	29,	To Cash from State Treasurer.....	2,800 00
Dec.	9,	To Cash from State Treasurer.....	200 00
Dec.	18,	To Cash from State Treasurer.....	1,100 00
		To Balance Librarian's Fund.....	8 79
		To Balance Student's Fees.....	969 65
		By Disbursements.....	\$46,087 19
		By Balance.....	294 28
			<hr/>
			\$46,381 47
			\$46,381 47

CR.

	By Balance from last Statement.....		\$6,227 08
1877.			
Dec. 22,	By Cash, Interest..... Voucher No. 6.		15 03
1878.			
Jan. 5,	By Cash, Interest.....	" 24.	51 55
Jan. 25,	By Cash, Interest.....	" 42.	36 94
April 5,	By Cash, Discount.....	" 116.	1 67
April 12,	By Cash, Interest.....	" 187.	18 33
June 26,	By Cash, Interest.....	" 215.	16 33
Sept. 30,	By Cash, Interest.....	" 456.	25 10
	By Balance, Incidentals.....		3,260 93
	By Balance, Salaries for Instructors.....		26,188 33
	By Balance, Employees and Workmen.....		1,182 25
	By Balance, Experimental Farm.....		1,957 45
	By Balance, Advertising.....		806 90
	By Balance, Repairs.....		1,843 18
	By Balance, Fuel.....		1,469 63
	By Balance, Plant House.....		337 78
	By Balance, Chemical Laboratory.....		75 00
	By Balance, Museum of Technology.....		23 37
	By Balance, Department of Physics.....		114 23
	By Balance, Library Expense.....		656 34
	By Balance, Library Faculty Fund.....		758 58
	By Balance, Library Reading Room.....		201 36
	By Balance, Insurance.....		819 81
			<hr/>
	Disbursements.....		\$46,087 19

INCIDENTALS.

DR.

1878.			
Feb. 9,	To Cash, Letter Heads.....		\$ 65
Feb. 26,	To Cash, Letter Heads.....		1 30
July —,	To Cash, Freight.....		4 75
July —,	To Cash, Pamphlet Boxes.....		1 50
July —,	To Cash, Paper.....		3 50
Aug. 30,	To Cash, Lunn, Use of Stable.....		2 50
Sept. 30,	To Cash, Cook, Use of Stable.....		2 50

CR.

1877.			
Dec. 15,	By Cash, Oil and Brooms..... Voucher No. 2.		\$ 6 50
Dec. 15,	By Cash, Rowley.....	" 4.	20 30
Dec. 24,	By Cash, Brooks Bros.....	" 17.	17 00
1878.			
Jan. 3,	By Cash, Heath.....	" 22.	22 50
Jan. 5,	By Cash, Newton.....	" 23.	14 80
1877.			
Dec. 25,	By Cash, Smith.....	" 25.	10 25
1878.			
Jan. 1,	By Cash, Tribune Co.....	" 27.	1 00
Jan. 3,	By Cash, Paper.....	" 28.	12 12
Jan. 7,	By Cash, Stationery.....	" 30.	4 22
Jan. 16,	By Cash, Telegrams.....	" 32.	1 08
Jan. 10,	By Cash, Brooks Bros.....	" 33.	10 10
Jan. 17,	By Cash, Talbert & White.....	" 35.	1 70
Jan. 22,	By Cash, Glass.....	" 37.	50
Jan. 4,	By Cash, Perkins.....	" 39.	133 00

Jan. 15,	By Cash, Regent Harwood.....	" 41.	16 50
Jan. 29,	By Cash, Rowley.....	" 46.	14 85
Feb. 2,	By Cash, Historical Charts.....	" 57.	4 92
Feb. 1,	By Cash, Newton.....	" 58.	12 70
Feb. 1,	By Cash, Pickett.....	" 59.	2 50
Feb. 11,	By Cash, Brooms.....	" 65.	4 60
Feb. 12,	By Cash, Printing.....	" 66.	2 50
Feb. 26,	By Cash, Sundries.....	" 74.	6 00
Feb. 28,	By Cash, Rowley.....	" 75.	6 00
Mar. 4,	By Cash, Printing.....	" 88.	9 10
Mar. 30,	By Cash, Under Prof. Laing.....	" 93.	9 30
April 1,	By Cash, Clerical Work.....	" 103.	14 70
April 1,	By Cash, Clerical Work.....	" 104.	16 55
April 2,	By Cash, Curtain Frames.....	" 112.	6 00
April 3,	By Cash, Under Prof. Laing.....	" 113.	9 30
April 11,	By Cash, Tribune Co.....	" 120.	5 50
April 13,	By Cash, Johnson & Smith.....	" 123.	58 75
April 13,	By Cash, Smith.....	" 124.	12 70
April 15,	By Cash, Melodeon Rent.....	" 125.	24 44
April 16,	By Cash, Bryant.....	" 126.	8 21
May 1,	By Cash, Savidge.....	" 138.	29 16
May 3,	By Cash, Bean, Wales & Chute.....	" 149.	119 44
May 21,	By Cash, Smith.....	" 152.	4 15
May 11,	By Cash, Taxes.....	" 163.	56 22
June 1,	By Cash, Thompson.....	" 165.	20 00
Mar. 14,	By Cash, Willard & Sturtevant.....	" 179.	2 00
Mar. 26,	By Cash, Smith.....	" 181.	3 00
April 1,	By Cash, Printing.....	" 183.	10 70
April 3,	By Cash, Freight.....	" 185.	6 44
April 4,	By Cash, Freight.....	" 186.	1 20
April 21,	By Cash, Lamp Chimneys.....	" 188.	1 53
May 6,	By Cash, Freight.....	" 192.	1 90
May 8,	By Cash, Under Prof. Lacy.....	" 194.	59 38
May 9,	By Cash, Hotel Expense.....	" 195.	1 50
May 9,	By Cash, Livery.....	" 196.	6 00
May 10,	By Cash, Campbell.....	" 197.	1 00
May 11,	By Cash, Freight.....	" 198.	8 10
May 21,	By Cash, Smith.....	" 201.	5 50
May 21,	By Cash, Diplomas.....	" 202.	16 65
May 28,	By Cash, Freight.....	" 203.	1 00
May 28,	By Cash, Tourist & Sportsman.....	" 204.	5 00
June 26,	By Cash, Printing.....	" 206.	26 30
June 11,	By Cash, Chairs, Rent.....	" 208.	8 00
May 10,	By Cash, Rockwood.....	" 216.	7 50
May 30,	By Cash, Printing.....	" 220.	17 50
June 1,	By Cash, Maps.....	" 222.	23 88
June 5,	By Cash, Enlargement of Campus.....	" 232.	136 66
June 8,	By Cash, Great Western Band.....	" 233.	60 00
June 8,	By Cash, Whitney.....	" 235.	5 50
June 8,	By Cash, Under Prof. Lacy.....	" 236.	14 40
June 10,	By Cash, Printing.....	" 237.	15 00
June 11,	By Cash, Oil, &c.....	" 238.	3 00
June 8,	By Cash, F. S. Gilson.....	" 239.	55 00
June 23,	By Cash, Lamp Chimneys.....	" 244.	1 73
June 25,	By Cash, Bryant.....	" 248.	17 25
June 28,	By Cash, Livery.....	" 252.	10 00
July 2,	By Cash, Rockwood.....	" 254.	34 80
May 10,	By Cash, Record of Deeds.....	" 257.	1 25
July 10,	By Cash, Sundries.....	" 258.	4 85
July 10,	By Cash, Postage, &c.....	" 259.	40 80
July 10,	By Cash, Folds & Griffith.....	" 266.	4 75
July 6,	By Cash, House Rent.....	" 267.	500 00
July 12,	By Cash, Under Prof. Laing.....	" 269.	70 65

July 16,	By Cash, Bryant.....	" 270.	57 00
July 31,	By Cash, Bryant.....	" 275.	20 00
July 30,	By Cash, Tribune Co.	" 276.	16 23
Aug. 9,	By Cash, Garden Rake, &c.....	" 279.	1 35
Aug. 9,	By Cash, Cartage.....	" 280.	39 28
Aug. 9,	By Cash, Stationery.....	" 281.	19 58
July 30,	By Cash, Work on Campus.....	" 286.	58 17
July 6,	By Cash, Johnson & Smith.....	" 295.	438 00
Aug. 29,	By Cash, Bowman.....	" 301.	5 00
Aug. 31,	By Cash, Bryant.....	" 305.	25 00
Sept. 2,	By Cash, Savidge.....	" 307.	19 90
Sept. 2,	By Cash, Johnson & Smith.....	" 309.	33 00
Sept. 13,	By Cash, George A. Wood.....	" 311.	9 75
Sept. 23,	By Cash, Bryant.....	" 317.	
Sept. 23,	By Cash, Young & Patterson.....	" 318.	9 90
Sept. 23,	By Cash, Examinations.....	" 319.	76 05
June —,	By Cash, Swett.....	" 331.	1 42
June —,	By Cash, Cushman & Plummer.....	" 333.	5 75
June 4,	By Cash, Freight.....	" 335.	3 68
June 26,	By Cash, Newton.....	" 336.	19 50
July 1,	By Cash, Barnard & Cope.....	" 337.	5 00
July 1,	By Cash, Rockwood.....	" 338.	16 80
July 20,	By Cash, Col. Flagler.....	" 339.	20 00
July 19,	By Cash, Halvorsen.....	" 340.	1 50
July 19,	By Cash, Parker & Botsford.....	" 341.	1 50
Aug. —,	By Cash, Henig.....	" 342.	2 00
Aug. 1,	By Cash, Globe.....	" 343.	3 00
Aug. 9,	By Cash, Walker.....	" 344.	3 00
Aug. 17,	By Cash, World.....	" 349.	3 75
Aug. 28,	By Cash, Directory.....	" 347.	3 00
Sept. 1,	By Cash, Dispatch.....	" 349.	3 00
Sept. 30,	By Cash, Rockwood.....	" 350.	20 00
Oct. 1,	By Cash, Newton.....	" 351.	4 00
Oct. 3,	By Cash, Savidge.....	" 352.	28 50
Oct. 3,	By Cash, Thompson.....	" 353.	3 00
Oct. 7,	By Cash, Janney, Moles & Brooks.....	" 354.	90
Oct. 9,	By Cash, Bryant.....	" 355.	3 48
Oct. 10,	By Cash, Geo. A. Wood.....	" 356.	1 65
Oct. 11,	By Cash, Lundeen.....	" 357.	1 75
Oct. 22,	By Cash, Savidge.....	" 358.	22 40
Oct. 23,	By Cash, Moore.....	" 359.	17 67
Oct. 1,	By Cash, Brooks Bros.....	" 361.	14 80
Oct. 1,	By Cash, Rockwood.....	" 362.	14 00
Oct. 7,	By Cash, Macy.....	" 372.	10 00
Oct. 7,	By Cash, Chambers.....	" 374.	8 10
Oct. 7,	By Cash, Hildreth.....	" 375.	8 00
Oct. 14,	By Cash, Thompson.....	" 378.	6 30
Oct. 17,	By Cash, Thompson.....	" 380.	35 45
Oct. 17,	By Cash, Thompson.....	" 381.	174 25
Oct. 17,	By Cash, Thompson.....	" 382.	9 00
Nov. 2,	By Cash, Bean, Chute & Wales.....	" 402.	15 68
Aug. 17,	By Cash, Eckman.....	" 412.	3 00
Nov. 12,	By Cash, Hawes & Smith.....	" 413.	10 65
	By Cash, Work on Campus.....	" 414.	57 42
Dec. 5,	By Cash, Rockwood.....	" 428.	3 50
Dec. 5,	By Cash, Rockwood.....	" 429.	9 50
June 20,	By Cash, Stamps.....	" 436.	43 00
Oct. 29,	By Cash, Pottle & Son.....	" 437.	50
Nov. 14,	By Cash, Freight.....	" 440.	5 22
Nov. 30,	By Cash, Lounsberry.....	" 442.	8 00
Dec. 3,	By Cash, Bachner Bros.....	" 443.	10 00
Dec. 3,	By Cash, Savidge.....	" 444.	10 22

UNIVERSITY OF MINNESOTA.

17

Dec. 3,	By Cash, Rowley.....	Voucher No. 446.	2 00	
Dec. 3,	By Cash, Stechard.....	" 447.	4 95	
Dec. 18,	By Cash, Treasurer's Salary.....	" 453.	300 00	
Dec. 18,	By Cash, Secretary's Salary.....	" 454.	100 00	
Dec. 18,	By Cash, Stationery, &c.....	" 455.	20 00	
Dec. 18,	By Cash, Examination Expenses.....	" 469.	146 30	
	To Transfer to Student's Fees.....		\$ 700 35	
	To Balance, Current Expense.....		3,260 93	
			<hr/>	
			\$3,977 98	\$3,977 98

SALARIES FOR INSTRUCTION.

1877.				
Dec. 24,	By Cash, Faculty.....	Voucher No. 7.	\$2,295 00	
Dec. 24,	By Cash, Bowman.....	" 8.	15 00	
Dec. 24,	By Cash, Pritchard.....	" 9.	10 00	
1878.				
Jan. 31,	By Cash, Faculty.....	" 48.	2,295 00	
Jan. 31,	By Cash, Bowman.....	" 49.	15 00	
Jan. 31,	By Cash, Pritchard.....	" 50.	10 00	
Feb. 28,	By Cash, Faculty.....	" 77.	2,395 00	
Feb. 28,	By Cash, Bowman.....	" 79.	15 00	
Feb. 28,	By Cash, Thompson.....	" 80.	25 00	
Feb. 28,	By Cash, Pritchard.....	" 81.	10 00	
Mar. 8,	By Cash, Lundeen.....	" 91.	250 00	
Mar. 8,	By Cash, Miss Campbell.....	" 92.	200 00	
Mar. 31,	By Cash, Faculty.....	" 95.	2,395 00	
Mar. 31,	By Cash, Bowman.....	" 96.	15 00	
Mar. 31,	By Cash, Pritchard.....	" 97.	10 00	
April 30,	By Cash, Dr. Hewitt.....	" 128.	50 00	
April 30,	By Cash, Faculty.....	" 129.	2,395 00	
April 30,	By Cash, Folwell.....	" 130.	400 00	
April 30,	By Cash, Bowman.....	" 131.	15 00	
April 30,	By Cash, Pritchard.....	" 132.	10 00	
May 31,	By Cash, Faculty.....	" 155.	2,395 00	
May 31,	By Cash, Rowman.....	" 160.	15 00	
May 31,	By Cash, Pritchard.....	" 161.	10 00	
June 1,	By Cash, Thompson.....	" 166.	25 00	
June 6,	By Cash, Faculty.....	" 168.	2,395 00	
June 6,	By Cash, Lundeen.....	" 169.	250 00	
June 6,	By Cash, Leonard.....	" 170.	200 00	
June 6,	By Cash, Miss Campbell.....	" 171.	100 00	
June 6,	By Cash, Bowman.....	" 175.	15 00	
June 6,	By Cash, Pritchard.....	" 176.	10 00	
May 3,	By Cash, Smith.....	" 190.	5 00	
Sept. 30,	By Cash, Faculty.....	" 324.	2,530 00	
Sept. 30,	By Cash, Miss Campbell.....	" 326.	60 00	
Sept. 30,	By Cash, Bowman.....	" 330.	15 00	
Oct. 31,	By Cash, Faculty.....	" 384.	2,530 00	
Oct. 31,	By Cash, Bowman.....	" 385.	15 00	
Nov. 30,	By Cash, Faculty.....	" 415.	2,530 00	
Nov. 30,	By Cash, Lundeen.....	" 416.	83 33	
Nov. 30,	By Cash, Miss Campbell.....	" 417.	140 00	
Nov. 30,	By Cash, Bowman.....	" 418.	15 00	
Nov. 11,	By Cash, Thompson.....	" 426.	25 00	
	To Balance to Current Expense.....		\$26,188 33	
			<hr/>	
			\$26,188 33	\$26,188 33

EMPLOYEES AND WORKMEN.

1877.				
Dec. 24,	By Cash, Wood.....	Voucher No. 13.		\$18 00
Dec. 24,	By Cash, Chambers.....	" 14.		30 00
Dec. 24,	By Cash, Bryant.....	" 15.		67 60
Dec. 1,	By Cash, Smith.....	" 20.		11 00
1878.				
Jan. 31,	By Cash, Bryant.....	" 51.		67 60
Jan. 31,	By Cash, Chambers.....	" 52.		30 00
Jan. 31,	By Cash, Wood.....	" 53.		18 00
Feb. 28,	By Cash, Chambers.....	" 83.		30 00
Feb. 28,	By Cash, Bryant.....	" 84.		67 60
Feb. 28,	By Cash, Wood.....	" 85.		18 00
Mar. 31,	By Cash, Bryant.....	" 100.		67 60
Mar. 31,	By Cash, Chambers.....	" 101.		30 00
Mar. 31,	By Cash, Wood.....	" 102.		18 00
April 30,	By Cash, Bryant.....	" 135.		67 60
April 30,	By Cash, Wood.....	" 137.		18 00
May 3,	By Cash, Chambers.....	" 146.		75 00
May 31,	By Cash, Bryant.....	" 157.		67 60
May 31,	By Cash, Wood.....	" 159.		18 00
June 5,	By Cash, Rockwood.....	" 167.		12 05
June 6,	By Cash, Bryant.....	" 172.		67 60
June 6,	By Cash, Wood.....	" 174.		18 00
July 4,	By Cash, Hildreth.....	" 253.		26 00
Sept. 30,	By Cash, Bryant.....	" 325.		65 00
Sept. 30,	By Cash, Wood.....	" 329.		18 00
Oct. 31,	By Cash, Wood.....	" 387.		18 00
Oct. 31,	By Cash, Chambers.....	" 388.		45 00
Oct. 31,	By Cash, Bryant.....	" 389.		65 00
Nov. 30,	By Cash, Bryant.....	" 423.		65 00
Nov. 30,	By Cash, Chambers.....	" 424.		45 00
Nov. 30,	By Cash, Wood.....	" 425.		18 00
	To Balance to Current Expense.....		\$1,182 25	
			\$1,182 25	\$1,182 25

EXPERIMENTAL FARM.

DR.

1878.			
July 1,	To Cash, Farm Products.....		\$432 16
Nov. 30,	To Cash, Farm Products.....		221 43
Nov. 30,	To Cash, Work on Campus.....		57 42

CR.

1877.			
Dec. 24,	By Cash, Eustis.....	Voucher No. 12.	\$50 00
April 3,	By Cash, Eustis.....	" 114.	21 16
April 3,	By Cash, Eustis.....	" 115.	55 00
April 13,	By Cash, Thompson.....	" 112.	7 57
April 30,	By Cash, Eustis.....	" 136.	55 00
May 1,	By Cash, Eustis.....	" 139.	31 35
May 2,	By Cash, Munn.....	" 142.	15 88
May 3,	By Cash, Schmidt.....	" 147.	11 82
May 31,	By Cash, Eustis.....	" 153.	55 00
May 3,	By Cash, Eastwood.....	" 191.	6 25
May 7,	By Cash, Manchester.....	" 193.	9 89
May 21,	By Cash, Shumway.....	" 200.	15 92
June 1,	By Cash, Eustis.....	" 223.	30 15
June 1,	By Cash, Horses.....	" 224.	325 00
June 3,	By Cash, Shumway.....	" 226.	17 59
June 3,	By Cash, Munn.....	" 227.	23 98

June 24,	By Cash, Calladine.....	Voucher No. 247.	29 00
June 25,	By Cash, Plough.....	" 249.	17 00
July 1,	By Cash, Eustis.....	" 255.	55 00
July 18,	By Cash, Phillips.....	" 262.	17 88
July 19,	By Cash, Linton.....	" 263.	16 18
July 20,	By Cash, Reynolds.....	" 265.	18 03
Aug. 5,	By Cash, Eustis.....	" 278.	55 00
July 31,	By Cash, Account Current.....	" 287.	33 83
July 31,	By Cash, Account Current.....	" 289.	636 96
Sept. 10,	By Cash, Manchester.....	" 293.	41 61
Aug. 30,	By Cash, Barret.....	" 304.	37 57
Sept. 2,	By Cash, Mahaffa.....	" 306.	16 00
Sept. 3,	By Cash, Eustis.....	" 310.	55 00
Sept. 28,	By Cash, Barret.....	" 320.	15 00
Sept. 30,	By Cash, Eustis.....	" 327.	55 00
Oct. 2,	By Cash, Budd.....	" 366.	20 00
Oct. 19,	By Cash, Drive Well.....	" 383.	10 00
Oct. 31,	By Cash, Eustis.....	" 386.	55 00
Nov. —,	By Cash, Account Current.....	" 409.	667 25
Nov. —,	By Cash, Swan.....	" 410.	11 37
Nov. —,	By Cash, Incidentals.....	" 411.	9 50
Nov. 30,	By Cash, Eustis.....	" 422.	55 00
Dec. 9,	By Cash, Geo. A. Wood.....	" 449.	9 72
	To Balance to Current Expense.....		\$1,957 45
			<hr/>
			\$2,668 46
			\$2,668 46

ADVERTISING ACCOUNT.

1877.			
Dec. 15,	By Cash, Ariel.....	Voucher No. 1.	6 66
Dec. 22,	By Cash, Ariel.....	" 3.	6 66
Dec. 26,	By Cash, Farmers Union.....	" 18.	16 67
1878.			
Jan. 25,	By Cash, Ariel.....	" 43.	6 66
Jan. 11,	By Cash, Anti-Monopolist.....	" 40.	65 00
Feb. 16,	By Cash, Ariel.....	" 67.	6 66
Feb. 23,	By Cash, Farmers Union.....	" 72.	7 50
April	By Cash, yearly account.....	" 110.	353 40
April 5,	By Cash, Anti-Monopolist.....	" 117.	65 00
May 2,	By Cash, Ariel.....	" 141.	20 00
June 4,	By Cash, Ariel.....	" 230.	6 66
June 20,	By Cash, Anti-Monopolist.....	" 242.	62 50
June 1,	By Cash, Holliday.....	" 296.	3 00
Sept. 17,	By Cash, Ariel.....	" 314.	6 70
Sept. 30,	By Cash, Anti-Monopolist.....	" 323.	62 60
June,	By Cash, Freie Presse.....	" 332.	3 00
Oct. 29,	By Cash, Crist.....	" 360.	2 60
Oct. 4,	By Cash, Ariel.....	" 363.	13 32
Oct. 4,	By Cash Pioneer Press.....	" 371.	70 00
Oct. 7,	By Cash, Tribune.....	" 373.	15 75
Dec. 6,	By Cash, Ariel.....	" 430.	6 66
	To Balance to Current Expense.....		\$806 90
			<hr/>
			\$806 90
			\$806 90

REPAIRS ACCOUNT.

1877.			
Dec. 29,	By Cash, Savidge.....	Voucher No. 19.	30 56
Dec. 24,	By Cash, Cauvett & Co.....	" 16.	35 75
1878.			
Jan. 15,	By Cash, Williams.....	" 34.	1 95
Jan. 31,	By Cash, Savidge.....	" 47.	16 15
Feb. 28,	By Cash, Savidge.....	" 76.	13 65
April 1,	By Cash, Savidge.....	" 107.	8 25
April 1,	By Cash, Savidge.....	" 108.	12 50

May 3.	By Cash, Cauvett & Co.....	Voucher No. 144,	89 12
May 3.	By Cash, Cauvett & Co.....	" 145.	14 58
May 3.	By Cash, Farnham & Lovejoy.....	" 150.	18 57
May 21.	By Cash, Savidge.....	" 154.	13 95
March 25.	By Cash, Locks.....	" 180.	18 25
June 6.	By Cash, Curtain Fixtures.....	" 205.	1 55
June 15.	By Cash, Curtains.....	" 211.	20 00
June 18.	By Cash, Truesdall & Boutell.....	" 241.	12 35
July 20.	By Cash, Savidge.....	" 264.	46 56
Aug. 26.	By Cash, A. A. Pond.....	" 298.	400 00
Sept. 2.	By Cash, Donigsbear.....	" 308.	2 50
Sept. 17.	By Cash, J. W. Perkins.....	" 315.	24 19
Sept. 19.	By Cash, Chas. A. Bicknell.....	" 316.	127 68
Oct. 3.	By Cash, North Star Iron Works.....	" 368.	35 00
Oct. 12.	By Cash, Talbert & White.....	" 377.	17 70
Oct. 31.	By Cash, A. A. Pond.....	" 399.	500 00
Nov. 7.	By Cash, Cauvett & Co.....	" 407.	41 87
Nov. 9.	By Cash, St. Anthony Iron Works.....	" 408.	112 83
Dec. 18.	By Cash, Pond.....	" 452.	209 93
Nov.,	By Cash, Savidge.....	" 457.	13 09
Dec. 20.	By Cash, Rowley.....	" 465.	4 65
	To Balance to Current Expense.....		
			<u>\$1,843 18</u>
			\$1,843 18
			\$1,848 18

INSURANCE ACCOUNT.

CR.

1878.			
July 10.	By Cash.....	Voucher No. 268.	\$9 81
Mar. 3.	By Cash.....	" 94.	555 00
May 3.	By Cash.....	" 148.	75 00
Aug. 2.	By Cash.....	" 277.	180 00
	To Balance to Current Expense.....		
			<u>\$819 81</u>
			\$819 81
			\$819 81

FUEL ACCOUNT.

CR.

Jan. 29.	By Cash, Lane.....	Voucher No. 45.	\$22 00
Feb. 17.	By Cash, Lane.....	" 68.	21 00
May. 2.	By Cash, Northwestern Fuel Company.....	" 143.	18 00
June 23.	By Cash, Hubbard.....	" 245.	63 00
Nov. 2.	By Cash, Mulford.....	" 400.	726 88
Nov. 7.	By Cash, Northwestern Fuel Company.....	" 406.	618 75
	To Balance to Current Expense.....		
			<u>\$1,469 63</u>
			\$1,469 63
			\$1,469 63

PLANT HOUSE ACCOUNT.

DR.

1878.			
July 1.	To Cash, Sales of Flowers.....		\$64 23
Nov.	To Cash, Sales of Flowers.....		15 32

CR.

Jan. 2.	By Cash, Geo. A. Wood.....	Voucher No. 38.	23 30
Feb. 2.	By Cash, Geo. A. Wood.....	" 61.	21 02
Mar. 6.	By Cash, Geo. A. Wood.....	" 89.	22 85
April 2.	By Cash, Geo. A. Wood.....	" 111.	28 30
May 1.	By Cash, Geo. A. Wood.....	" 146.	33 82
July 22.	By Cash, Geo. A. Wood.....	" 271.	31 60

July 31.	By Cash, Account Current.....	Voucher No. 258.	113 97
Sept. 13.	By Cash, Geo. A. Wood.....	" 312.	40 68
Oct. 3.	By Cash, Geo. A. Wood.....	" 369.	44 04
Nov. 4.	By Cash, Geo. A. Wood.....	" 404.	32 19
Dec. 9.	By Cash, Geo. A. Wood.....	" 450.	25 56
	To Balance to Current Expense.....		\$337 78

\$417 33 \$417 33

CHEMICAL LABORATORY ACCOUNT.

DR.

1878.			
June 6.	To Cash, From Students.....		\$447 33
June 6.	To Cash, Sales of Apparatus.....		25 70
June 6.	To Cash, Discount for Analyses.....		111 40

CR.

Dec.,	By Cash.....	Voucher No. 448.	659 43
	To Balance to Current Expense.....		75 00

\$659 43 \$659 43

DEPARTMENT OF PHYSICS.

CR.

June 15.	By Cash, Account Current.....	Voucher No. 214.	114 23
	To Balance to Current Expense.....		114 23

\$114 23 \$114 23

MUSEUM OF TECHNOLOGY.

CR.

June 15.	By Cash, Account Current.....	Voucher No. 210.	23 37
	To Balance to Current Expense.....		23 37

\$23 37 \$23 37

LIBRARY EXPENSE ACCOUNT.

1877.			
Dec. 24.	By Cash, Campbell.....	Voucher No. 11.	50 00
1878.			
Jan. 3.	By Cash, Miss Rollit.....	" 29.	6 98
Jan. 9.	By Cash, Freight.....	" 31.	380
Jan. 22.	By Cash, Express.....	" 36.	2 50
Jan. 31.	By Cash, Campbell.....	" 54.	50 00
Feb. 5.	By Cash, Miss Rollit.....	" 62.	17 32
Feb. 6.	By Cash, Express.....	" 64.	1 00
Feb. 19.	By Cash, Freight.....	" 69.	5 42
Feb. 19.	By Cash, Express.....	" 70.	1 10
Feb. 26.	By Cash, Sundries.....	" 73.	7 80
Feb. 28.	By Cash, Campbell.....	" 82.	50 00
March 1.	By Cash, Miss Rollit.....	" 86.	18 60
March 31.	By Cash, Campbell.....	" 99.	50 00
April 30.	By Cash, Campbell.....	" 133.	50 00
May 30.	By Cash, Campbell.....	" 158.	50 00
June 6.	By Cash, Campbell.....	" 173.	50 00
April 1.	By Cash, Miss Rollit.....	" 184.	17 62
May 11.	By Cash, Miss Rollit.....	" 199.	19 27
June 4.	By Cash, Miss Rollit.....	" 231.	18 15
Sept. 14.	By Cash, Keyser.....	" 313.	25 09
Sept. 30.	By Cash, Miss Rollit.....	" 328.	50 00
June,	By Cash, Miss Rollit.....	" 334.	5 62
Aug. 30.	By Cash, Miss Rollit.....	" 348.	6 07
Oct. 31.	By Cash, Miss Rollit.....	" 390.	50 00
Nov. 30.	By Cash, Miss Rollit.....	" 419.	50 00
	To Balance to Current Expense.....		\$656 34

\$656 34 \$656 34

ANNUAL REPORT.

LIBRARY FACULTY FUND.

DR.

1878.			
Feb. 20,	To Cash, Dictionary.....	\$ 8 75	
Feb. 26,	To Cash, German Book.....	1 00	
Oct. —,	To Cash, J. G. Moore.....	33 37	

CR.

Feb. 23,	By Cash, Foote.....	Voucher No. 151.	\$18 72
Jan. 21,	By Cash, Foote.....	" 177.	24 30
Feb. 16,	By Cash, Foote.....	" 178.	71 00
April 1,	By Cash, Foote.....	" 182.	19 90
June 10,	By Cash, Freight.....	" 207.	3 98
June 15,	By Cash, Freight.....	" 213.	17 51
July 11,	By Cash, Pott, Young & Co.....	" 260.	254 36
Aug. 8,	By Cash, Freight.....	" 344.	4 70
June 1,	By Cash, Van Nostrand.....	" 364.	8 00
Oct. 11,	By Cash, Casino.....	" 376.	40 17
Oct. 14,	By Cash, Pott, Young & Co.....	" 379.	316 06
Dec. 18,	By Cash, Books.....	" 451.	23 00
	To Balance to Current Expense.....	\$758 58	
		\$801 70	\$801 70

LIBRARIAN'S FUND.

DR.

1878.			
July 11,	To Cash, Interest.....	2 36	
July 12,	To Cash, Rockwood.....	30	
Nov. 1,	To Cash, Dictionary.....	8 85	
Nov. 1,	To Cash, Curtains.....	7 50	
Dec. 6,	To Cash, Interest.....	2 78	

CR.

Nov. 1,	By Cash, Segner.....	Voucher No. 438.	3 00
Nov. 25,	By Cash, Smith.....	" 431.	10 00
	By Balance to Current Expense.....		8 79
		\$21 79	\$21 79

READING ROOM.

DR.

Mar. 8,	To Cash, Binders.....	1 14
April 24,	To Cash, Binders.....	1 80
June 8,	To Cash, Covers.....	60
June 10,	To Cash, Binders.....	1 50
June 10,	To Cash, Covers.....	2 70

CR.

Jan. 7,	By Cash, Money orders.....	Voucher No. 432.	144 66
Jan. 31,	By Cash, Minneapolis Post Office.....	" 433.	28 05
Feb. 26,	By Cash, Gurth.....	" 434.	8 00
Mar. 4,	By Cash, Barret & Co.....	" 435.	13 13
Mar. —,	By Cash, Barret & Co.....	" 445.	15 28
	To Balance to Current Expense.....	201 38	
		\$209 12	\$209 12

STUDENTS' FEES.

Dr.

1878.			
Jan.	—,	To Cash.....	\$ 85 00
July	—,	To Cash.....	35 00
Sept.	30,	To Cash.....	1,200 00
Oct.	18,	To Cash.....	100 00
Nov.	30,	To Cash.....	250 00
		By Transfer from Incidentals.....	\$700 35
		By Balance, Current Expense.....	969 65
			<hr/>
			\$1,670 00 \$1,670 00

GEOLOGICAL SURVEY.

Dr.

1878.			
April	5,	To Cash.....	\$1,000 00
June	26,	To Cash.....	1,000 00

Cr.

By Balance from last statement.....	\$5,522 04
By Transfer Museum from Current Expense.....	603 03

1877.			
Dec.	24,	By Cash, Winchell.....	Voucher No. 10. 200 00
Dec.	31,	By Cash, Juni.....	" 21. 7 50
Dec.	31,	By Cash, Balance Account Current.....	" 26. 14 18
1878.			
Jan.	28,	By Cash, Expense Account.....	" 44. 31 35
Jan.	31,	By Cash, Winchell.....	" 54. 200 00
Feb.	2,	By Cash, Juni.....	" 60. 9 37
Feb.	5,	By Cash, Herrick.....	" 63. 9 60
Feb.	28,	By Cash, Winchell.....	" 78. 200 00
March	31,	By Cash, Winchell.....	" 98. 200 00
April	10,	By Cash, Benjamin.....	" 118. 37 25
April	10,	By Cash, Benjamin.....	" 119. 31 30
May	30,	By Cash, Winchell.....	" 134. 200 00
May	31,	By Cash, Winchell.....	" 156. 200 00
May	9,	By Cash, Expense Account.....	" 162. 100 00
June	13,	By Cash, Winchell.....	" 209. 200 00
June	15,	By Cash, Analyses.....	" 212. 40 00
May	27,	By Cash, Greeley.....	" 218. 2 25
May	30,	By Cash, Whitman.....	" 221. 100 00
June	3,	By Cash, Hall.....	" 225. 75 00
June	4,	By Cash, Blankets.....	" 228. 10 00
June	4,	By Cash, Field Expenses.....	" 229. 50 00
June	8,	By Cash, Tents.....	" 234. 31 00
June	22,	By Cash, Field Expenses.....	" 243. 10 00
		By Cash, Boat.....	" 246. 70 00
		By Cash, Field Expenses.....	" 250. 34 46
		By Cash, Blankets.....	" 251. 10 00
July	3,	By Cash, Janney Bros.....	" 256. 13 40
July	6,	By Cash, Lathe and Apparatus.....	" 261. 145 00
July	11,	By Cash, Green.....	" 272. 42 75
July	26,	By Cash, Expense Account.....	" 273. 100 00
July	30,	By Cash, Smith.....	" 274. 9 00
Aug.	23,	By Cash, Juni.....	" 284. 78 25
Aug.	20,	By Cash, Hall.....	" 282. 100 00
Sept.	3,	By Cash, Malman.....	" 291. 127 34
Sept.	3,	By Cash, McLennan & Co.....	" 292. 14 69
Sept.	10,	By Cash, Bowman.....	" 294. 90 00

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Aug. 24,	By Cash, McLennan & Co.....	Voucher No ^o 297.	14 89
Aug. 26,	By Cash, Blankets.....	" 299.	5 00
Aug. 27,	By Cash, Snow.....	" 300.	94 00
Aug. 29,	By Cash, Winchell.....	" 302.	200 00
Aug. 29,	By Cash, Hill.....	" 303.	21 00
Sept. 30,	By Cash, Wilson.....	" 321.	32 49
Sept. 30,	By Cash, Wilson.....	" 322.	2 44
Aug. 8,	By Cash, Wiland.....	" 365.	8 87
Oct. 3,	By Cash, Winchell.....	" 367.	200 00
Oct. 14,	By Cash, Pott, Young & Co.....	" 379.	246 83
Sept. —,	By Cash, Mayhew.....	" 391.	20 48
Sept. 26,	By Cash, Mayhew.....	" 392.	21 43
Sept. 28,	By Cash, Cariboo.....	" 393.	10 00
Oct. —,	By Cash, Hall.....	" 394.	6 30
Oct. —,	By Cash, Mayhew.....	" 395.	10 97
Oct. 26,	By Cash, Mayhew.....	" 396.	10 17
Oct. 30,	By Cash, Morrison.....	" 397.	40 37
Oct. 30,	By Cash, Lightbody.....	" 398.	112 84
Nov. —,	By Cash, Hall.....	" 400.	57 60
Nov. 2,	By Cash, Winchell.....	" 403.	200 00
Nov. 4,	By Cash, Hall.....	" 405.	100 00
Nov. 30,	By Cash, Winchell.....	" 420.	200 00
Nov. 30,	By Cash, Hall.....	" 421.	100 00
Nov. 19,	By Cash, Hall.....	" 427.	200 00
Dec. 7,	By Cash, Malman.....	" 431.	114 00
March 25,	By Cash, Analyses.....	" 109.	90 00
May 31,	By Cash, Advertising.....	" 458.	9 80
Aug. 31,	By Cash, Supplies.....	" 439.	14 58
Aug. 31,	By Cash, Incidentals.....	" 459.	36 68
Aug. 31,	By Cash, Incidentals.....	" 460.	6 17
Aug. 31,	By Cash, Freight.....	" 461.	32 98
Aug. 31,	By Cash, Apparatus.....	" 462.	137 45
Aug. 31,	By Cash, Supplies.....	" 463.	102 11
Sept. 30,	By Cash, Transportation.....	" 464.	85 00
April 15,	By Cash, Field Expenses.....	" 466.	60 00
Oct. 30,	By Cash, Field Expenses.....	" 467.	50 00
Nov. 26,	By Cash, Field Expenses.....	" 468.	75 00
	By Balance, Museum.....		420 94
	To Balance.....		
		\$10,069 15	

\$12,069 15 \$12,069 15

MUSEUM ACCOUNT.

1878.			
Jan. 31,	By Cash, Paul.....	Voucher No. 53.	\$124 50
Feb. 20,	By Cash, Minerals.....	" 71.	105 00
March 7,	By Cash, Herrick.....	" 90.	4 05
April 1,	By Cash, Juni.....	" 105.	4 50
April 1,	By Cash, Juni.....	" 106.	6 45
April 16,	By Cash, Herrick.....	" 127.	4 60
May 11,	By Cash, Syffert.....	" 164.	16 50
April 29,	By Cash, Syffert.....	" 189.	10 50
May 25,	By Cash, Syffert.....	" 217.	17 25
May 29,	By Cash, Syffert.....	" 219.	4 20
June 12,	By Cash, Gardiner.....	" 240.	12 78
Aug. 23,	By Cash, Herrick.....	" 283.	97 20
May 19,	By Cash, Sundries.....	" 290.	13 41
	To Balance to Geological Survey.....		420 94
		\$420 94	\$420 94

BUILDING ACCOUNT.

DR.

To Balance from last Statement..... \$7,457 09

CR.

1878.				
Aug. 23,	By Cash, Wheaton & Reynolds.....	Voucher No. 285.		\$1,165 99
	By Balance.....			6,291 10
			<hr/>	
			\$7,457 09	\$7,457 09

HEATING AND FURNISHING.

DR.

To Balance from last Statement..... \$245 86

CR.

1877.				
Dec. 22,	By Cash, Museum.....	Voucher No. 5.		\$25 00
1878.				
Mar. 2,	By Cash, Museum.....	" 87.		25 90
April 13,	By Cash, Bennet.....	" 121.		65 55
	By Balance.....			129 41
			<hr/>	
			\$245 86	\$245 86

EXPERIMENTAL FARM FUND.

DR.

To Balance from last Statement..... \$671 87

LAND SALES' FUND.

DR.

To Balance from last Statement..... \$813 42

SALT LAND SALES.

CR.

Oct. 4,	By Cash, Wright.....	Voucher No. 370.		48 00
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Dr.

Oct. 30,	To Cash, Sale of Land.....		\$2,941 64	
	By Balance.....			2,893 64
			<hr/>	
			\$2,941 64	\$2,941 64

ANNUAL REPORT.

SUMMARY OF ACCOUNTS,

Building Account, to Balance.....		\$6,291 10	
Heating and Furnishing, to Balance....		129 41	
Experimental Farm Fund, to Balance.....		671 87	
Land Sale Fund, to Balance.....		813 42	
Salt Land Sales, to Balance.....		2,893 64	
Current Expense, to Balance.....		294 28	
Geological Survey, by Balance.....	\$10,069 15		
Balance on Hand	1,024 57		
		<hr/>	
		\$11,093 72	\$11,093 72

TWELFTH ANNUAL REPORT

OF THE

PRESIDENT

OF THE

UNIVERSITY OF MINNESOTA

TO THE

BOARD OF REGENTS.

1877-8.

THE UNIVERSITY OF MINNESOTA, }
MINNEAPOLIS, MINN. }
DECEMBER 31, 1878. }

SIR: I have the honor herewith to transmit the twelfth annual report of the condition and progress of the University.

I have the honor to be,

Very respectfully,

Your obedient servant,

WILLIAM W. FOLWELL,

President.

To the Hon. HENRY H. SIBLEY,

President of the Board of Regents.

REPORT OF THE PRESIDENT OF THE UNIVERSITY.

To the Honorable Board of Regents:

The University year 1877-8 began on the 11th day of September, 1877, and ended June 6th, 1878. The dates of the recesses and legal holidays may be seen in the annual calendar for the year.

PERSONS AND DUTIES.

ATTENDANCE.

The following tables exhibit the enrollment and classification of students for the year:

SUMMARY—1877-78.

COLLEGE OR DEPARTMENT.	CLASS.	Gentlemen.	Ladies.	Totals.
Science, Literature and the Arts.....	{ Senior	11	3	14
	{ Junior	16	8	24
	{ Special	1	.....	1-39
Mechanic Arts.....	{ Senior	1	.....	1
	{ Junior	2	.....	2-3
Agriculture.....	Special.....	1	.....	1-1
Collegiate Department.....	{ First	15	12	27
	{ Second.....	35	11	46-73
	{ Third.....	48	29	77
	{ Fourth.....	63	47	110-187
	{ Special.....	42	26	68-68
Totals.....	.....	235	136	371

OR BY CLASSES ONLY.

Seniors—of all Departments.....	15
Juniors—of all Departments.....	26
Sophomores—First Class, Collegiate Department.....	27
Freshmen—Second Class, Collegiate Department.....	46—114
Preparatory, { Third Class, Collegiate Department.....	77
{ Fourth Class, Collegiate Department.....	110—187
Special.....	70—70
Total.....	371

COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

CLASS.	COURSE.	Gentlemen.	Ladies.	Total.
SENIOR.....	{ Classical.....	5	.....	5
	{ Scientific.....	5	2	7
	{ Modern.....	1	1	2—14
JUNIOR.....	{ Classical.....	7	1	8
	{ Scientific.....	6	4	10
	{ Modern.....	2	3	5
	{ Speciall.....	2	.....	2—25
Totals.....	.....	28	11	39

COLLEGE OF MECHANIC ARTS.

CLASS.	COURSE.	Gentlemen.	Ladies.	Total.
SENIOR.....	Mech. Engineering.....	1	.....	1
JUNIOR.....	{ Civil Engineering.....	1	.....	1
	{ Mech. Engineering.....	1	.....	1
Totals.....	.....	3	.....	3

COLLEGE OF AGRICULTURE.

SPECIAL STUDENTS—Gentlemen..... 1.

COLLEGIATE DEPARTMENT.

CLASS.	COURSE.	Gentlemen.	Ladies.	Total.
FIRST.....	{ Classical.....	5	2	7
	{ Scientific.....	9	4	13
	{ Modern.....	1	6	7
		15	12	27
SECOND.....	{ Classical.....	18	1	19
	{ Scientific.....	12	3	15
	{ Modern.....	5	7	12
		35	11	46
THIRD.....	{ Classical.....	13	1	14
	{ Scientific.....	24	3	27
	{ Modern.....	11	25	36
		48	29	77
FOURTH.....	{ Classical.....	13	4	17
	{ Scientific.....	49	12	61
	{ Modern.....	1	31	32
		63	47	110
SPECIAL STUDENTS.....		42	26	68
Totals.....		203	125	328

ADMISSIONS.

In the summer of 1877 the experiment of holding examinations for admission in various parts of the state, which had long before been proposed and which had received the sanction of the board of regents, was first put in practice.

The result was the enrollment and examination of an unprecedentedly large number of candidates. This was partly due to the circumstance that no declaration of intention to enter the University was required, but any persons, without restriction, were allowed to participate. 126 persons were enrolled in Dodge Center, St. Cloud, Mankato, Garden City, New Ulm, Owatonna, Champlin, Rochester, Hutchinson, Le Sueur and Redwood; 81 were enrolled in Minneapolis in June, and 123 at and after the opening of the scholastic

year. Total of examinees, 330. Of this total, 12 on learning the nature of the examinations withdrew, and 95 submitted to partial examination only. Accordingly 223 persons were fully examined. From this number subtract 43 who failed, and there remain 180 successful candidates. 130 of these joined the classes in September or later. In the course of the year 34 persons from the number of candidates whose examinations were at first incomplete or unsuccessful, were admitted, and three were admitted without examination, by vote of the general faculty.

The whole number of new students admitted to instruction in the year 1877-8 was, as above, one hundred and sixty-seven (167.) They selected their courses of study as follows:

Classical Course—Gentlemen.....	16
Ladies.....	4—20
Scientific Course—Gentlemen....	55
Ladies.....	17—72
Modern Course—Gentlemen.....	4
Ladies.....	37—41
Selected Studies—Gentlemen.....	20
Ladies.....	14—34
Total.....	167

The average per cents of merits for the *elementary* branches, in which all applicants are by rule examined, were as follows:

Reading, 76; Writing, 72; Spelling, 73; English Grammar, 59; Arithmetic, 73; Elementary Algebra, 72; Geography, 77; United States History, 68; Average, 72.

In the report for the year to the State Superintendent of public instruction, may be found a particular account of the manner in which the "local examinations" for admission, were conducted during the summer of 1878, by committees of the General Faculty, acting under their regulations.

GRADUATIONS.

The sixth Annual Commencement was held in the Assembly hall of the University, on June 6th, 1878. The exercises were conducted according to the following programme.

*The University of Minnesota, Sixth Annual Commencement,
June 6th, 1878.*

ORDER.

- Music—Overture "Invocation A Ste. Cecille," *Lamotte*.
 Prayer—By the Rev. Henry Cross, D. D. of St. Paul.
 Music—Romance "Youth's Prayer," *Thiele*.
 Oratio Salutatoria*.....Miss Robinson.
 Oration—The Town Meeting.....Mr. Bryant.
 Oration—The Mechanical Engineer.....Mr. Bushnell.
 Oration—Man the "Roof and Crown of Things".....Mr. Couillard.
 Music—March from Tannhaeuser, *Wagner*.
 Oration—An International Code.....Mr. Howell.
 Oration—Liberty and Philosophy.....Mr. Lewis.
 Essay—The Golden Age.....Miss Maes
 Oration—Public Opinion.....Mr. Newton.
 Music—Selection "Girofle Girofla" *Lecocq*.
 Oration—Music in Civilization.....Mr. Prichard.
 Oration—Has every Man his Price?.....Mr. Smith.
 Oration—Communism.....Mr. Taylor.
 Oration—Social Science and Legislation.....Mr. Warren.
 Music—Fantasia for Violin, *Weissenborn*.
 Oration—Skilled Labor.....Mr. Williams.
 Oration—No Caste in Education.....Mr. Wood.
 Essay—Foundation Stones—Valedictory*.....Miss Getchell.
 Music—Overture "Stradella," *Flotow*.
 Conferring of Degrees.
 Music—Kutschke Polka, *Stasny*.
 Benediction.

*By election of the class.

The degrees conferred were as follows:

COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

Bachelors of Arts.

Julian Clarence Bryant.....	St. Peter.
John Hamilton Lewis.....	Monticello.
Thos. Rogers Newton.....	Maple Grove.
Evan Roland Prichard.....	Judson.
Daniel Williams.....	Lime Springs, Iowa.

Bachelors of Science.

Fred. Leslie Couillard.....	Richfield.
Nettie Getchell.....	Minneapolis.
Judson Torrey Howell.....	Chatfield.
Mary Warwick Robinson.....	Minneapolis.

Harvey Jay Smith.....	Red Wing.
Myron De Vere Taylor.....	Melrose.
William John Warren.....	Medford.
Henry Clay Leonard, (B. C. E., 1875).....	Washington.

Bachelors of Literature.

Mary Ann Maes.....	Owatonna.
George Albert Wood.....	Elliot.

COLLEGE OF MECHANIC ARTS.

Bachelor of Mechanical Engineering.

Charles Spencer Washnell.....	Minneapolis.
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A brief address delivered to the candidates, is offered to be printed with this report.

THE WORK OF THE YEAR.

The first term of the year began September 11th, and ended December 6th, 1877; the second term extended from December 11th 1877, to March 6th 1878, and the third from March 12th, to June 6th, 1878. The whole number of working days was 181. The following table exhibits the work, as to kind and amount performed in the several departments of instruction as reported by the respective officers in charge. In addition to the information given in previous tables, this notes the text books used, or specifies lectures when the instruction was so given. The inspection of examination and many other papers could not be included in such an exhibit.

Subject.	Text Book.	Instructor.	No. of Exercises	Class.	No. of Students	Term.
MATHEMATICS.						
Plane Geometry.....	Olney.	Thompson.	50	Second.	43	II.
.....	.....	Lundeen.	50	.....	32	II.
Algebra.....	Ficklin.	Thompson.	30	Fourth.	41	II.
Astronomy.....	Kiddle.	.....	52	.....	35	III.
Algebra.....	Olney.	.....	54	Thrd.	24	I.
.....	.....	Lundeen.	51	.....	22	I.
.....	.....	.....	51	.....	34	I.
Solid and Sp. Geometry.....	.....	Thompson.	12	Second.	56	I.
Plane Trigonometry.....	.....	Lundeen.	23	.....	24	I.
.....	.....	.....	23	.....	20	I.
.....	.....	H. J. Smith.	20	.....	22	I.
Sp. Trigonometry.....	.....	Thompson.	17	.....	23	I.
.....	.....	Lundeen.	17	.....	18	I.
.....	.....	H. J. Smith.	17	.....	21	I.
Algebra.....	Ficklin.	Thompson.	30	Fourth.	32	I.
.....	Olney.	.....	54	Thrd.	38	III.
.....	.....	Lundeen.	54	.....	20	III.

Subject.	Text Book.	Instructor.	No. of Exercis's	Class.	No. of Students	Class.
MATHEMATICS—Continued.						
Analytical Geometry.....	Olney.	Thompson.	30	Second.	58	II.
Mechanics.....	Peck.	"	20	First.	11	II.
Descriptive Astronomy.....	Snell.	"	30	"	25	III.
Diff. Calculus.....	Olney.	"	50	Junior.	16	I.
Practical Astronomy.....	Loomis.	"	40	Senior.	8	I.
Integral Calculus.....	Olney.	"	50	Junior.	6	II.
Theory of Equations.....	Todhunter.	"	46	"	7	III.
Algebra.....	Ficklin.	"	30	Fourth.	26	III.
CHEMISTRY.						
General Chemistry.....	Barker.	Peckham.	40	Second.	63	I.
<i>Analytical Chemistry.</i>	Lectures.	"	14	"	63	I.
Qualitative.....	(Manuals of Appleton, Fre- senius and Odling.)	"	50	Senior.	2	I.
Quantitative.....		"	50	Jun & Sen	6	I.
Experimentation.....		"	50	Junior.	2	I.
Qualitative.....		"	35	First.	3	I.
Experimentation.....		"	54	Senior.	14	II.
Qualitative.....		"	54	Junior.	1	II.
Quantitative.....		"	54	Junior.	2	II.
Medical.....		"	54	Junior.	5	II.
Qualitative.....		"	22	First.	12	III.
Quantitative.....		"	53	Special.	1	III.
Assaying.....		"	53	Junior.	1	III.
Medical.....		"	53	Junior.	2	III.
Qualitative.....	"	53	Junior.	1	III.	
Quantitative.....	"	53	Junior.	1	III.	
Applied Chemistry.....	Lectures.	"	38	Second.	15	III.
Correlation of Sciences.....	Recitations.	"	16	"	15	III.
	Lectures.	"	11	Senior.	14	II.
PHYSICS.						
Natural Philosophy.....	Peck's Ganot	Peck.	54	Fourth.	69	I.
Mechanical Physics.....	} Snell's	"	54	First.	11	I.
Molecular Physics.....	} Olmsted.	"	54	Third.	37	II.
Practical Physics.....	Ganot.	"	57 d. h.	Senior.	1	II.
Molecular Physics.....	(Laboratory)	"	57	Second.	20	III.
General Physics.....	Ganot.	"	57	"	25	III.
GEOLOGY.						
Dynamical Geology (2 sec.)	Dana.	Winchell.	108	Third.	93	II.
Historical Geology.....	Lectures.	Hall.	20	Junior.	11	III.
			32	Junior.	11	III.
BOTANY.						
Lessons and Hand Analysis	Gray.	Leonard.	112	Third.	57	III.
PHYSIOLOGY.						
Human Physiology.....	Dalton.	Lacy.	8	Fourth.	60	III.
".....	"	Leonard.	46	"	60	III.
ENGLISH.						
British Eloquence.....	Goodrich.	Marston.	55	Senior.	6	I.
Literary Criticism.....	Lectures.	"	55	"	13	III.
English Literature.....	} Brooke &	"	55	Junior.	24	II.
Anglo-Saxon.....	} Lectures.	"	55	First.	5	I.
Early English.....	Carpenter.	"	55	"	8	II.
Anglo-Saxon.....	Morris & Sk't.	"	55	"	2	III.
Rhetoric.....	Carpenter.	"	55	"	30	II.
Logic.....	Hepburn.	"	55	"	28	I.
English Composition (3 sec)	Jevons.	Folwell.	55	"	116	I.
Study of Words (2 sec.)	Gilmore.	Mrs. Smith.	162	Fourth.	71	II.
Old English History (2 sec.)	Swinton.	"	108	"	59	I.
	Freeman.	Miss M. J. C.	110	"		

Subject.	Text Book.	Instructor.	Exercis's	Class.	No. of Students	Term.
LATIN.						
Horace.....	{ Chase & Stuart.	Clarke.	51	First.	9	I.
".....	Essays.	"	27	"	9	"
Cicero (2 sections.).....	{ Allen & Greenough	"	108	Third.	53	"
".....	Essays.	"	53	"	53	"
Cæsar.....	{ Allen & Greenough	Hutchinson.	54	Fourth.	29	"
Grammar and Reader.....	"	Clarke.	55	"	44	"
Tacitus.....	Tyler.	Brooks.	54	Junior.	11	II.
Livy (1st section.).....	Lincoln.	Clarke.	52	Second.	16	"
".....	Essays.	"	16	"	16	"
Livy (2d section.).....	Lincoln.	"	52	"	19	"
".....	Essays.	"	19	"	19	"
Virgil (1st section.).....	Frieze.	"	52	Third.	23	"
".....	Essays.	"	23	"	23	"
Virgil (2d section.).....	Frieze.	"	52	"	28	"
".....	Essays.	"	28	"	28	"
Cæsar.....	{ Allen & Greenough	Hutchinson.	52	Fourth.	26	"
Grammar and Reader.....	"	Miss M. J. C.	50	"	46	"
Cicero de Amicitia.....	{ Chase & Stuart.	Brooks.	20	Senior.	8	III.
Cic. de Senectute & Plautus	Harrington.	"	48	Junior.	12	"
".....	Essays.	"	24	"	12	"
Tacitus.....	Tyler.	Clarke.	53	First.	9	"
".....	Essays.	"	9	"	9	"
Livy (1st section.).....	Lincoln.	"	52	Second.	13	"
".....	Essays.	"	26	"	13	"
Livy (2d section.).....	Lincoln.	"	52	"	23	"
".....	Essays.	"	46	"	23	"
Virgil (1st section.).....	Frieze.	"	55	Third.	21	"
".....	Essays.	"	42	"	21	"
Virgil (2d section.).....	Frieze.	Miss M. J. C.	55	"	21	"
Cicero (2 sections.).....	{ Allen & Greenough	Hutchinson.	110	Fourth.	49	"
".....	Essays.	"	49	"	49	"
GREEK.						
Greek Literature.....	Lectures.	Brooks.	24	Senior.	5	I.
".....	{ Exam'n & Reviews.	"	24	"	5	"
Plato.....	Tyler.	"	53	Junior.	8	"
".....	Essays.	"	24	"	8	"
Homer.....	Boise.	Hutchinson	52	Second.	20	"
".....	Essays.	"	60	"	20	"
Anabasis.....	Boise.	"	54	Third.	8	"
".....	Essays.	"	8	"	8	"
Grammar and Reader.....	{ Hadley & Boise.	"	54	Fourth.	18	"
Aristotle.....	Ox. Class.	Brooks.	51	Senior.	5	II.
Demosthenes.....	Heslop.	"	49	First.	5	"
Homer.....	Boise.	Hutchinson.	52	Second.	16	"
Anabasis.....	"	"	52	Third.	8	"
Grammar and Reader.....	{ Hadley & Boise.	"	52	Fourth.	18	"
Æschylus.....	Woolsey.	Brooks.	51	First.	7	III.
".....	Essays.	"	18	"	7	"
Herodotus and Thucydides.	Mather.	Hutchinson.	52	Second.	19	"
".....	Essays.	"	57	"	19	"
Grammar and Reader.....	{ Hadley & Boise.	"	55	Fourth.	17	"

Subject.	Text Books.	Instructor.	Exercis's	Class.	No. of Students	Term.	
MENTAL PHILOSOPHY.							
Psychology.....	} Hickok ½h Lectures.	Campbell.	55	Junior.	27	III.	
History of Philosophy.....			"	40	Senior.	13	I.
Ontology.....			"	15	"	13	I.
MORAL PHILOSOPHY.							
Practical Ethics.....	Lectures.	Campbell.	10	Second.	47	II.	
History of Ethics.....	"	"	20	Senior.	15	II.	
Philosophy of Ethics.....	Hickok.	"	15	"	15	II.	
Evidences of Christianity.....	Lectures.	"	20	"	15	II.	
Natural Theology.....	"	"	20	"	10	III.	
COMPAR. PHILOLOGY.							
Philology (theoretical).....	Lectures.	Campbell.	22	Junior.	25	I.	
FINE ARTS.							
Fine Arts.....	Lectures.	Campbell.	10	Senior.	10	III.	
MINERALOGY.							
Lithology and Blow-Pipe Analysis.....	Brush.	Winchell.	63 d. h.	Junior.	10	II.	
ZOOLOGY.							
Comparative Zoology.....	Tenney.	Winchell.	10	First.	18	III.	
".....	"	Lacy.	47	"	18	III.	
PHYSICAL GEOGRAPHY.	Lectures.	Lacy.	64	Fourth.	61	II.	
INDUSTRIAL DRAWING.							
Drawing—Geom. and Proj.	(oral.)	Rhame.	*54 d. h.	Third.	38	I.	
Descriptive Geometry.....	Church.	"	54	Second.	23	II.	
".....	"	"	54	First.	12	II.	
Free Hand Drawing.....	Smith.	"	57	Fourth.	56	III.	
CIVIL ENGINEERING.							
Field Work.....	(oral.)	Rhame.	54	Jun&Sen	2	I.	
Applied Mechanics.....	Weisbach.	"	54	Senior.	2	I.	
Machinery, with Drawing..	Rankin.	Peck.	54	Jun&Sen	3	I.	
Mechanics.....	Weisbach.	"	54	Junior.	2	II.	
Mechanical Constructions.	Laboratory.	"	54	Senior.	1	II.	
Strength of Materials.....	Weisbach.	"	53	Junior.	2	III.	
Bridge Building.....	Wood.	"	30	Senior.	1	III.	
Building Materials.....	Mahan.	"	20	"	1	III.	
Surveying.....	Lectures.	"	4 d. h.	Second.	21	III.	
".....	Field Work.	"	18 "	"	21	III.	
SOCIAL SCIENCE.							
Civil Government.....	DeTocquey.	Folwell.	30	Senior.	13	II.	
".....	Const. U. S.	"	9	"	13	II.	
".....	Const. Minn.	"	3	"	13	II.	
".....	Papers.	"	39	"	13	II.	
Political Economy.....	Lectures.	"	47	"	15	III.	
SANITARY SCIENCE.							
".....	Lectures.	Hewitt.	8	"	15	III.	
HISTORY.							
History of Civilization.....	Guizot.	Laing.	34	Junior.	30	I.	
Mediæval History (2 sec.)..	Gibbon.	"	46	Second.	50	II.	
Modern History.....	Thalheimer.	"	22	First.	24	III.	
General History.....	Swinton.	"	58	Fourth.	37	III.	
"..... (2 sec.).....	"	Mrs. Smith.	116	"	55	III.	

Subject.	Text Book.	Instructor.	Exercis's	Class.	No. of Students	Term.
MILITARY SCIENCE.						
Co. Drill (Dnties of Officers)	Upton.	Lundeen.	16	First.	12	I.
" (Duties of Guides.)	"	"	16	Second.	40	I.
"	"	"	16	Third.	43	I.
Squad Drill and Manual of Arms.....	"	"	20	Fourth.	46	I.
Military Organization	Lectures.	"	2	1st & 2nd	50	I.
Co. and Battallion Drill— (Duties of Officers).....	Upton.	"	38	First.	6	III.
Co. and Battallion Drill.....	"	"	38	2d, 3d, 4th	109	III.
Skirmish Drill.....	"	"	5	1st, 2nd, 3d, 4th.	101	II.
Target Practice.....	"	"	4	"	64	III.

This Commencement was honored by the presence of the Senate of the State in a body, who adjourned for that purpose.

The dinner of the alumni and their guests, including the officers of the University, many State officers and legislators, at the Nicollet House, deserves mention, as a most agreeable re-union, calculated to stimulate and refresh the loyalty of those who have been recipients of your care and instruction in former years. It seems to me in every way proper that the University should cherish this feeling of respect and affection, by granting some pecuniary assistance to the management of these meetings. A regular appropriation of a small amount would ensure their success, and I am certain no suspicion of wrong use of public money could rest upon the Board. The commencements of a college is everywhere recognized as an indispensable feature of college life. They cannot be conducted, even on a small scale, without a considerable expense, and as this University grows in number and importance the expenditures for Commencement Day will increase. It is therefore proper that these charges be included in your estimate of expenses, and provided for by a regular appropriation. For the first time, this year, we failed to enjoy the music of the fine military band of the 20th U. S. Infantry, for many years stationed at Fort Snelling, the headquarters of the Brevet Maj. Gen. Sykes. The performance of the Great Western Band was of a very high character, heightening the interest of the day.

The following table shows the number and kinds of degrees which have been conferred by the University.

	1873.	1874.	1875.	1876.	1877.	1878.	Total.
Bachelor of Arts.....	2	1	3	4	9	5	24
Bachelor of Science.....		1	2	5	3	8	19
Bachelor of Literature.....			1		3	2	6
Bachelor of Civil Eng.			3	3			6
Bachelor of Mech. Eng.....						1	1
Bachelor of Architecture.....					1		1
Bachelor of Agriculture.....							
Total....	2	2	9	12	16	16	57

This table likewise exhibits the selections of degrees and courses of study leading to each, made by candidates. So far the traditional classical course seems to be most frequently chosen. The probability is, that for a long time to come as large a number of persons proportionally to the population will continue to demand this ancient and honorable curriculum, while large additional numbers will desire one or other of the new courses. Were our colleges and universities to refuse to conduct the scientific and literary or modern language courses these persons would be denied the higher education so far as schools are concerned.

The technical courses in engineering and agriculture do not now attract large numbers anywhere, because the country does not yet insist on scientific and scholarly qualifications in the directors of industry and the liberal training formerly demanded of candidates for professions seems to have fallen into disrepute with the majority of persons entering them. The ministry remains the only learned profession.

MASTERS' DEGREES.

In pursuance of the by-laws adopted at the last annual meeting of the Board, the faculties of the Colleges of Science, Literature and the Arts, and of Mechanic Arts, have established the regulations necessary to carry them into effect. It was not deemed practicable to offer to candidates any regular, stated instruction at the University, as the professors are now employed with undergraduate teaching. The plan adopted simply maps out certain fields of study and investigation, suitable to the particular degrees aspired to.

The cultivation of certain portions is insisted on in each case as pre-requisite to graduation, but a wide range of elective work remains open. In each case a thesis appropriate to the nature of the degree is required to be submitted.

In the College of Science, Literature and the Arts, several candidates have already been enrolled.

For the full text of the regulations adopted reference is made to the annual calender for 1877-8. Other rules, in particular, for fixing the manner and extent of the examinations, will at length become necessary. It is believed that this University was the first institution of the North to announce the policy, since adopted in many quarters, of granting no degrees, except for merit as determined by examinations. This policy was agreed to by this Board as early as June, 1870.

I. *EQUIPMENT.*

BUILDINGS.

An inspection of the buildings will show them to be in good repair and preservation; a fact creditable to the large body of students who have gone in and out during the year. One dollar will cover all the wilful damages of the year. The serious damage to the plastering of the assembly hall by the defects of the slate roof has ceased since the completion of the new tin roof put on the last summer. As this otherwise fine room is thus much defaced, it is important that the original plan for its decoration be soon carried out.

There is still a lack both of sufficient and suitable furniture for many of the rooms, in particular the ladies' parlor and the faculty rooms. The common cottage chairs and old school desks still in use in several class rooms, should be replaced by the tablet chairs provided for others.

The needs of the institution in the way of new structures will be referred to later.

MUSEUM AND COLLECTIONS.

The Curator's report will show in detail the additions and enlargements to the General Museum. The opening of the south room for the display of minerals, has been the principal change.

Considerable accessions have been made to the collections of Agriculture and Technology, but they cannot be displayed without additional cases. At the date of this report, the articles ordered under the small appropriation of the board for the increase of the Classical Museum have not been received, so that no changes are to be noted.

APPARATUS.

The Chemical Laboratory has received some additions to its outfit, through the necessity of providing assaying apparatus for the operations of the Geological Survey. It ought to be well known throughout the state, that this laboratory is now thoroughly equipped for all the ordinary analytical, metallurgical and toxicological examinations.

No material additions have been made either to the mineralogical or physical apparatus.

Attention is asked to the statement of the assistant professor in charge of physics, of the needs of that department. The point that physics is no longer a mere attachment to another department of instruction, but is in itself a vast and independent field, which must presently undergo subdivision, is, no doubt, well taken. A thoroughly equipped and constantly growing museum and laboratory of physics is already acknowledged to be indispensable to every college or university. No other department of human learning has been extended so rapidly within the past thirty years, and none other is now so widely developing. I would respectfully second the request for a moderate standing appropriation.

In the department of astronomy the equipment of apparatus stands where it has stood before, substantially at zero. The professor in charge has been seriously considering the propriety of recommending to the Board, to discontinue the offer of all instruction except the more elementary portions, on account of the lack of the indispensable instruments. The kindly loan by a citizen of Minneapolis, of a fine telescope of sufficient power for illustration, has been highly appreciated by the professor and his students.

I must here be allowed to express my disappointment, that none of the numerous representations in successive reports and communications, of the need of a working observatory, has ever met with a response from the legislature. The consequence is, that to-day, the State University is indebted to the enterprise of a sister college for a standard of time by which to summon her classes to their duties.

The department of History has been materially aided by the collection of wall maps, imported by order of the Executive Committee at an expense of some seventy dollars. The instruction has also been reinforced by a number of tasteful maps drawn and colored by the professor himself.

There is pressing need in all departments of books, maps, charts, and instruments.

THE PLANT HOUSE.

This establishment opened in a tentative manner the previous year by Professor Lacy has been in successful operation and has served a useful purpose in illustrating the instruction in Botany and Horticulture. Although no exertions have been made to reach a market, the sales of plants and flowers has been considerable, and it is believed that it would not be difficult by somewhat extending the house, to make the establishment self-supporting or nearly so. This however, might be at the expense of usefulness as an appliance of instruction.

EXPERIMENTAL FARM.

A considerable addition to the workable area has, been made by the drainage of the hillside east of the barn.

The detailed report of Prof. Lacy, herewith transmitted, will show the nature and extent of the experiments and other operations carried on. A considerable amount of labor has been performed by students who have received customary wages of men or boys respectively. There are no means by which our young men can be compelled to labor on the farm at less wages than they can receive for similar services elsewhere. The resolution of the Board fixing their compensation at 12½ cents an hour is a dead letter and had better be repealed.

In connection with this topic the following question is submitted without discussion for the consideration of the Board:—

Unless the farmers of the state within a reasonable period, avail themselves of the instruction in scientific and practical agriculture to a far greater extent than hitherto, ought not the board in justice to the other branches of the institution to reduce the expenditures of the college of agriculture?

FRUIT FARM.

Of this there is only occasion to say here, that the report of Superintendent Gideon will be found with that of Professor Lacy, the fruit farm being made by law a portion or extension of the experimental farm.

While it is impossible to foresee the results of this new enterprise, this much is certain, that the landed investment is a good one for the University, and the reasonable promise of success under so able superintendence abundantly justifies the expenditure of the small amount appropriated from the State Treasury.

THE GEOLOGICAL AND NATURAL HISTORY SURVEY.

The sixth report of progress is herewith transmitted. A summary of the topics treated has already, through the kindness of the chief geologist been communicated for incorporation in the report of the Board, which renders unnecessary further remark in this place.

DRILL HALL AND GYMNASIUM.

There is none. Reference is respectfully made in the last report for a discussion of the needs and the promise of the military department.

THE LIBRARY.

The whole number of volumes, exclusive of public documents and pamphlets, added during the year was 716. These were chiefly purchased out of the appropriations of the Board at the previous annual meeting. I would respectfully recommend that the appropriations for the purchase of books and periodicals be made permanent and annual. When made from year to year it is inconvenient to close the accounts by reason of outstanding orders, and considerable balances are lost to the library.

The attention of the Board is called to the list of accessions forming appendix "B" of the last annual report. This list, embracing a very valuable collection of books, conforms closely to the best examples of the modern art of cataloguing, so far as the resources of the State printer would allow. The accessions since the printing of this list have been so few that it is not deemed necessary to encumber the report with their titles, and with the consent of the Board they will be held over to a later report.

So soon as possible a considerable appropriation should be made for binding periodicals and pamphlets, of which a large collection is now on hand.

DONATIONS.

The following donations have been duly acknowledged on behalf of the Board:

LIST OF DONATIONS.

- Arthur M. Eastman:
Eclectic Magazine, 1865.
W. E. Leonard, B. A.:
Jackson's Optics.

Prof. E. J. Thompson:

De Imitatione Christi.

Regents of the University of the State of New York, [through Hon. S. B.

Woolworth, Secretary;

Annual Regents Reports 1865, 1872-76.

Annual Reports State Cabinet Natural History, 1868--1872.

Am. Unitarian Association:

Sermons by Jas. Walker.

War Department:

Ordnance Regulations.

Mrs. M. F. Pierce, Cambridge, Mass.:

Agassiz Contributions to Nat. History of U. S., 4 v.

Helvetius, Oeuvres completes.

Kant, Essays and Treatises, (trans.)

Cutter, War Poems.

"Tom Bowling's" Book of Knots.

Black's Guide to Warwickshire.

Prof. R. W. Laing, L. L. D.

Tale of a Tub, &c.

Calendar, London University, 1861-4.

H. W. Howgate, U. S. N.

Polar Colonization.

Dominion of Canada.

Geological Survey, Report of Progress, 1866-77.

U. S. Government.

Coast Survey, 1874.

Report, Chief of Ordnance.

Report of Survey of the Territories, Hayden.

Official Register, 1877.

Documents of, 44th Congress, 2nd Session.

PERIODICALS.

The following list comprises the periodicals and journals supplied to the reading room. Those marked with a * have been furnished gratuitously by the publishers, to whom the thanks of the Board are due:

Quarterlies—Journal of Speculative Philosophy, Edinburgh Review, Westminster Review, London Review, British Review, Popular Science Review, Mind, Bibliotheca Sacra, National Quarterly Review.

Bi-Monthlies—New Englander, N. A. Review, International Review.

Monthlies—Am. Journal of Science and Art, Appleton's Journal, Art Journal, Atlantic, Blackwood, Contemporary Review, Deutsche Revue, Eclectic, Harper's Monthly, Popular Science Monthly and Supplement, Scribner's Monthly, The Gardner's Monthly, Agriculturist, Live Stock Journal, Minnesota Farmer, Health Reformer, *Messenger of Peace.

Semi-Monthlies—Revue des Deux Mondes, Ueber Land und Meer.

Weeklies—Academy, Atheneum, Chemical News, Harper's Weekly, Littell's Living Age, London Times, Nature, Nation, Publisher's Weekly, *Official.

Gazette of Patent Office, Library Journal, Scientific American and Supplement, *Anoka Sun and Republican, *Glencoe Register, *Prairie Farmer, Farmers' Union, Rural New Yorker, Country Gentleman, New Orleans Picayune, Alta California, *Owatonna Journal, *Minneapolis Freie Presse (Ger.) *Minneapolis Staats Tidning (Swedish) Richmond Whig, Boston Statesman.

Semi-Weekly—New York Tribune, *New York Evening Post.

Dailies—*War Department Weather Map, *St. Paul and Minneapolis Pioneer Press, *Minneapolis Tribune.

Books issued during the years named:

Year ending in June.	'73.	'74.	'75.	'76.	'77.	'78.
Biography.....	121	83	134	147	170	359
History.....	94	139	219	300	489	527
Metaphysics.....	163	96	176	446	513	272
Belles Lettres, Prose.....	117	101	161	186	267	511
Belles Lettres, Poetry.....	140	107	167	143	156	323
Ancient Languages, Literature.....	12	41	41	68	54	70
Modern Languages, Literature.....	53	92	104	64	120	175
Natural History, Science.....	83	106	107	121	93	203
Mathematics.....	95	43	28	31	18	32
Travels.....	108	99	145	111	105	120
Political Science.....	32	23	55	45	84	120
Miscellaneous.....	191	103	165	169	144	191
	1,360	1,066	1,569	1,904	2,356	2,930
Issued to Faculty.....	203	166	471	486	669	1,022
Used by students in reading room...	370	500	720	1,650	3,200	4,000†
	1,933	1,622	2,750	4,040	6,225	7,925

†Estimated.

I desire formally to acknowledge the efficient services of Mr. Graham C. Campbell, as assistant librarian, who quit the service of the University at the close of the year, in order to devote himself to his chosen profession—the ministry. Mr. Campbell, from several years' service, had become expert in many of the departments of a librarian's duty.

THE FUTURE.

It was ten years ago on the 13th day of February last, that the act which forms the charter of the University was passed by the Legislature of 1868. The preparatory department had been opened a few weeks before. The material results may be summed up in the lands, buildings, and their equipment, forming successive topics

of this report. They are adequate for the instruction of four hundred students in most of the essentials of the traditional scholastic branches, and in some of those referred frequently to as comprising the new education. The immaterial, but most permanent results of these ten years' history, must be sought in the influences which may be exerted by nearly two thousand youths who have been here instructed. The number of persons whose circumstances have enabled them to persevere in a course of studies covering seven years, must not be taken as the only or the chief index of the work of a college. It may well be suspected, that if our American colleges were to enumerate among their alumni, all those who had been instructed but not graduated, many of the most useful and some of the most famous of their sons, would be found among the non-graduates.

The Board have reason to congratulate themselves and the State upon the progress which has been made. The past, therefore, is secure. When the present outfit is compared, not with what will be indispensable in the distant future, but with what the leading American colleges to-day are providing, no governing board nor legislature can be credited with full performance of duty, which merely contents itself with a careful expenditure of the present income. If merely to audit receipts and disbursements were all, a committee of state officers would be sufficient.

The great and chief office of a governing board is to provide for, i. e., to foresee the future and its demands, to plan, to aggregate and to amplify the means and facilities of the University. Especially is this true in a new state. The time is passing, and will so on be passed forever, when it may be possible to provide, without inconvenience or distress, for such an endowment for this institution as shall not only ensure its development as a leading centre of learning in the nation, but shall relieve future generations of any serious burden of taxation for its support. The lands now set apart for the endowment will yield, with a continuance of good management, a round million dollars after, say, twenty years. The maximum income cannot be placed above five per cent., at which rate the yearly receipt would be \$50,000. In twenty years from this time the annual expenditures of this University ought not to be less than \$150,000. It will then be merely one-third of the present annual expenditure of Harvard University, and a trifle more than the whole outlay of the University of Michigan last year. The increase of the endowment, therefore, is a problem of the first importance for the Board of Regents, and will be until it is either solved or abandoned as impracticable. In the latter case the hope indulged by

some, that here in the center of the great northwest a great seat of learning may in our time be founded for all generations, must be deferred until individuals more generous than states shall devote the needful wealth.

It may, however, be suggested that the future may be left to care for itself, and that the duty of the present generation is done, when such opportunities for culture as may here be compassed, are placed before our youth. Descending to this ground, there still remains the most vexatious question, "how to increase the present current income in view of impending demands?"

The plan and outfit of the University is respectable for this year, but will not be in three or five years. If no new departments, such as law and medicine shall be attempted, those now in operation will need large additional outlays to meet the growing demands. There must be more class rooms, more laboratory and museum room, more, a great deal more space for the library; there must be a gymnasium. Books, instruments, furniture and apparatus of all kinds, in large amounts, will be needed. In these days, when scholarship runs into specialties, and can only be maintained by special studies, it is not possible to secure the best instruction from men of mere general information. The previous reports have already specified particular additions which ought even to-day to be made to the teaching force.

It is not, therefore, the future alone, but the present needs of the University which calls for all the energy and wisdom of the Board.

The University can not remain stationary and remain respectable. Her offer of free instruction will be disregarded by the youth of Minnesota, if there is reason for them to believe it to be scant or inferior.

Permit me, speaking with the earnestness of one in daily contemplation of the present demands and future possibilities of this University, to express the conviction, that no trivial considerations, whether of reserve or despair, should prevent this Board from demanding of the representatives of the people those means by which alone your trust can be executed.

All of which is respectfully submitted.

APPENDIX A.

Short Address by President Folwell, Upon Conferring the Degrees at the Sixth Annual Commencement, June 6, 1878.

Mr. President:

Before proceeding to the ancient and simple ceremony which will mark the close of the under graduate career of these candidates, permit me to use the customary privilege of speaking some words to them. I desire to certify you that the degrees about to be conferred by your authority belong by right to those who receive them, because they have severally complied with the conditions prescribed by the Board of Regents acting in pursuance of law. These diplomas are not complimentary certificates to a certain term of residence here, but to the successful prosecution and completion of long and exacting courses of study. Had these courses been by you made shorter or easier, or had the faculty been less faithful in exacting thorough performance, the number of candidates appearing here to-day to receive your decoration might have been much greater. I beg you to remember that these successive graduating classes are the few heroic survivors of many scholastic campaigns. The thinning-out process, however, I cannot claim to be due to an excessive rigor in our own discipline. It is the prevailing rule of American Colleges, including the oldest of them, that less than 50 per cent. of those who enter, ever reach graduation. Nor need this seem strange when we take into account financial complications, family changes, disease, to say nothing of the casualties of the examination room.

We present these candidates then as our Spartan band, and I think the fact that they are here to-day performing the final duty imposed by you is proof enough that they have been faithful and dutiful and are worthy to be honored by you.

My friends you have now gone through college, you have "got an education." You will be congratulated on all hands and you

will be sensible of an honest pride in having at length obtained so good a degree. Your friends will call you fortunate—and fortunate indeed you are, but it may be for reasons other than those which find affectionate expression from the lips of happy friends. I doubt whether any of you will be happier, as the world uses the word, than other people. The perfect physical poise and integrity of the seaman or the mountaineer you will never know; the untroubled serenity and the undoubting omniscience of the well fed ignoramus is not for you. You have passed many years learning how little men really know and how easily they are led and misled. You have had occasion to note how hard a struggle man wages on this planet for his life and life's needs, against the whirlwind, the earthquake, famine, fire and flood, the wild beast, disease and bitterest and most fatal of all, the vices and ferocity of brother men. You have learned too much of the changes and chances of this mortal life ever to be happy, as children are happy. The ancient preacher said most truly: "For in much wisdom there is much grief, and he that increaseth knowledge increaseth sorrow."

It is not then on the score of happiness—for that is a dream—that I would congratulate you, but rather because by a course of scholastic discipline you have been permitted to furnish yourselves more completely for the duties of life, and to perform higher and nobler service than the unskillful, in the good cause of God and country.

It is especially appropriate and to be expected, that the alumni of a public endowed university, offering free instruction, should devote themselves to the public service and to social actions.

That you appreciate this obligation, the deep interest you have taken in those studies which lie nearest to the practical public questions, testifies. The general turn of the discussions which you have brought forward here to-day, betrays your sense of interest and responsibility in regard to many of the problems of legislation and society which are ever occurring and recurring in free States. What some of these problems are and how grave and menacing they just now are looming into our sky, some of you have sufficiently shown. Our Arcadian era—our golden age—with its simple ways and pure democracy, is gone. A great nation, spanning the continent, lately reinforced by many millions of persons untrained in the art of self-government and these clustering into a few great cities, can no longer govern itself by the simple republican routine of the town meeting. Every thinking man is wrestling with the problem, how shall we preserve order without imperilling liberty? I commend your resolution and industry in grappling with such

questions, even in the arena of the drill ground, and I trust you will not be discouraged hereafter by any of those circumstances which surround public life.

Politicians in the just and noble sense of the word I hope you all will be, politicians in the low and bad sense never.

I do not, however, advise you or any of you to enter the political arena, to figure as combatants in the lot struggles of caucus and party. You, as thinkers, can do far better service on the private benches. The candidate for office is not favorably situated to form just and clear opinions of public policy. The office holder must follow forms and precedents, and administer the law as he finds it. In a country such as ours the active politician cannot govern himself by abstract and speculative considerations. He must be looking constantly into the glass of public sentiment to see what signals it reflects. Be it yours to form, or help to form that public opinion, according to principles. You will, as good citizens faithfully discharge any public duties which your fellow citizens may impose upon you, but you will never covet offices. The conduct of public affairs demands abilities, mental, moral and physical in such combinations as few men possess. The probability is that the thinker and scholar will not possess them. If so, let him not complain that he has no weight in the state. Need the pale mathematician, who maps out sea charts and navigation tables complain that he is worth no more than a child on the quarter deck of man-of-war or steamer, off a dangerous coast in a tempest? No, no, such men as De Tocquville and Guizot, Locke and Bentham, Lieber and Woolsey—the men who make the charts by which statesmen must steer the ship of State, need have no fears for their usefulness or their fame.

In exhorting you, therefore, to the serene but earnest study of social questions, I would not have you think that such questions furnish their own solution. Your political philosophy will be but a part of your general philosophy of life and conduct. What has been said of theology and philosophy is just as true, perhaps, of politics and philosophy. "No difficulty emerges in theology (politics) which has not already emerged in philosophy." One of your number has well shown how great revolutions have been set going by the opinions invented or sanctioned by great thinkers. Be careful, then, what philosophy you lay down as the major premise of your logic of society and government.

In the conduct of your private lives let me add, that philosophy is of supreme importance. We are all philosophers at first or second hand. "As a man thinketh so is he," and so does he. If you

shall choose to think with some that there are no things existing for us except those which the bodily senses can take note of, you will, by and by, find yourselves teaching and practicing some epicurean manner of life, of which the outcome is simply "eat, drink and be merry" as best you can.

You will, I trust, have adopted a better philosophy, whose logic will last you not to death, but to life; not to despair, but to hope; not to an endless sleep, but to immortal activity beyond the fading scenes of this world; remembering ever, that "the things which are seen are temporal, but the things which are not seen are eternal."

PROFESSOR LACY'S REPORT.

Wm. W. Folwell, President of the University of Minnesota:

SIR:—I respectfully beg leave to submit the following report of the College of Agriculture for the year ending Oct. 31st, 1878:

INSTRUCTION.

Three persons are now pursuing studies in the College of Agriculture. One is enrolled in the Elementary Course, one in a special course for the year 1878-9, and the third is a graduate of the University, pursuing the study of Agricultural Chemistry.

Special courses for the year 1878-9, including agricultural chemistry, natural philosophy, physical geography, physiology, farm drainage, farm accounts and agriculture, have been offered this year, as last, under the authority of the by-law admitting "any persons to any class in this college upon the sole condition that they appear to be competent to receive the instruction." These courses were published with the other announcements of the College of Agriculture in the University Calendar. Five hundred copies of this portion of the Calendar were bound separately and distributed to those who, it was supposed, might be specially interested. Five hundred circulars, letter size, calling attention to these special courses, have also been distributed by mail.

FARMER'S LECTURE COURSE.

Several inquiries have been made concerning the lecture course for farmers offered in the University Calendar, by persons who would like to attend the same. This lecture course is offered with the condition that thirty persons not members of any class in the University shall signify their intentions to attend it. It is believed that the value of such a course could be ascertained best by proceeding to give it without regard to promised attendance. Success should be measured, not by the attendance, but by the interest manifested in this institution and in agricultural education in the course of some period of time, say three or four years. To promote and secure this success two measures would be necessary:— (1.) Wide and liberal advertising in advance. (2.) The publication of the lectures and discussions in full in some one or more weekly papers, employing a stenographer whenever necessary to secure full and accurate reports. These two

measures are, it is believed, quite as important as to procure noted and expensive lecturers from abroad. Many of the Agricultural Colleges are now offering these lecture courses for farmers.

LIBRARY.

Thirty-five volumes of the "Journal of the Royal Agricultural Society of England" have been added to the list of agricultural works in the library, and constitute a most important and valuable addition. The "Country Gentleman" and "National Live Stock Journal" have been added to the list of agricultural papers received in the Reading Room.

MUSEUM.

One hundred and seventy-eight specimens of wood have been received from the United States Department of Agriculture. They were grown in Illinois, California, Oregon, Brazil and Argentine Republic. A series of the woods of our own State would be a most valuable addition. The case mentioned in last report has been filled with seeds, grains, grasses, models of machines, &c., and a large number of objects remain unprovided for. Additional cases are greatly needed.

ORCHARD, FRUIT GARDEN AND NURSERY.

Nothing in the orchard and fruit garden requires particular mention here. For purposes of experiment and instruction, ten to fifty each of the following trees and shrubs were procured and planted in the nursery last spring.

Mountain, White, Pitch, Scotch and Austrian Pines; Norway and White Spruces and Balsam Fir; American and Siberian Arbor Vitæ; Balsam and Silver Poplars; Cottonwood; Honey and Common Locusts; Sugar, Red and Silver-Leaved Maples; Bur, Swamp White, Black Scrub, Red, Black, Scarlet and White Oaks; Barberry; Wahoo; Virginia Creeper; Smoke Tree; Staghorn Sumac.

It is intended to make additions to this list from time to time. Silver-Leaved Maples to the number of 2,583 and 285 Box Elders, grown from the seed, were also transplanted.

VEGETABLE GARDEN.

Experiments with garden vegetables have been continued on substantially the same plan as heretofore, but observations have been taken more extensively and accurately.

These experiments include—

Bush Beans,	Pole Beans,	Garden Beets,
Carrots,	Parsnips,	Cucumbers,
Squashes.	Spinach,	Garden Peas,
Tomatoes,	Cauliflower,	Early Cabbage,
Late Cabbage,	Sweet Corn,	Pop Corn,
Lettuce,	Onions,	Swiss Chard.
Radishes.		

The results, as far as time has permitted us to prepare them, are detailed in the following pages:

GARDEN BEANS—DWARF.

Seventeen varieties were planted May 15th. Soil sandy, plowed the autumn previous, harrowed thoroughly before planting, and furrows then opened with a single shovel plow two and a half feet apart. The beans were dropped by hand in these furrows, five or six in a hill, and the hills eighteen inches apart, after which they were covered with the single shovel plow. Just before coming up they were harrowed with Thomas' smoothing harrow, and afterwards they were kept clear of weeds by running the cultivator between the rows, the hoe being used simply to cut the weeds from the row itself. The following table gives the results of the trial.

NAME.	Yield. <i>a.</i>	No. days from planting to first picking.
Refugee.....	Poor.	76
Intermediate Horticultural.....	Good. <i>b.</i>	69
Early Valentine.....	"	65
Early Round Yellow six Weeks.....	"	61
Yellow Eye.....	Fair.	61
Dun Cranberry.....	Very Good. <i>c.</i>	69
Early Fejee.....	Good.	61
White Wax.....	Poor.	61
Black Wax.....	"	57
Golden Wax.....	"	57
Early Six Weeks.....	Fair.	57
Early Mohawk.....	Good.	57
Concord Bush.....	Poor.	67
Early China.....	Fair.	57
Early Rachel.....	Fair.	57
Newington Wonder.....	Best. <i>d.</i>	76
Broad Windsor.....	Poor.	....

a. Reported poor when less than 8 bushels per acre; fair when from 8 to 12; good from 12 to 16, and very good when over 16 bushels.

b. Rate of 14.6 bushels per acre.

c. Rate of 16.4 bushels per acre.

d. Rate of 23.5 bushels per acre.

In earliness the Wax varieties are not surpassed, while in tenderness, delicacy of flavor and length of season they are not equaled. In these respects they differ, however, among themselves. All things considered the Black Wax is doubtless the best. The Golden Wax has larger pods, and probably yields somewhat better, but it is not so long in season for snap beans, and is a little more affected by rust. The White Wax is decidedly delicate in the growth of the vine and inferior in yield.

The Intermediate Horticultural is similar to the old fashioned Cranberry, but on soils moderately rich does not run sufficiently to require poles.

The Newington Wonder, it will be observed, was very productive. Its qualities as a snap bean were not tested.

The Broad Windsor is a tall, coarse growing variety, of no special value for the table, nor for any purpose, on moderately rich soils. On very rich soils it might be profitable to grow for stock.

CAULIFLOWER.

Henderson's Early Snowball, Extra Early Dwarf Erfurt, Early Erfurt and Early Paris were sown in hot bed April 1st, transplanted to another bed April 27th, and to sandy soil in the garden May 23d. The first named, Henderson's Early Snowball, proved far superior to all the others in earliness, and in number and size of heads. None but good reports of it have been received. Extra Early Dwarf Erfurt ranked second.

Carter's Dwarf Mammoth, Italian Early Giant, and Veitch's Autumn Giant were sown May 24th, and transplanted to sandy soil in the garden July 8th, but no heads were obtained.

CARROTS.

Seed sown on sandy soil, in rows 30 inches apart, April 18th, 19th and 20th. Plants thinned when large enough to about six inches in the row. The following table shows the results of the experiment, the second column showing for comparison the result of 1877 :

	Yield per acre, bush. of 60 lbs. each.	
	1878.	1877.
Short Horn.....	210	124.7
Danvers.....	323	146.0
Early Very Short Horn.....	86	.....
Improved Long Orange.....	293	50.9
Long Orange.....	154	52.2
Half Long Orange.....	232	.....
Large Altringham.....	100	90.6
Large White Belgian.....	124	.....
James' Intermediate.....	.....	55.5
Half Long Carentan.....	.....	35.9

PARSNIPS.

Seed sown on sandy soil, in rows 30 inches apart, April 18th. Plants thinned when large enough to about six inches in the row. The following table shows the results of the experiment:

	Yield per acre, bush. of 60 lb each.	Description of Roots.
Hollow Crowned.....	371	Long, slender, much branched—many small ones.
Sutton's Student.....	324	Long, slender, but little branched—many small ones.
*Long Sugar.....	369	Long, slender, more branched than second, less than first.
Maltese.....	388	Shorter, thicker, somewhat branched, but on the whole nice.
Round Early or Turnip.....	355	Turnip shaped, tolerably free from roots.

*Long Sugar was from Hollister, Carter & Co., the others from Gregory.

GARDEN PEAS.

Forty-seven varieties planted April 3d. Soil very sandy, plowed autumn previous and harrowed thoroughly before sowing. Furrows made with single shovel plow $2\frac{1}{2}$ feet apart for medium and small, and three feet apart for large growing varieties. Seed sown in furrow with Planet Drill at rate of one quart to 235 feet, and covered 3 to 4 inches deep with single shovel plow. The cultivation consisted in harrowing thoroughly just before coming up, after which the cultivator was run between the rows. The hoe was used only to cut out weeds in the row. Many of the varieties have been on trial three and four years. The table gives in the first column the number of days from planting to first picking, 1878 and in the other columns the average of all the observations that have been made on "Yield," "Table Quality," length of "Picking Season" and "Growth of Vine."

NAMES.	No. days from planting to first picking.	Yield, Average.	Table Quality, Average.	Picking Season, Average.	Growth of Vine, Average.
1878.					
Early Caractacus.....	77	Medium.	Very good.	Short.	Small.
McLean's Blue Peter.....	84	Good.	Good.	Long.	Medium.
Nutting's No. 1.....	84	Medium.	Very good.	Long.	Small.
Kentish Invicta.....	93	Good.	Good.	Medium.	Small.
Laxton's Alpha.....	79	Poor.	Very good.	Medium.	Dwarf.
William I.....	79	Poor.	Medium.	Short.	Dwarf.
Philadelphia Extra Early.....	77	Medium.	Good.	Short.	Medium.
Extra Early Winship.....	77	Poor.	Very good.	Short.	Small.
Dexter.....	82	Medium.	Good.	Medium.	Small.
Early Kent.....	82	Good.	Medium.	Medium.	Small.
Carter's First Crop.....	82	Good.	Medium.	Short.	Large.
Tom Thumb.....	85	Poor.	Medium.	Medium.	Small.
McLean's Little Gem.....	79	Poor.	Good.	Medium.	Dwarf.
Carter's Extra Early Prem. Gem	79	Poor.	Good.	Medium.	Dwarf.
McLean's Advancer.....	82	Medium.	Very good.	Long.	Dwarf.
Dwarf Waterloo Marrow.....	85	Good.	Good.	Long.	Small.
Eugenie.....	90	Good.	Very good.	Long.	Medium.
Laxton's Prolific Early L'ng Pod	84	Good.	Good.	Medium.	Large.
Princess Royal.....	88	Good.	Good.	Long.	Medium.
Napoleon.....	94	Good.	Good.	Long.	Large.
Yorkshire Hero.....	93	Good.	Good.	Long.	Medium.
McLean's Premier.....	95	Medium.	Good.	Long.	Medium.
Champion of England.....	95	Good.	Good.	Long.	Very large
Veitch's Perfection.....	94	Good.	Very good.	Long.	Medium.
Dwarf Blue Imperial.....	94	Good.	Very good.	Medium.	Medium.
Carter's Surprise.....	95	Good.	Very good.	Medium.	Medium.
Large Gem.....	94	Good.	Good.	Medium.	Medium.
Omega.....	107	Medium.	Good.	Medium.	Medium.
Laxton's Superlative.....	85	Good.	Good.	Medium.	Very large
Black Eyed Marrowfat.....	91	Good.	Poor.	Medium.	Very large
H. C. & Co.'s Extra Early.....	80	Medium.	Good.	Short.	Small.
Extra Early Dan O'Rourke.....	82	Medium.	Medium.	Medium.	Large.
Drew's Dwarf.....	93	Poor.	Good.	Medium.	Small.
McLean's Best of All.....	91	Poor.	Medium.	Medium.	Large.
Fill Basket.....	88	Good.	Medium.	Medium.	Medium.
De Grace.....	.....	Poor.	Very good.	Medium.	.....
Tall Sugar.....	.....	Poor.	Good.	Short.	Large.
Hancock.....	77	Medium.	.....	.....	.....
Popular.....	94	.....	.....	.....	.....
Laxton's Supreme.....	91	Medium.	.....	.....	.....
Carter's Challenger.....	98	.....	.....	.....	.....
Carter's Little Wonder.....	95	.....	.....	.....	.....
Carter's Commander in Chief.....	91	.....	.....	.....	.....
New Golden.....	86	.....	.....	.....	.....
Bliss' American Wonder.....	80	.....	.....	.....	.....

TOMATOES.

Seed sown in hotbed March 30th. Plants transplanted to cold frame April 25th and 26th and to open ground May 29th, 30th and 31st. Soil sandy, plowed autumn previous. Plants set $3\frac{1}{2}$ by 4 feet. Systematic observations were made on the time of ripening only. The following table gives the names of the varieties with the number of days from transplanting in open ground to ripening of first fruit:

	Transp. to Ripening.
Red Cherry. <i>a</i>	51 Days
Little Gem. <i>b</i>	54 "
Yellow Plum.....	55 "
Yellow Victor.....	61 "
Canada Victor. <i>c</i>	62 "
Hubbard's Curled Leaf. <i>d</i>	62 "
Conqueror.....	62 "

Acme.....	62 days.
Currant.....	62 "
Foote's Hundred Days. <i>d</i>	63 "
General Grant.....	63 "
Paragon.....	63 "
Green or Golden Gage.....	64 "
New White Apple. <i>e</i>	65 "
Large Smooth Red.....	65 "
Hathaway's Excelsior.....	67 "
Golden Trophy.....	67 "
Trophy.....	70 "
Mammoth Leaf. <i>f</i>	71 "
Powell's.....	72 "
Fejee.....	77 "
Arlington.....	78 "
Tomato de Laye. <i>g</i>	

a. Seed bought under this name, but the fruit was so large that it may possibly have been Red Plum.

b. The fruit of Little Gem is larger than Red Plum but yet very much smaller than Conqueror and Canada Victor. Its earliness is its best point, but in addition to this the vines are very productive and the fruit is smooth and of good flavor.

c. Seed purchased as "extra selected."

d. There is no important difference between Hubbard's Curled Leaf and Foote's Hundred Days. In both, the vines are small and bear heavily. The fruit ripens early but is very much furrowed or wrinkled.

e. The fruit of New White Apple is rather small and not produced abundantly, but is white, smooth and very mild in flavor. There is, however, little demand for tomatoes of any color other than red, and none appear to possess any advantage over the red ones.

f. The Mammoth Leaf is a rather large, coarse growing and unproductive variety. The fruit is of a dark red or purple color, but rotted about as fast as it ripened.

g. Tomato de Laye is peculiar in having a single stout upright stem. It bears but sparingly and none of the fruit ripened before frost.

FARM EXPERIMENTS.

These include experiments on—

Field Beans,	Field Corn,	Winter Wheat,
Spring Wheat,	Oats,	Field Peas,
Beets for Stock,	Potatoes,	Winter Rye,
Spring Rye,	Barley.	Times of sowing Wheat.

With wheat especially, the trial of varieties has been very extensive and careful.

Some of these experiments are detailed in the following pages:

FIELD BEANS.

Nine varieties were planted. The soil was sandy, plowed in autumn of 1877, and thoroughly harrowed before planting. The rows were marked at thirty inches, and furrows opened with single shovel plow. The seed was dropped in continuous rows by a Planet seed drill, and covered with the shovel plow.

The cultivation consisted in the use of Thomas' smoothing harrow as often as the weeds sprouted, until the beans appeared above ground, after which the fifth tooth cultivator was run between the rows. The hoe was only used to cut out such weeds as could not be reached by the cultivator.

The beans were planted May 25th, and May 27th. The results of the trial are shown in the following table:

	YIELD PER ACRE.		No. days planting to ripening.
	Seed.	Straw.	
	<i>Bushels.^a</i>	<i>Pounds.</i>	
California Pea <i>b</i>	8.8	1,656	102
White Pea	12.3	1,177	84
White Pea <i>c</i>	14.3	.....	80
Navy	17.0	.....	78
White Medium	10.2	1,530	93
White Marrow	9.9	1,460	95
White Kidney <i>d</i>	13.0	.....	88
Red Kidney <i>d</i>	15.8	1,087	77
Early Manley <i>e</i>			

(a.) Of sixty-two pounds each.

(b.) These two lots (California Pea and White Pea) were obtained from Holliester, Carter & Co., and J. J. H. Gregory, under the above names respectively. After careful examination they were decided to be the same. A high wind mixing them after they were puffed, rendered it necessary to thresh them together. The same cause shelled many, and doubtless explains in part, at least, the low yield. The vigor of the vines and their lateness in maturing, will be, however, serious objections unless they prove superior in yield.

(c.) These, White Pea, were from R. H. Allen & Co.

(d.) The White and Red Kidney are tall and upright, bearing the pods clear of the ground and showing no tendency to run.

(e.) The seed of the Early Manley was furnished by G. E. Starkweather, of Minneapolis, and was raised in Orleans county, N. Y., where it was reputed to be very early and productive. Superiority in these respects does not, however, appear to be well sustained in this trial. It is claimed to be a variety of the White Medium, which it closely resembles.

FIELD CORN.

Seven varieties were planted, but owing to the fact that they were planted in different places to prevent mixing, and consequently on different soils they cannot all be compared with each other.

I.

Canada Early Yellow Flint, Adams Early Dent and Silver Laced Pop Corn were planted on sandy soil, plowed in autumn of 1877 and thoroughly harrowed before planting. These were planted in rows $3\frac{1}{2}$ feet apart, and hills $2\frac{1}{2}$ feet apart in the row, three kernels to the hill.

The following table gives the principal points of interest :

	No. days fr'm plant- ing until fit to cut.	Yield per acre, a Bushels.	Size of stalks.	Size of ears.	Length of ears.
Canada Early Yellow Flint...	104	38 0	Medium.	Small.	Short.
Adams Early Dent.....	110	52.6	"	Medium.	"
Silver Laced Pop.....	114	26.3	Large.	Small.	"

a. Of 72 lbs. each in the ear.

In husking the Canada Early Flint the frequent breaking of the ear so as to leave a portion on the stalk is a serious objection ; but where quick growth and early maturity are required it may yet be desirable. The yield may be greatly increased by closer planting which the small size of the stalks readily permits.

11.

Compton's Early Field and White Dent were planted on sandy soil, in hills 3 feet apart, and the rows $3\frac{1}{2}$ feet apart, 3 or 4 kernels per hill. The following table exhibits the principal results :

	No. days fr'm plant- ing until fit to cut.	Yield per acre, Bushels. a	Size of stalks.	Size of ears.	Length of ears.
Compton's Early Field b.....	117	31.3	Large.	Medium.	Long.
White Dent.....	117	44.2	"	Large.	Short.

a. Of 72 lbs. each.

b. Difficulty in breaking off the ears in husking is a serious objection to Compton's Early Field.

III.

Speckled Dent and Yellow Flint were planted on sandy loam, in hills 2 feet apart and rows $3\frac{1}{2}$ feet apart, 3 kernels per hill. The results are exhibited in the following table.

	No. days fr'm plant- ing until fit to cut.	Yield per acre, Bushels. a	Size of stalks.	Size of ears.	Length of ears.
Speckled Dent.....	105	59.9	Large.	Large.	Short.
Yellow Flint.....	105	63.5	Medium.	Small.	Long.

a. Of 72 lbs. each.

WINTER WHEAT.

Four varieties were sown Sept. 19th, 1877, and the 5th three days later. Soil sandy and plowed just before sowing. The following table exhibits the results of the trial :

	YIELD PER ACRE.		When Ripe.
	Grain, Bushels.	Straw, Pounds.	
Jenning's White <i>a</i>	23.1	2265	July 15.
Clawson White <i>b</i>	21.9	2574	July 15.
Square Head.....	5.9	1373	July 19.
Fultz.....	19.8	1857	July 12.
White.....	19.6	1761	July 15.

a. It was the design that all the varieties should enjoy an equal chance ; but through miscalculation a narrow strip of Jennings's White was sown on ground on which corn had been manured in the hill. The effect of the manure was plainly visible, and doubtless was the cause of the superior yield of this variety over the Clawson.

b. From the opening of spring until ripening, the Clawson presented the most vigorous and uniform appearance.

SPRING WHEAT.—I.

White Fife wheat was sown Nov. 2d and Dec. 28th, 1877, and March 28th, 1878, with a view of testing the assertion that wheat sown late in autumn, so late that it would not germinate until spring, would do better than that sown in the usual season. Soil and treatment precisely the same in all respects save in the time of sowing. The following table exhibits the results, in acres:

Date of Sowing.	YIELD PER ACRE.		When Ripe.
	Grain.	Straw.	
	<i>Bushels.</i>	<i>Pounds.</i>	
November 2, 1877.....	12.1	1972	July 19
December 28, 1877.....	17.1	2665	" 19
March 28, 1878.....	22.6	3781	" 22

SPRING WHEAT.—II.

Seventeen varieties were sown on clayey loam, March 27th. The land was plowed in autumn of 1877 and thoroughly harrowed before sowing. The seed was sown with a seeder and covered with the harrow. The following table exhibits the results of the experiment:

	YIELD PER ACRE.		When Ripe.
	Grain.	Straw.	
	<i>Bushels.</i>	<i>Pounds.</i>	
Dominion	14.8	1947	July 22
Mediterranean.....	18.8	1897	" 23
Rio Grande.....	15.1	1726	" 23
Scotch Fife (seed from Can. '76).	14.9	1982	" 23
Golden Globe or Redfern.....	14.3	2250	" 22
Scotch Fife (Minn. seed).....	16.6	1956	" 23
White Fife, <i>a</i>	18.1	2441	" 25
Lost Nation.....	19.1	2323	" 23
Prussian White, <i>b</i>	17.7	2373	" 25
China Tea.....	20.6	1947	" 23
Brooks.....	16.6	2328	" 23
Judkin.....	20.4	2177	" 23
Scotch Fife (Minn. seed) <i>c</i>	17.4	1983	" 23
Egyptian.....	12.4	1906	" 23
Touzelle.....	15.7	1903	" 19
Canada Club.....	16.3	1751	" 19
Golden Drop.....	13.1	1739	" 19
China Spring.....	14.1	1937	" 22

a. Only the Fife varieties are hard wheats. The White Fife has been tested by many farmers the past season and so far as heard from they are all well pleased with it. It is a hard wheat though not so hard as the common Fife. The millers are reported, however, as speaking unfavorably of it.

b. The Prussian White is the same as White Fife or so closely resembles it in grain, straw and chaff as not to be distinguishable from it. It will not be sown again as a distinct variety.

c. This being the standard of comparison two plats were sown in order that none of the others might be too far removed from it.

SPRING WHEAT.—III.

Two varieties, sown one day later and in a different manner from those in II. The soil and its preparation was the same, but in sowing the ground was marked off in rows 15 inches apart, furrows made with a hoe, $1\frac{1}{2}$ to 2 inches deep, the seed dropped at the rate of about six kernels to the foot, and covered with a hoe. While young, the grain was cultivated twice with a wheel hoe. The results were as follows:

	YIELD PER ACRE.		When ripe.
	Grain.	Straw.	
	<i>Bushels.</i>	<i>Pounds.</i>	
Australian Club.....	11.7	1479	July 22
Champlain	16.0	2185	" 25

SPRING WHEAT.—IV.

One variety sown on sandy soil March 14th. Land plowed in autumn of 1877 and thoroughly harrowed before sowing. Manner of sowing and cultivation the same as in III. The following was the result:

	YIELD PER ACRE.		When Ripe.
	Grain.	Straw.	
	<i>Bushels.</i>	<i>Pounds.</i>	
Australian Club.....	15.9	2036	July 19

SPRING WHEAT—V.

Four varieties sown March 13th in quantities too small to admit of computing the yield. The soil and its preparation the same as in IV. The manner of sowing and the cultivation the same as in III, except that the kernels were planted about six inches apart. The results are indicated in the following remarks:

Peace River—The seed was obtained from the Peace River country northwest of Winnipeg, through P. B. Nettleton, Esq., of the Minneapolis Harvester Works. The seed was reddish in color, large and soft. It grew well and escaped serious injury from rust, though in close proximity to the following varieties. The straw was of medium length, stiff and upright. The head was bald, of medium length, and well filled. The chaff white. But this trial gives no safe indication of its value as wheat is ordinarily grown.

Oregon Little Club, Oregon Common Club and Chili Club—These varieties together with the Australian Club in III and IV were obtained from Salem, Oregon, through D. Edwards, Esq., of Minneapolis. These three varieties were attacked with rust soon after heading so badly as to effectually prevent the filling of the heads, and thus to cause the ruin of the crop. While they might do much better another season, and on different soil, yet there is every reason to believe that they cannot resist rust and other diseases so well as the other varieties we now have.

SPRING WHEAT—VI.

Ten varieties sown April 12th. Soil very sandy; its preparation the same as in IV. The manner of sowing and the cultivation the same as in III, except that after marking the seed was sown with a Planet seed-drill. The following table contains the names of the varieties and exhibits some of the results:

	YIELD PER ACRE.		When ripe
	Grain.	Straw.	
	<i>bush.</i>	<i>lbs.</i>	
Chili.....			July 27
Club.....			" 23
Siberian.....			" 27
Australian.....			" 27
Oregon Club.....			" 23
Sonora.....			" 19
Scotch Fife (Minnesota Seed).....	13.9	3,484	" 25
Defiance.....	8.1	3,302	" 27
ChAMPLAIN.....	7.7	3,534	" 21
Odessa.....	7.8	3,153	" 30

All of these varieties were attacked by the rust more or less severely, the Scotch Fife, as would appear from the yield, least of any. The results of the trial with the last three varieties are sufficiently indicated by the table.

The seed of the first six varieties was obtained from California through J. T. Lucas, Esq., of Minneapolis. The quantity of each was too small to admit of computing the yield. They were all attacked by the rust more severely than the Scotch Fife sown at the same time and growing beside them, Oregon Club and Sonora being injured the most.

SPRING WHEAT—VII.

Three varieties sown April 6th, soil sandy at one end of the plats, and wet and cold at the other end. Preparation of soil and manner of sowing same as in II. The following table shows the results:

	YIELD PER ACRE.		When ripe
	Grain.	Straw.	
	<i>bush.</i>	<i>lbs.</i>	
Saxon Fife.....	7.5	1,237	July 24
Scotch Fife (Minnesota Seed).....	7.7	1,488	" 22
Russian.....	7.9	1,380	" 23

SPRING WHEAT—VIII.

Two varieties sown April 9th. Soil same as in VII. Preparation of soil and manner of sowing same as in II. The following table shows the results:

	YIELD PER ACRE.		When ripe
	Grain.	Straw.	
	<i>bush.</i>	<i>lbs.</i>	
Scotch Fife (Minnesota Seed).....	4.2	940	July 29
Sherman.....	5.9	1,630	" 23

The Sherman wheat, it will be seen, is remarkable for its earliness, while in this experiment at least it appears to be somewhat superior in yield to Scotch Fife. The grain is soft and the chaff bearded, the only objections noted.

WHEAT—FOUR YEARS' EXPERIMENTS.

To facilitate comparison the results of all the experiments with varieties of wheat for four years, including those detailed in the foregoing pages, are condensed in the following tables:

	Very poor Sandy Soil. 1875.	Loamy Soil. 1876.	Poor Sandy Soil. 1877.	Clayey Loam. 1878. II. b	White Fife Wheat, 1878. I. c.	Winter Wheat, d. 1878.
	Bush. Per acre.	Bush. Per acre.	Bush. Per acre.	Bush. Per acre.	Bush. Per acre.	Bush. Per acre.
Arnotka.....	3.2	8.7	Poor. a.			
Oran.....	5.9	5.9	Poor. a.			
Scotch Fife (Minn. Seed).....	5.9	16.6	13.5	17.0 e		
China Spring.....	5.9			14.1		
Mediterranean.....	7.4	13.4	11.2	18.8		
Mixture of above five.....	8.3					
Golden Drop.....		15.9		13.1		
Canada Club.....		9.4		16.3		
Golden Globe.....		17.0	11.7	14.3		
Scotch Fife (Seed from Can'a).....		17.3	12.9	14.9		
Dominion.....		18.3	9.9	14.7		
Lost Nation.....		15.6	Good. a.	19.1		
Rio Grande.....			12.7	15.1		
White Fife.....			11.4	18.1		
Touzelle.....			3.2	15.7		
Egyptian.....			Poor. a.	12.4		
Prussian White.....				17.7		
China Tea.....				20.6		
Brooks.....				16.6		
Judkin.....				20.4		
Sown Nov. 2, 1877.....					12.1	
Sown Dec. 28, 1877.....					17.1	
Sown March 28, 1879.....					22.6	
Jennings' White.....						23.1
Clawson.....						21.9
Square Head.....						5.9
Fultz.....						19.8
White.....						19.6

- Sown in quantity too small to admit of computing the yield.
- For details of culture see "Spring Wheat II," in foregoing pages.
- For details of culture see "Spring Wheat I," in foregoing pages.
- For details of culture see "Winter Wheat," in foregoing pages.
- Average of two plats.

	Clayey loam, sown Mar. 28, 1878. (III.) a.	Sandy soil sown Mar. 14, 1878. (IV.) a.	Sandy soil sown Mar. 13, 1878. (V.) a.	Very sandy soil sown April 12, 1878. (VI.) a.	Sandy soil sown April 6, 1878. (VII.) a.	Sandy soil sown April 9, 1878. (VIII.) a.
	Bush. Per acre.	Bush. Per acre.	Bush. Per acre.	Bush. Per acre.	Bush. Per acre.	Bush. Per acre.
Australian Club.....	11.7	15.9	.....	.....	.....	.....
ChAMPLAIN.....	16.0	.....	.....	7.7	.....	.....
Peace River.....	Good. b	.....	.....	.....
Oregon Little Club.....	Very Prb	.....	.....	.....
Oregon Common Club.....	"
Chili Club.....	Poor. b	.....	.....
Chili.....	"
Club.....	"
Siberian.....	"
Australian.....	Very Prb	.....	.....
Oregon Club.....	"
Sonora.....
Scotch Fife, Minn. Seed.....	13.9	7.7	4.2
Defiance.....	8.1	.....	.....
Odessa.....	7.8	.....	.....
Saxon Fife.....	7.5	.....
Russian.....	7.9	.....
Sherman.....	5.9

a. For details of sowing and cultivation see "Spring Wheat" with corresponding number in foregoing pages.

b. Quantity sown too small to admit of computing the yield.

OATS.

Eleven varieties were sown March 26th. The soil was sandy loam and underlaid with sand—a June grass sod broken in 1877. It was thoroughly harrowed in autumn of 1877 and again before sowing, but much June grass remained, notwithstanding, unsubdued. The following table exhibits the results:

	YIELD PER ACRE.		When Ripe.
	Grain.	Straw.	
	<i>Bushels. a</i>	<i>Pounds.</i>	
Silver White Queen.....	18.2	622	July 23
White Schonen.....	28.8	1,072	" 24
Canadian.....	33.6	1,446	" 19
Brunswick.....	35.2	1,672	" 19
Waterloo.....	23.7	1,157	" 18
Black Norway.....	27.7	1,184	" 27
Probstair.....	24.3	966	" 27
Excelsior.....	27.4	1,100	" 20
White Dutch.....	28.6	1,062	" 24
Alvey.....	21.2	966	" 19
Chinese Hullless.....	12.5	1,230	" 21

(a.) Of 32 pounds each.

The following table contains the results of four trials with varieties of oats, together with averages for four, three and two years. These data enable us to indicate the most productive varieties with far more confidence than we could from a single trial, which is often contradicted by the succeeding one.

	Yield Per Acre—Bushels.*				Average Yield for		
	1875.	1876.	1877.	1878.	4 Yrs. '75-'78.	3 Yrs. '76-'78.	2 Yrs. '77-'78.
Silver White Queen.....	14.0	30.6	23.5	18.2	22.0	24.7	20.8
White Schonen.....	17.8	36.2	29.6	28.8	28.1	31.5	29.2
Canadian.....	17.5	38.7	33.4	33.6	30.8	35.2	33.5
Black Norway.....	18.6	39.6	32.5	27.7	29.8	33.2	30.1
Probsteir.....	20.6	38.7	32.5	24.3	29.0	31.8	28.4
Excelsior.....	13.1	39.6	25.4	27.4	26.3	30.8	26.4
Brunswick.....		30.6	29.6	35.2		31.8	32.4
Waterloo.....		38.7	24.1	23.7		28.8	23.9
White Dutch.....			26.9	28.6			27.7
Chinese Hulless.....			11.1	12.5			11.8
Alvey.....				21.2			

*Of thirty-two pounds each.

Arranging the varieties in the order of their average yields, we have the following list:

Order of average Yield for 4 years.		Order of average yield for 3 years.		Order of average yield for 2 years.	
Canadian.....	30.8	Canadian.....	35.2	Canadian.....	33.5
Black Norway.....	29.8	Black Norway.....	33.2	Brunswick.....	32.4
Probsteir.....	29.0	Probsteir.....	31.8	Black Norway.....	30.1
White Schonen.....	28.1	Brunswick.....	31.8	White Schonen.....	29.2
Excelsior.....	26.3	White Schonen.....	31.5	Probsteir.....	28.4
Silver White Queen..	22.0	Excelsior.....	30.8	White Dutch.....	27.7
		Waterloo.....	28.8	Excelsior.....	26.4
		Silver White Queen..	24.7	Waterloo.....	23.9
				Silver White Queen	20.8
				Chinese Hulless....	11.8

The most productive varieties are shown by these lists to be

1. Canadian.
2. Black Norway.
3. Probsteir.
4. Brunswick.
5. White Schonen.

Other methods of comparison lead to the selection of the same varieties.

PEAS—CANADA FIELD.

The same variety was sown in two different places, neither of which were suitable for wheat. The land was plowed in both cases in autumn of 1877, and thoroughly harrowed before sowing. Seed sown broadcast with seeder and covered by harrowing with Thomas' smoothing harrow. The following table exhibits the results:

	Yield per Acre.		When sown.	When ripe.
	Grain.	Straw.		
Very sandy soil.....	<i>Bushels.*</i> 20.1	<i>Pounds.</i> 2,066	March 12	July 15
Vegetable loam underlaid with sand.....	17.5	.....	April 4	August 3

*Of sixty pounds each.

BARLEY.

Three varieties were sown March 27th. Soil, clayey loam; plowed in autumn 1877, and thoroughly harrowed before sowing. Seed sown with seeder and covered with Thomas' smoothing harrow. The following table exhibits the results:

	Yield per Acre.		When Ripe.
	Grain.	Straw.	
Chevalier.....	<i>Bushels.*</i> 27.7	<i>Pounds.</i> 1,638	July 18
Two Rowed.....	27.2	1,594	July 16
Four Rowed.....	25.0	1,500	July 12

*Of forty-eight pounds each.

The Chevalier is a two-rowed variety, the seed of which was received two or three years ago from the United States Department of Agriculture. It does not appear to be more productive than the common two-rowed, but the berry is remarkable for its plumpness and light color.

SPRING RYE.

The same variety of Spring Rye was sown in three places, none of which were considered suitable for wheat. The following table exhibits the results:

	Yield per Acre.		When Sown.	When Ripe.
	Grain.	Straw.		
On very sandy soil.....	<i>Bushels</i> 11.0	<i>Pounds</i> 1,421	March 12	July 15
Sandy loam underlaid with sand.....	10.8	1,160	March 26	July 17
Vegetable loam underlaid with sand.....	15.0	March 29	July 17

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WINTER RYE.

Two varieties were sown Sept. 27th, 1877, on sandy soil, plowed shortly before sowing. The following table exhibits the results of the experiment:

	Yield per Acre.		When Ripe.
	Grain.	Straw.	
	<i>Bushels.</i>	<i>Pounds.</i>	
Amber <i>a</i>	24.1	3,049	July 7
White.....	25.1	2,665	July 10

(*a*.) At the opening of spring and throughout the remainder of their growth the Amber presented the most uniform and vigorous appearance. A frequent observer would not hesitate to say that this was the hardiest and would yield the best crop. The result, therefore, was something of a surprise.

VARIETIES OF POTATOES.

Thirty-four varieties were planted, twenty-eight of them *both* on clayey loam and on sandy soil. In both cases the land was plowed in autumn of 1877, and thoroughly harrowed in the spring. The land was marked for the rows three feet apart and furrows were made with a single shovel plow.

The seed was cut, leaving as nearly as possible a single eye to each piece, and the pieces were dropped in the furrows about 12 inches apart, after which they were covered with the shovel plow. No manure was applied in any manner.

The cultivation consisted in the use of Thomas' Smoothing Harrow, as often as the weeds appeared, until the potatoes were well above ground. The 5-tooth cultivator and double shovel plow were then used between the rows, and before the vines fell down they were ridged with the single shovel plow. The hoe was only used to cut out weeds where the cultivator could not reach them.

They were planted on clayey loam April 23d, and on sandy soil April 29. The former were dug Oct. 7th, and the latter Oct. 16th.

The chief results of the trial are shown in the following table:

	YIELD PER ACRE ON CLAYEY LOAM.		Average Size on Clayey Loam.	YIELD PER ACRE ON SANDY SOIL.		Average Size on Sandy Soil.	When b. Ripe on Sandy Soil.	Shape.	Color.	Depth of Eyes.
	Large, Bushels.	Small, Bushels.		Large, Bushels.	Small, Bushels.					
Peerless.....	115.2	18.7	Medium.	58.6	12.1	Medium.	Aug. 28.	Oblong.	White.	Shallow.
Shaker Fancy.....	161.4	11.7	Large.	28.2	5.1					Deep.
Eureka.....	114.1	16.1	Medium.	52.3	11.9	Below Med'm.	Sept. 5.	Roundish.	Rose.	
Late Rose.....	154.5	19.1	"	74.2	12.5			Oblong.	White.	
Little Giant.....	118.7	8.1	Large.	44.7	7.4	Medium.	Aug. 26.	Roundish.	Rose.	Shallow.
Excelsior.....	116.8	23.0	Medium.	37.9	18.3	"	"	Oblong.	White.	Medium.
Dunmore's Seedling c.....	140.7	19.7	"	75.8	14.1	"	"	Roundish.	"	Deep.
Calcutta Seeding.....	154.1	23.8	Above Med'm.	93.7	20.3	"	"	Oblong.	"	Shallow.
Paragon.....	48.6	23.3	Very Small.	41.0	34.3	Very Small.	Aug. 19.	"	"	"
Fluke.....	176.2	36.5	Above Med'm.	94.8	27.2	Medium.	Aug. 26.	"	"	"
Burbank's Seedling.....	135.0	14.2	Medium.	51.3	14.0	"	Aug. 28.	"	"	Deep.
Cayuga Chief.....	121.7	7.3	Above Med'm.	35.0	7.0	"	Aug. 26.	Long.	"	Very Shallow.
Victor.....	172.6	14.5	Large.	52.9	12.7	Large.	Aug. 26.	Roundish.	Purple.	Shallow.
Brownell's Beauty.....	105.3	9.3		76.9	14.7			Oblong.	Red.	"
Ruby.....	59.6	13.4	Below Med'm.	98.3	24.0	Medium.	Aug. 28.			"
Improved Peachblow.....	32.7	23.9	Very Small.	18.7	16.5	Very Small.	Aug. 15.			"
Superior.....	91.6	11.7	Below Med'm.	44.1	17.9	Below Med'm.	Sept. 5.	Round.	Rose & White.	Medium.
Snowflake.....	63.1	13.2	"	99.8	30.2	"	Aug. 26.	Long.	Red.	"
Extra Early Vermont.....	64.6	22.0	"	124.2	24.2	"	Aug. 21.	Oblong.	White.	Shallow.
Early Rose.....	39.6	11.2	Small.	114.5	31.5	Medium.	Aug. 19.	"	Light Rose.	"
Alpha.....							Aug. 5.	"	Rose.	"
Early Ohio.....	27.7	65.8	Medium.	114.6	15.4	Above Med'm.	Aug. 5.	Roundish.	Light Rose.	Shallow.
Trophy.....	49.8	12.0	Small.					"	Red.	Very Shallow.
Bliss' Triumph.....	48.2	15.5						"	Red.	Shallow.
Compton's Surprise.....	107.5	16.2	Below Med'm.	66.3	10.8	Medium.	Sept. 5.	Oblong.	Purple.	Deep.
St. Lawrence d.....	112.9	16.8	Medium.	114.6	12.2	"	Aug. 28.	"	Red.	Shallow.
Iowa Beauty.....	31.6	21.8	Very Small.					"	White.	"
Success.....	36.1	11.2	Small.					Long.	"	"
White Ash.....	56.0	10.6	Medium.	69.4	18.5	Medium.	Sept. 5.	Roundish.	"	Medium.
Early Wideawake (Adv'ce).....	78.9	16.9	Above Med'm.	129.6	22.2	Above Med'm.	Aug. 15.	Very Long.	Rose.	Shallow.
Harlequin.....	49.6	9.7	Medium.					Oblong.	"	"
Centennial.....				32.0	10.5	Medium.	Aug. 29.	Roundish.	Red.	"
Mahopac Seedling.....				57.7	18.3	Below Med'm.	Sept. 5.	Oblong.	Light Rose.	"
Tloga.....				82.0	8.8	Above Med'm.		"	White.f	Deep.

- a. Bushels of 60 lbs. in every case.
 b. The time when the vines appeared dead.
 c. Dunmore's Seedling has been for two years previous the best producer. No satisfactory explanation can be given for the comparatively low yield this year.
 d. So far as this trial goes, it indicates a singular adaptation of the St. Lawrence to both heavy and light soil.
 e. The Early Wideawake is the best yielding early potato, while its size is equal or superior to that of other early varieties.
 f. With pink or rose colored eyes.

It will be noticed that the best producers on clayey loam are all late varieties, while the best producers on sandy soil are, with one exception, early varieties. Probably this is due to some peculiarity of the season and may not occur again.

In order to facilitate comparison the results of six trials have been arranged in the following table, together with the averages of three and of two of these trials. No arrangement has yet been found by which it can be stated positively which is the most productive variety, which second and so on, but it is believed that an inspection of the table will not fail to yield some idea of the comparative productiveness of different varieties. For example, it will be seen that Peerless averages below a large number of other varieties; that the Extra Early Vermont averages far above Early Rose, Early Ohio and Snowflake; and that Early Wideawake (Advance), in two trials, averages far above any other early potato.

YIELD PER ACRE IN BUSHELS OF SIXTY POUNDS EACH.

	1875.	1876.		1877.	1878.		Av'rge of 3 Trials. 1877-'78. Large only.	Av'rge of 2 Trials. 1878. Large only.
	Large and Small.	Sandy Soil. Large and Small.	Stiff Loam. Large and Small.	Large only.	Clayey Loam. Large only.	Sandy Soil. Large only.		
Fluke.....				67.6	176.2	94.8	112.8	135.5
Calcutta Seedling.....				32.2	154.1	93.7	113.3	123.9
Late Rose.....	170.5	280.8	216.6	70.1	155.7	74.2	100.0	114.9
St. Lawrence.....					112.9	114.6		113.7
Victor.....				91.3	172.6	52.9	105.6	112.7
Dunmore's Seedling.....		396.0	161.1	99.3	141.7	75.8	105.6	108.7
Early Wideawake.....					78.9	129.6		104.2
Shaker Fancy.....				48.9	161.4	28.2	79.5	84.9
Extra Early Vermont.....	109.5	205.0	169.4	70.4	64.8	124.2	86.4	94.5
Burbank's Seedling.....		226.8	137.9	80.5	135.0	51.3	88.9	93.1
Brownell's Beauty.....	161.5		107.4	65.7	105.3	76.9	82.6	91.1
Compton's Surprise.....	161.5	162.0	100.1		107.5	66.3		86.9
Eureka.....	175.0	270.0		77.6	115.1	52.3	81.6	88.7
Little Giant.....				69.2	118.7	44.7	77.5	81.7
Snowflake.....	115.0	270.0		67.0	63.1	99.8	76.6	81.4
Peerless.....	159.5	216.0	134.5	84.4	101.5	58.6	81.5	80.0
Ruby.....				65.4	61.1	98.3	74.9	79.7
Cayuga Chief.....				60.0	121.7	35.0	64.0	78.3
Early Rose.....	136.0	216.0	95.3	36.0	39.6	114.5	63.3	77.0
Early Ohio.....	218.0	216.0		55.9	27.7	114.6	66.0	71.1
Superior.....				9.2	91.6	44.4		67.8
Excelsior.....	164.5		162.1	48.5	96.9	37.9	61.1	67.4
White Ash.....					56.0	69.4		62.7
Paragon.....		205.0	74.0	45.4	48.6	41.0	45.0	44.8
Improved Peachblow.....				9.8	32.7	18.7	20.4	25.7
Tioga.....						82.0		
Mahopac Seedling.....						57.7		
Harlequin.....					50.0			
Trophy.....					49.8			
Bliss' Triumph.....					48.2			
Success.....					36.1			
Centennial.....				28.3		32.0		
Iowa Beauty.....					31.4			
Alpha.....	121.0	270.0	40.1	24.0				
Early Favorite.....	90.0	178.0						
Early Nonsuch.....	159.5	270.0	114.9					
White Blow French.....	247.5	205.0	128.2					
Acme.....	181.5							
Minnesota Seedling.....		108.0						
Breeze's No. 2.....		216.0						
Neshannock.....			63.6					

BEETS FOR STOCK.

Planted on clayey loam May 7th. Land plowed in autumn of 1877 and again just before planting. After harrowing thoroughly the seed was planted in rows 30 inches apart. When large enough the plants were thinned to about 12 inches in the row. Cultivation consisted in the use of cultivator and hoe to destroy weeds. No manure was applied. The following table exhibits the results:

	Yield per acre in bush. of 60 lbs. each.
Mammoth Long Red Mangold.....	287.7
Long Red Mangold.....	188.0
Long Yellow Mangold.....	222.2
Champion Intermediate Mangold. <i>a</i>	38.8
Red Globe Mangold.....	225.1
Carter's Orange Globe Mangold.....	136.9
Webb's New Kniver Yellow Globe Mangold.....	172.7
Yellow Ovoid Mangold.....	192.3
Red Giant Ovoid Mangold.....	197.5
Imperial Sugar Beet.....	164.4
White Silesian Red Top Beet.....	234.9
White Silesian Green Top Beet.....	221.8
Lane's Improved American Sugar Beet.....	344.0
White Green Top Sugar Beet. <i>b</i>	283.6

a. The seed of Champion Intermediate germinated but poorly and there were many and long vacant spaces in the rows.

b. This variety, White Green Top Sugar Beet, was sent out by the Commissioner of Agriculture with the view of determining the value of the beet for sugar in the United States. Examination by Professor S. F. Peckham revealed in the juice of these beets 15.63 per cent. of cane sugar (saccharose).

FERTILIZERS.

No experiments with fertilizers were made in 1878, but it has been considered worth while to reproduce those of 1875 and 1877 in the following form:

	Quantity of fertilizer per acre.	Cost of fer- tilizer per acre.	Cost fertiliz- er, transport- ation includ- ed, per acre	Increased yield per acre over "no manure."	
				Grain.	Straw.
WHEAT—1875.					
No manure <i>b</i>				Bush.	Lbs.
Bone flour.....	310	7.50	10.35	0.7	50 <i>a</i>
Superphosphate of lime.....	300	7.50	10.26	1.2	90
Animal fertilizer.....	417	7.50	9.79	1.3	22
Peruvian guano.....	200	7.50	9.96	3.9	648
WHEAT—1877.					
Rectified Peruvian guano.....	505.9	16.42	21.47	5.1	607
Stockbridge manure for wheat.....	458.2	15.83	20.41	8.7	1,012
No manure <i>c</i>					
Superphosphate of lime.....	892.2	14.76	23.33	4.7	351
Ashes.....	35.7	5.35	5.35	0.5	107 <i>a</i>
Gypsum.....	595.2	4.46	4.46	0.0	84 <i>a</i>
POTATOES—1877.					
Rectified Peruvian guano.....	381.9	12.75	16.56	Large. bushels.	Small. bushels.
Stockbridge manure for potatoes.....	424.7	12.75	16.99	9.5	6.0
No manure <i>d</i>				7.5	1.6
Superphosphate of lime.....	762.1	12.66	20.02	1.3	1.7 <i>a</i>
Ashes.....	33 bu	5.09	5.09	4.4	3.2
Gypsum.....	637.3	4.81	4.81	5.2	3.2

- (a.) Decrease in these cases instead of increase.
- (b.) The soil in this experiment was completely exhausted so that the total yield with "no manure" was 3.3 bushels of grain, and 762 pounds of straw.
- (c.) Total yield with "no manure", 11.4 bushels of grain and 762 pounds of straw.
- (d.) Soil sandy and badly affected by drouth, so that the total yield with "no manure" was only 38.0 bushels, large, and 15.2 bushels, shall potatoes.

IMPLEMENTS.

Several trials of farm implements have been made on the farm either by us or in our presence. The Limber Jack Harrow, Taylor Harrow, Thomas' Smoothing Harrow, Clipper 14-inch plow, Northwestern Rotary Plow, and a combined Plow-Pole and Wheel Attachment have been thus tested. The following is a detailed report of these trials;

LIMBER JACK HARROW.

This harrow consists of short, thick and heavy blocks of oak wood, held together by iron rods passing through them, on which are also wooden rings to keep the blocks at proper distance from each other. On one side of these blocks are cast-iron knives or cutters, while from the other side the teeth issue inclining obliquely backwards. Thus either the cutters or the teeth are made operative by simply turning the harrow over.

The claims made for this harrow are briefly stated as follows: "The Limber Jack Harrow will do better work under all circumstances, and on all kinds of land, than any other harrow."

This harrow was first tried for levelling tussocks on a wet meadow in comparison with a common Scotch Harrow consisting of two sections, the latter being weighted to make it draw about equally heavy with the Limber Jack. The Limber Jack was passed twice over the ground with the cutters down and then twice with the teeth down. On another strip it was passed twice over with the teeth alone. In both cases the same amount of labor with the Scotch Harrow did the work equally well.

The Limber Jack was next tried crosswise of stiff unrotted sod turned over the autumn previous. The ground was passed over once with the cutters and once with the teeth. The same amount of labor with the Scotch Harrow did the work of levelling and pulverizing equally well and did not turn up the sods any more than did the Limber Jack.

The Limber Jack was then tried lengthwise of rough soddy soil, full of small roots, plowed the autumn previous. Four strips side by side, each 16 feet wide, were measured off. No. 1 was reduced to an ordinary condition by the Scotch Harrow, which occupied 18 minutes. No. 2 was worked with the Limber Jack the same length of time, 12 minutes with cutters down and 6 minutes with teeth down. No. 3 was worked 18 minutes with Thomas' Smoothing Harrow. No. 4 was worked 18 minutes with the Limber Jack, teeth down. The work done by the Limber Jack was in neither case superior to that done by the Scotch Harrow and was in both cases decidedly inferior to that done by the Thomas' Smoothing Harrow.

The fourth trial of the Limber Jack was made on clayey loam—stubble land plowed the autumn previous. Three strips of equal width were measured off

and the time devoted to each was the same. On one the Limber Jack was used, cutters down; on another with teeth down; on the third Thomas' Smoothing Harrow was used. The work done by the last was better than in either of the other cases.

THE TAYLOR HARROW.

This harrow consists of three sections, each containing twenty-four teeth, each section being entirely independent of the others, but attached by short chains to a cross bar in front, to which bar the team is also attached. Its light and trim appearance, the broad sweep it takes and the square draft, one part not falling behind another—these points secure in advance for the harrow a very favorable opinion.

This harrow was first tried in comparison with Thomas' smoothing harrow for smoothing and pulverizing land plowed from stubble the autumn previous. The Taylor harrow did good work, but not equal to that done by the other harrow.

Two trials were made on stiff sods recently plowed. In each trial the team was repeatedly shifted from one harrow to the other, and weights were added to the Taylor harrow as well as to the other. In both trials the same amount of labor with Thomas' smoothing harrow secured better and deeper pulverization, though in the absence of this close comparison the working of the Taylor harrow would be pronounced very good.

The result of these trials, though unexpected, may yet be explained. The teeth of the Taylor harrow are perpendicular. They were observed to catch slightly in the sod, and when jerked loose by the team the whole section made a short jump or skip. The teeth of Thomas' smoothing harrow, on the contrary, are set obliquely, slanting backwards, and as there was no catching there was no jumping or skipping, and the teeth were constantly in contact with the soil doing their work.

THOMAS' SMOOTHING HARROW.

This harrow has small cylindrical teeth set as above described, the whole consisting of three sections joined to each other by iron rods and to a cross-bar in front by short chains. It has now been used on the farm for three years, and the more it is used the more it commends itself. Its equal has not yet been presented for trial.

COMBINED PLOW-POLE AND WHEEL ATTACHMENT.

This consists of a pole similar to a wagon pole, only lighter, to the rear end of which is attached on the under side a small plow wheel and apparatus for conveniently gauging the depth, and to the upper side the whiffletrees. The advantages claimed for this apparatus are as follows:

"First—The plow runs steadier, not being much affected by stones, stray side steps of the team or sawying of the whiffletrees, which are attached to the pole.

"Second—The plow is moved much easier laterally; being held in the upright position by the pole and its connections, and being unencumbered by whiffletrees, there is a greater leverage in favor of the operator.

"Third—The traces are free from trembling, vibration and shake, and do not chafe the breasts of the horses, or irritate them by coming in contact with their heels. The whiffletrees being elevated and supported by the pole, the horses cannot step over or upon the traces.

"Fourth—The plow can be backed by the team, and it follows the steps of the horses at the ends of a piece being back-furrowed, and of itself comes into proper position to begin the returning furrow.

"Fifth—The draft is from twelve to fifteen per cent. less than without the attachment.

"Sixth—It can be attached to harrows, cultivators and stone-boats."

The same plow was used alternately with this attachment and with the ordinary plow wheel placed under the beam.

First, Second and Fifth. These claims were not supported by the most careful personal trial and observation. The dynamometer, however, was not applied.

Third. In plowing, or any other work, where the draft is constant there never is vibration or shaking of the whiffletrees to chafe the breasts of horses, and but rarely to irritate by coming in contact with their heels.

Fourth. In backing the attachment gives considerable assistance, and where there is very much of this to do, it might be an object to have it. In crossing the ends the attachment does not yield any material advantage in causing the plow to follow the team, while in its effect on the whiffletrees, tilting one end up and the other down, it is a positive inconvenience.

Sixth. Not tested, but its use on harrows and cultivators would probably be undesirable, because of clogging of the wheel in loose dirt and clods.

The implement is one that is commended by its appearance and novelty, but after a few weeks or a season's use it is likely to rot and rust in a fence corner for want of positive advantages.

CLIPPER PLOW—(14 inch).

Manufactured by Laraway, King & Co., Minneapolis.

This plow was not tested in the usual manner by immediate comparison of its working with that of another plow in the same soil and at the same time. But it did such excellent work, both in breaking sod and in plowing stubble, cleaning perfectly in a soil in which no other plow had ever done so, that it was afterwards purchased for regular use on the farm. Continued use has given no occasion to regret the purchase, though spots have been found where in certain conditions of moisture even this plow has failed to "clean," or "scour."

Probably it would be difficult to find a soil affording severer tests than portions of the Experimental Farm, in which no plow has yet been found to clean perfectly in all states of moisture and dryness.

NORTHWESTERN ROTARY GANG PLOW.

It would be difficult to give any description of this implement that would convey an idea of its construction and appearance. This, like the last was not tested in immediate competition with another plow so the general results of the trial only can be stated.

It was tested in the worst soil the farm affords, and in a state of moisture by no means favorable. It was drawn by two horses and there being two plows, two furrows were turned at once. The ground was more thoroughly inverted and pulverized, and left more nearly level by this implement than the same soil ever was by an ordinary plow. While the draft was certainly not greater than that of two plows taking the same width and running the same depth. While this report does not in the least exaggerate the results of this trial, it is believed that only repeated and continued trials and perhaps years of constant use can

fully test the durability &c., and establish the superiority of an implement of of this character. Plows and plowing would appear, however, to afford a promising field for extensive improvements.

FARM CROPS.

Hay is the only crop to which any attention has been paid without a view to experiment. Of this crop about 50 tons have been put up the past year. From the farm experiments will be obtained about as follows: Twenty-five bush. field beans; 60 bush. oats; 8 bush. winter wheat; 7 bush. winter rye; 12 bush. spring rye; 40 bush. spring wheat; 10 bush. spring barley; 15 bush. peas; 90 bush. potatoes.

IMPROVEMENTS.

Some additional breaking has been done between the barn and the avenue. Something has been done towards subduing that broken in the same locality last year. All of this, being unsuited for experimental work, together with other land of the same character, heretofore under cultivation, has been sown with winter rye and timothy with a view to making it more sightly and more remunerative as meadow.

On the meadow 560 rods of ditch has been dug, a part 2 feet and the remainder 3 feet deep. This has already resulted in improvement to the land thus ditched. It is the plan however to deepen the ditches to $3\frac{1}{2}$ feet, to lay tile in the bottom and refill. Seven thousand feet of tile have been procured for this purpose.

PLANT HOUSE.

The plant house continues in good condition. Mr. Geo A. Wood remains in charge of the same. Its usefulness appears to be fully vindicated by the assistance it affords in teaching botany, the taste for flowers it promotes among the students and the decorations it furnishes to the University grounds and to the buildings both ordinarily and upon public occasions. Its loss would now be very keenly felt.

THE FAIRS.

Exhibitions were made by the College of Agriculture at both the St. Paul and Minneapolis fairs. The exhibits were substantially the same in both places and consisted mainly of grains, seeds and vegetables from the farm, woods and seeds from the museum of agriculture and plants from the plant house. These were arranged with a view to instruction rather than general effect, though the latter was not wholly neglected.

At the close of these fairs the main part of the exhibit at St. Paul was taken to Red Wing and exhibited at the fair at that place. Later it was taken to the Freeborn county fair at Albert Lea. At both places it attracted no small share of attention.

CAMPUS.

No important improvement has been made on the campus the past year. Its appearance has however been greatly improved by the removal of a remnant of fence, the comparative exclusion of stock and loaded teams, the closing of many wheel tracks and their obliteration by growing grass, and the removal of a small house and garden, as well as by the ordinary care which has consisted in mowing twice, and raking and hauling the leaves away once.

CHAS. Y. LACY.

Report of Hon. Peter M. Gideon, in charge of the Fruit Farm of the Department of Agriculture, at Lake Minnetonka.

As Superintendent of the experimental fruit farm, I herewith send the following report of my doings:

To the President of the University.

SIR:—On the 19th of April last I got notice to proceed with the work. On the next day began the clearing, and by the sixth of May had the ground cleared, plowed, and 795 trees set, and two days later under good fence. The trees set were crown and root grafts. About three-quarters have done well, the growth ranging from one to five feet. The loss was occasioned by the heat and dryness where brush and logs had been burned.

The varieties set were our best hardy seedlings, alternate in row, the best long keeping varieties that could be procured, all worked on hardy seedling stock. In same manner I propose to fill vacancies next spring, having on hand the best of stock to do it with.

On another part of the premises I set a few grapes last spring, about one-half being seedlings from our best grapes, the soil and location being all that could be desired, and I expect to set some five or six hundred more next spring.

Adjoining the grapery, and on top of the hill, I intend to set a pear orchard in the spring, the location and soil being just what I want for the purpose.

I will add that the Marblehead Mammoth Sweet Corn, got of your department,* yielded enormously, the ears long and large and the finest I ever saw.

The peas from your department were the following, viz.: Carter's first crop, Eugenie, Princess Royal, Veitch's Perfection, Dwarf Blue Imperial, Carter's Surprise, Large Gem, Omega, and Fill Basket. All have done well; all planted May 10th, side by side, and received the same culture—rich land well manured. Carter's First Crop was fit for use in 60 days and the others came in succession about the same as on your printed list, the Eugenie giving largest pods and most of them, the Fill Basket next in point of yield, the balance about an average, and as to quality I could see but little difference—all good.

With respect,

PETER M. GIDEON.

EXCELSIOR, MINN., NOV. 12, 1878.

*College of Agriculture.