

The University of Minnesota

THE PRESIDENT'S REPORT

1912-1913



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THE PRESIDENT'S REPORT

To the Board of Regents of the University of Minnesota:

GENTLEMEN: I herewith submit my report for the year ending July 31, 1913. In reporting changes in the personnel of the teaching staff, I include only men and women of professorial rank.

Resignations.—The University, the Medical School, and the cause of public health suffered a serious loss in the withdrawal of Dean Frank F. Wesbrook to assume the Presidency of the new University of British Columbia. Professor H. R. Hoagland, of the Division of Soils in the Department of Agriculture, resigned to accept a position with the Federal Government. Associate Professor Carl W. Thompson resigned the directorship of the Research Bureau in Agricultural Economics to join the staff of the Department of Agriculture in Washington. Assistant Professor Hugh E. Willis, of the Law School, was elected Dean of the Law School of the University of Southern California. Assistant Professor H. W. Hill, of the Department of Pathology, Bacteriology, and Public Health, became Director of the Institute of Public Health at London, Ontario. Assistant Professor A. R. Kohler, in the Division of Horticulture, withdrew to take up practical fruit-raising near Philadelphia, Pennsylvania. Assistant Professor H. W. Bellows, who formerly gave half time to the Department of Rhetoric, is now wholly engaged in editorial work. The reorganization of the Medical School staff caused several rearrangements which are not recorded here. (See pages 12, 13.)

Retirements.—Dr. Thomas S. Roberts was retired as Professor Emeritus in Pediatrics. Dr. Roberts found himself unable to assume the increased responsibility which the reorganization of the Medical School Faculty would have thrown upon him if he had retained his connection with the staff.

Deaths.—Hans Juergensen, Assistant Professor of German, died on September 5, 1912. Dr. Parks Ritchie, Professor and

Chief of the Department of Obstetrics and Gynecology, died on February 2, 1913.

Leaves of absence.—Professor Charles E. van Barneveld was granted leave of absence for three years without pay to assume the directorship of the Mining Division of the Panama-Pacific Exposition. Associate Professor C. P. Bull was granted leave of absence for one year from July, 1913, without salary, to assume the management of the National Corn Exposition. Associate Professor J. P. Wentling and Assistant Professor A. G. Ruggles were granted leaves of absence,—the former for six months, and the latter for a year, without salary, to co-operate with the Chestnut Blight Commission of Pennsylvania.

Appointments.—The following appointments to positions of professorial rank were made during the year:

E. P. Lyon, Dean of the Medical School and Director of the Department of Physiology with the rank of Professor.

B.S., 1891, B.A., 1892, Hillsdale College; Ph.D., University of Chicago, 1897; M.D. (Honorary), St. Louis University, 1910; Instructor, Harvard School, Chicago, 1892-6; Instructor, South Side Academy, Chicago, 1896-7; Instructor, Bradley Polytechnic Institute, Peoria, 1897-1900; Assistant Professor, University of Chicago and Rush Medical College, 1900-4; Professor, St. Louis University, 1904-13; Dean, Medical School, St. Louis University, 1907-13.

Guy S. Ford, Professor of History and Chairman of the Department in the College of Science, Literature, and the Arts, and Dean of the Graduate School.

B.L., University of Wisconsin, 1895; Ph.D., Columbia University, 1903; Principal and City Superintendent, Grand Rapids, Wisconsin, 1895-8; Instructor in History and Assistant Professor, Yale University, 1901-6; Professor of Modern European History, University of Illinois, 1906-13.

Richard R. Price, Director of University Extension, with the rank of Professor.

B.A., University of Kansas, 1897; B.A., 1900, M.A., 1901, Harvard University; Principal of High School, 1901-2, Superintendent City Schools, 1902-9, Hutchinson, Kansas; Director of University Extension, University of Kansas, 1909-13.

Edward Dana Durand, Director of University Bureau of Social Statistics, and Professor of Economics in the College of Science, Literature, and the Arts.

B.A., Oberlin College, 1893; Ph.D., Cornell University, 1896; Assistant Professor, Leland Stanford Junior University, 1897-9; Instructor, Harvard University, 1902-3; Deputy Commissioner of Corporations, 1907-9; Director of the Federal Census, 1909-13.

Clarence M. Jackson, Professor of Anatomy and Director of the Department of Anatomy in the Medical School.

B.S., 1898, M.S., 1899, M.D., 1900, University of Missouri; Instructor in Anatomy, 1899-1900, Assistant Professor of Anatomy and Histology, 1900-2, Professor of Anatomy and Histology, 1902-13, Junior Dean of the Medical School, 1906-9, Dean of the Medical School, 1909-13, University of Missouri.

Arthur D. Hirschfelder, Professor of Pharmacology and Director of the Department of Pharmacology in the Medical School.

B.S., University of California, 1897; M.D., Johns Hopkins University, 1903; Assistant in Medicine, Cooper Medical College, 1904-5; Voluntary Assistant in Medicine, 1905-6, Instructor in Medicine in Charge of the Physiological Laboratory of the Medical Clinic, 1906-8, Associate in Medicine in Charge of the Physiological Laboratory of the Medical Clinic, 1908-13, Johns Hopkins University.

Josephine T. Berry, Professor of Nutrition and Head of the Department of Home Economics in the Department of Agriculture.

B.A., University of Kansas, 1893; B.S., 1904, M.A., 1910, Columbia; Superintendent of Public Schools, Waterville, Kansas, 1901-3; Instructor, Department of Household Administration, University of Chicago, 1904-5; Head of Department of Home Economics, State Normal School, De Kalb, Illinois, 1905-9; Head of Department of Home Economics, State Agricultural College, Pullman, Washington, 1911-3.

Roscoe W. Thatcher, Professor of Agricultural Chemistry, Agricultural Chemist of the Experiment Station, and Chief of the Division of Agricultural Chemistry in the Department of Agriculture.

B.Sc., 1898, M.A., 1901, University of Nebraska; Assistant Chemist, Experiment Station, University of Nebraska, 1899-1901; Assistant Chemist, 1901-3, Chemist, 1903-12, Director, 1907-13, Experiment Station, Assistant Professor of Agricultural Chemistry, Associate Professor of Agricultural Chemistry, Professor of Agricultural Chemistry and Head, Department of Agriculture, 1903-13, State College of Washington.

Frederick M. Mann, Professor of Architecture and Head of the Department of Architecture in the College of Engineering.

B.C.E., University of Minnesota, 1892; B.S. in Architecture, 1894, M.S. in Architecture, 1895, Massachusetts Institute of Technology; C.E., University of Minnesota, 1898; Instructor in Architectural Design, 1896-9, Instructor in Architectural Construction, 1899-1900, University of Pennsylvania; Professor of Architecture, Washington University, 1902-10; Professor of Architecture, University of Illinois, 1910-13.

Edmund M. Morgan, Jr., Professor of Law in the Law School.

B.A., 1902, M.A., 1903, I.L.B., 1905, Harvard University.

Eldon R. James, Professor of Law in the Law School.

B.S., 1896, LL.B., 1899, University of Cincinnati; S. J. D., Harvard University, 1912; Instructor and Professor of Law, University of Cincinnati, 1900-12; Professor of Law, University of Wisconsin, 1912-3.

John H. Allison, Professor of Forestry in the Division of Forestry in the Department of Agriculture.

Ph.B., Sheffield Scientific School, Yale, 1905; M. F., Yale Forest School, 1906; six and one-half years' experience in United States Forest Service.

Frederick J. Alway, Professor of Soil Chemistry, Soils Chemist of the Experiment Station, and Chief of the Division of Soils in the Department of Agriculture.

B.A., University of Toronto, 1894; Ph.D., University of Heidelberg, 1897; Professor of Chemistry, Nebraska Wesleyan University, 1898-1906; Professor of Agricultural Chemistry, University of Nebraska, 1906-13.

George J. Young, Professor of Mining in the School of Mines.

B.S. in Mining, University of California, 1899; Assistant, University of California, 1899-1900; Assistant Professor of Metallurgy, 1900-3, Professor of Mining and Metallurgy, 1904-13, University of Nevada; in charge Mackay School of Mines, 1908-13.

Waldron M. Jerome, Professorial Lecturer in charge of the subject of Evidence in the Law School.

B.S., University of Minnesota, 1900; LL.B., Harvard University, 1906.

Frederick H. Stinchfield, Professorial Lecturer in charge of Practice Work in the Law School.

B.A., Bates College, 1900; LL.B., Harvard University, 1905.

John Devaney, Professorial Lecturer in charge of Practice Work in the night classes of the Law School.

B.A., 1905, LL.B., 1907, LL.M., 1909, University of Minnesota.

Edward P. Burch, Professorial Lecturer in Electric Railway Engineering in the College of Engineering.

B.E.E., 1892, E.E., University of Minnesota, 1898; Instructor in Electrical Engineering, 1890-1, Lecturer in Electric Railway Engineering, 1906-10, Professorial Lecturer, 1910-12, University of Minnesota.

Adolph F. Meyer, Professorial Lecturer in Hydraulics in the College of Engineering.

B.S.C.E., 1905, C.E., University of Wisconsin, 1909.

Mac Martin, Professorial Lecturer in Advertising in the General Extension Division.

Member Educational Committee Associated Advertising Clubs of America, 1910-12.

Ernest W. Major, Associate Professor of Animal Nutrition in the Division of Dairy and Animal Husbandry in the Department of Agriculture.

B.Agr., University of Minnesota, 1899; Assistant in Dairy Husbandry, University of Minnesota, 1900-1; Instructor, Assistant Professor, and Associate Professor of Animal Husbandry, University of California, 1901-12.

Clare L. Rotzel, Associate Professor of Accounting in the Department of Economics, in the General Extension Division.

B.C.S., New York University, 1907; Certified Public Accountant, University of the State of New York, 1907; Head of Commercial Department, Goddard Seminary, Barre, Vermont, 1901-3; Head of Department of Foreign Commercial Practice, Yamaguchi Higher Commercial School, Yamaguchi, Japan, 1907-10; Instructor of Accounting, New York University, 1911-3.

William M. Moore, Assistant Professor of Entomology in the Division of Entomology in the Department of Agriculture.

B.A., Ursinus College, Collegeville, Pennsylvania, 1907; two and one-half years of graduate work at Cornell University; Assistant Instructor of Botany, Cornell University, 1908-10; Lecturer in Zoology and Entomology, School of Agriculture, Potchefstroom, S. Africa, 1910-13.

George A. Works, Assistant Professor of Agricultural Education in the Division of Agricultural Education in the Department of Agriculture.

Ph.B., 1904, M.S., 1912, University of Wisconsin; Superintendent of Schools, St. Croix Falls, Wisconsin, 1899-1902; Principal of High School, 1905-8, Superintendent of Schools, 1908-11, Menomonie, Wisconsin; Instructor in Agricultural Education, University of Wisconsin, 1912.

Marion Weller, Assistant Professor in Textiles in the Division of Home Economics in the Department of Agriculture beginning August 1, 1914.

B.A., University of Chicago, 1897; Instructor in Frances Shimer Academy of the University of Chicago, 1897-99; Instructor in the Joliet Township High School, 1899-1902; Instructor in the Northern Illinois State Normal School, 1902-12; Graduate work in the University of Chicago and at Columbia University.

Richard Wellington, Assistant Professor of Pomology in the Division of Horticulture in the Department of Agriculture.

B.S., Massachusetts Agricultural College, 1906; M.S., Harvard University, 1911; Assistant Horticulturist, 1906-11, Associate Horticulturist, 1911-13, New York Agricultural Experiment Station, Geneva, New York.

Louise McDanell, Assistant Professor of Foods and Cookery in the Division of Home Economics in the Department of Agriculture.

B.S., University of Nashville, 1902; B.A., Leland Stanford Junior University (Chemistry), 1906; M.A., Columbia University, 1912; Master's diploma in Education (Household Arts), Teachers' College, 1912; Instructor in Science and Mathematics, Andrew College, Cuthbert, Georgia, 1902-3; Teacher, Grammar Schools, Los Angeles, California, 1903-5; Instructor in Science and Mathematics, High School, Corona, California, 1906-7; Instructor in Science (in charge of Department) High School, Alhambra, California, 1907-11; Assistant Professor of Foods and Cookery, Department of Home Economics, 1912-13, Summer 1912, in charge of Home Economics, Summer 1913, in charge of Food and Nutrition, State College of Washington.

Wilfrid G. Brierley, Assistant Professor of Horticulture in the Division of Horticulture in the Department of Agriculture.

B.S.A., Cornell University, 1906; M.S. in Hort., State College of Washington, 1913; Instructor in Horticulture, National Farm School, Doylestown, Pennsylvania, 1906-8; Instructor in Horticulture and Institute Lecturer in Horticulture, State College of Washington, 1908-13.

Alva H. Benton, Assistant Professor of Farm Management in the Division of Agronomy and Farm Management in the Department of Agriculture.

B.S. in Agr., Ohio State University, 1912; M.S., Pennsylvania State College, 1913; Teaching Fellow at Pennsylvania State College, 1912-13.

Herbert F. Bergman, Assistant Professor of Botany in the College of Science, Literature, and the Arts.

B.S., Kansas State Agricultural College, 1905; Assistant in Botany, Kansas State Agricultural College, 1906-8; Assistant Professor of Botany, North Dakota Agricultural College, 1908-12.

Chessley J. Posey, Assistant Professor of Geography in the Department of Geology and Mineralogy in the College of Science, Literature, and the Arts.

B.S., University of Illinois, 1900; M.S., University of Chicago, 1905; Teacher Public Schools, 1896-1903; Head, Department of Physical Science, State Normal School, Mankato, Minnesota, 1905-11; Instructor in Geology, University of Wisconsin, 1912-13.

Samuel L. Hoyt, Assistant Professor of Metallography in the School of Mines.

E.M., University of Minnesota, 1909; graduate study, Columbia University, candidate for Ph.D. degree, 1914.

Raymond A. Kent, Assistant Professor of Education in the College of Education and Principal of the University High School with the rank of Associate Professor.

B.A., Cornell College, Mt. Vernon, Iowa, 1903; M.A., Columbia University, 1910; Teacher, Minnesota grade and high schools, 1905-9; Instructor in State Normal School, Winona, Minnesota, 1909-13; Superintendent City Schools, Winona, Minnesota, 1911-3; Secretary Minnesota Educational Commission, 1913-4.

Promotions.—The following promotions to positions of professorial rank were made during the year:

College of Science, Literature, and the Arts—

- C. D. Allin from Assistant Professor to Associate Professor of Political Science.
- Hal Downey from Assistant Professor to Associate Professor of Animal Biology.
- D. F. Swenson from Assistant Professor to Associate Professor of Philosophy.
- J. S. Young from Assistant Professor to Associate Professor of Political Science.

College of Engineering—

- J. I. Parcel from Instructor to Assistant Professor in Structural Engineering.

College of Agriculture—

- A. D. Wilson from Associate Professor to Professor and Chief of the Agricultural Extension Division.
- Carl W. Thompson from Assistant Professor to Associate Professor of Agricultural Economics.
- W. L. Boyd from Instructor to Assistant Professor of Veterinary Medicine and Surgery.
- E. C. Stakman from Instructor to Assistant Professor of Vegetable Pathology and Botany.
- C. W. Howard from Instructor to Assistant Professor of Entomology.
- H. P. Hoskins from Instructor and Assistant Veterinarian to Assistant Professor of Veterinary Medicine and Surgery.

The Medical School—

- Dr. R. E. Scammon from Assistant Professor to Associate Professor of Anatomy.

The College of Dentistry—

- J. M. Walls from Professor to Head of Department of Operative Dentistry.
- H. S. Godfrey from Associate Professor to Professor of Operative Dentistry.
- H. A. Maves from Assistant Professor to Associate Professor of Operative Dentistry.
- C. A. Griffith from Assistant Professor to Associate Professor of Operative Dentistry.
- G. W. Reynolds from Instructor to Assistant Professor of Crown and Bridge Work.
- R. R. Knight from Instructor to Assistant Professor in the Administration of Anaesthetics.

The School of Analytical and Applied Chemistry—

E. P. Harding from Assistant Professor to Associate Professor of Chemistry.

W. H. Hunter from Instructor to Assistant Professor of Chemistry.

The General Extension Division—

C. H. Preston from Instructor to Assistant Professor of Business Administration.

ADMINISTRATIVE CHANGES

The appointment of advisory committees.—In connection with the University Extension work in Minneapolis, St. Paul, and Duluth, committees of citizens have been appointed to serve in an advisory capacity to the Extension Division. It is believed that the active co-operation of practical business men and of women interested in civic betterment will be of service in keeping the extension courses in close relation to the needs of these urban communities. An advisory committee has also been appointed to co-operate with the Northeast Demonstration Farm near Duluth.

Residence classification.—In three colleges additional fees are imposed upon non-resident students. It is in many cases difficult to decide precisely what should constitute "residence." Pending a revision of the rules of the Board of Regents, the following new regulation has been adopted: "Self-supporting students over twenty-one years of age who declare an intention to reside in Minnesota shall be classified as resident students."

The American Mathematical Monthly.—The Regents have adopted the policy of co-operating in scientific work by authorizing a small payment toward the subsidizing of the *American Mathematical Monthly*. A number of other educational institutions are contributing to the support of this scientific publication. The University of Minnesota is represented on the editorial board.

University Extension policy.—A definite schedule of tuition fees for University Extension courses has been adopted. The courses have been classified and fees assigned as follows: Academic and introductory courses, \$5.00 a semester; technical courses, \$7.50 a semester; specialized and advanced courses, \$10.00 a semester. The compensation of instructors and of the

regular staff who give additional Extension courses has been determined in accordance with the following schedule:

Instructors with salaries of \$1200 to \$1450—\$125 per course.
Instructors with salaries of from \$1500 to \$1950—\$150 per course.
Instructors with salaries of from \$2000 to \$2450—\$175 per course.
Instructors with salaries of from \$2500 to \$2950—\$200 per course.
Instructors with salaries of from \$3000 up—\$225 per course.

In academic subjects the course shall consist of sixteen evening sessions; in engineering, of twelve evenings.

Agricultural department organization.—The Department of Agriculture occupies a unique position in the organization of the University. It includes many units of instruction and investigation. The administration of this department, therefore, involves a serious tax upon the time and the energy of the Dean and Director. In order to relieve him the Regents have created the position of Assistant Dean in the College of Agriculture. This officer is expected to give especial attention to the administration of the College. Dr. E. M. Freeman was appointed to this position.

EDUCATIONAL POLICIES

Organization of the University Senate.—In accordance with the plan of organization recommended by the former University Council and adopted by the Regents, the University Senate was formally convened during the year. Standing committees have been appointed, and this central governing body of the University has begun its work. It is to be hoped that University unity will be furthered by this new organization without encroachment upon the necessary autonomy of the various subdivisions of the institution.

University Bureau of Statistics.—The Regents created within the year a University Bureau of Statistics and were fortunate in securing for the direction of this Bureau Dr. E. Dana Durand, recently Director of the Federal Census. It is hoped to develop this University Bureau into an important agency, not only for educational research, but for public service. The Bureau of Research in Agricultural Economics has been made a part of this general University Bureau. During the summer of 1913 social and economic surveys of Ada and Braham townships were undertaken.

The Department of Political Science.—On the recommendation of the Dean of the College of Science, Literature, and the Arts, a separate department of Political Science has been created, with a staff of three men. The courses in Political Science heretofore given under the auspices of the Department of Economics and Political Science have become sufficiently numerous, and the registration of students large enough to warrant this recognition of Political Science as a separate department.

College of Science, Literature, and the Arts.—On the recommendation of the Faculty of this College a new plan of organization has been put into effect. Two new bodies have been created. The first, an Administrative Board, assumes the functions of the former committees on program, curriculum, and students' work. The members of this board are relieved from a certain amount of teaching in order that they may devote themselves with care to the study of individual cases of students who are deficient in their work. The second body is an Advisory Committee which forms a cabinet for the Dean. This committee of eight is appointed by the President and Dean from a list of fifteen faculty members submitted by the Faculty of the College. It is the duty of this committee to express views to the Dean with reference to general educational policies, the promotion of members, increases of salaries, and the appointment of new members of the staff. This is a significant experiment in faculty participation in college administration; the results will be studied with interest.

Summer Session policy.—A uniform practice with respect to the salaries of those who teach in the summer sessions has been adopted. Heretofore members of the teaching staff in the Department of Agriculture have been expected to give summer instruction without additional compensation, while in the other divisions of the University supplemental salaries have been provided for service of this kind. Under the new regulation all members of the faculty who offer summer courses will receive additional compensation proportioned to their regular salaries.

Reorganization of the College of Medicine and Surgery.—For some years the conviction had been growing that for historic and other causes the clinical staff of the College of Medicine and Surgery was larger than necessity demanded, and that moreover it contained too many men of co-ordinate rank. At the

request of the Regents and with the hearty co-operation of the Executive Faculty of the College of Medicine and Surgery a complete reorganization of the entire staff both clinical and laboratory was decided upon. All the members of the medical staff placed their resignations in the hands of the President. The Regents appointed as a committee of reorganization the President; the Dean of the College, Dr. F. F. Westbrook; two members of the Executive Faculty, Dr. J. E. Moore and Dr. Charles L. Greene; and three alumni of the College, Dr. L. B. Wilson, Dr. E. L. Tuohy, and Dr. Theodore Bratrud. This committee was requested to present to the Regents, first, a complete plan of organization for the medical faculty, and second, nominations of individuals to fill the positions provided in this plan. The report of the committee was received and adopted on February 17, 1913, to take effect August 1, 1913. The whole spirit in which this reorganization was carried out demonstrated the highmindedness and devotion of the medical staff and the magnanimity of the medical profession in Minneapolis and St. Paul. The principles of the reorganization were essentially these: the reduction of numbers, the increase of time and responsibility for the chiefs of staff, and the assigning of positions under their leadership in such a way as to secure the greatest efficiency of effort and continuity and unity of instruction.

Summer Session of the Medical School.—For the first time in its history the Medical School voted to offer summer instruction for the season of 1913. This was the beginning of what it is hoped will prove to be an increasingly important session which will not only enable regular students to make up lost ground or to anticipate courses, but will also provide for medical practitioners an opportunity for graduate study and research.

Law School policy.—On the recommendation of the Faculty of the Law School, the Regents adopted the following regulation: "A special student who throughout his course of three years maintains an average of *good*, may by a special vote of the Faculty be recommended for the degree of Bachelor of Laws." This action is in harmony with the policy of the Law School not to exclude from opportunity and privilege students of unusual and demonstrated ability.

Farm Management training stations.—On the recommendation of the Division of Farm Management the Regents author-

ized the leasing of two farms to be put in charge of two students of the senior class in the College of Agriculture. It is planned to make these students wholly responsible for the management of these farms for the year, and to condition the granting of degrees upon the successful completion of this work. The outcome of this test will be awaited with interest. So far as known, this is the first formal attempt to supply a carefully supervised test of the practical efficiency of agricultural college graduates.

THE TEACHING STAFF

A salary scale.—While no definite scale has been agreed upon, an effort has been made to approximate at least certain sums as minima for the different academic ranks. It is hoped that instructors may be appointed at \$1,200 and, if successful, advanced \$100 each year up to \$1,400 or \$1,500. It is the policy not to promote to an assistant professorship anyone to whom a salary of at least \$1,500 can not be paid. This minimum ought to be put at \$1,750. The minimum for an associate professor has been made \$2,250. A man worthy of full professorial rank should receive not less than \$2,750. It is recognized that in professional schools a somewhat higher salary scale must be maintained to meet the economic demands for especially trained men of certain types.

THE STUDENTS

Cost of living for students.—During the year an investigation was made by Dr. L. D. H. Weld, who received individual reports from 92 per cent of the collegiate students in residence. The tabulated results show that the average room rent paid by men was \$1.64 a week, by women \$1.77. The average for all students (not living at home) was \$1.68. The average board paid by men was \$3.89 a week, by women \$4.04. The average for all students (not living at home) was \$3.93. Eleven men and seven women reported that board cost them less than \$2.00 a week. The average of total annual expenses, including tuition fees, was for men \$536.18, for women \$474.48. The higher tuition

fees of the professional schools raise the average for men. In the College of Science, Literature, and the Arts, the average total expense for men is \$469.52, for women \$487.90. Seventeen men and women reported a total annual expense of less than \$250. Sixty-two men and 14 women reported an annual expense of \$850 or more.

Earnings of students.—The statistical inquiry reported above disclosed the following facts with reference to the earnings of students: 47.6 per cent of the men and 11.9 per cent of the women have engaged in remunerative work during the college year. The average earnings of the men were \$161.16, of the women \$99.14. The aggregate earnings of men and women who reported satisfactorily were \$129,487.47. Of the men 56 earned more than \$400. During the summer vacation, of the men 85.1 per cent and of the women 16.2 per cent were at work. The average earnings of the men were \$161.51, of the women \$68.25. The aggregate summer earnings reported were \$237,168.37. The gross earnings for men and women for the year between June 1, 1912 to June 1, 1913, were estimated at slightly over \$400,000. The answers of certain students were unsatisfactory; still others failed to answer the questions at all.

Occupations followed by students.—The principal occupations of the men in the order of largest numbers were as follows: as salesmen, solicitors, clerks, waiters, newspaper reporters, musicians, drug clerks, draftsmen. The principal occupations of the women in order of importance were clerical work, house work, tutoring, music. The average number of hours spent a week for men was 17.3, for women 18.2. Of the men 16.4 per cent and of the women 19.4 per cent reported that they worked more than 30 hours a week.

Aid for self-supporting students.—Thanks to the generosity of individuals, a sum of from \$4,000 to \$5,000 is available annually for loans to students. In the near future the University must itself assume the functions of the employment bureau which is now conducted by the Young Men's Christian Association. The University should make diligent and systematic search for opportunities for work, and report these to all students who desire remunerative employment. In this way the revenues of self-supporting students could be materially increased.

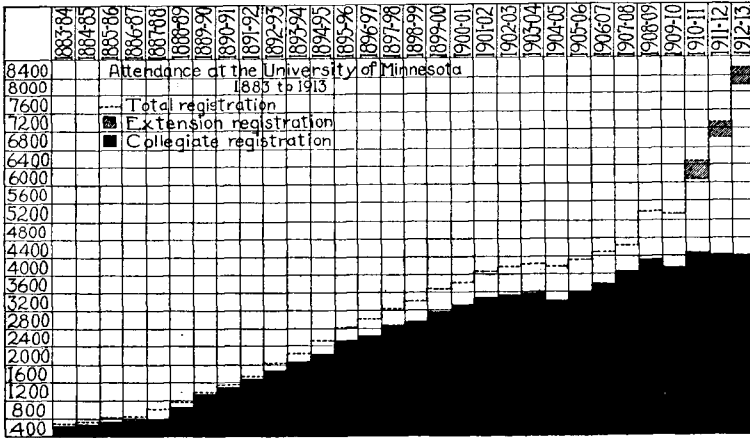
Encouragement for self-supporting students.—The committees

on students' work always take into account the fact of self-support. Students who are earning their own way are given every opportunity to show that they are also capable of taking advantage of the educational resources of the institution. If any discrimination is made it is always in favor of those who are wholly or in part dependent upon their own efforts. There are oftentimes serious handicaps suffered by those who are making their way through the University. It is true that a stage may be reached when it is better for students to drop out for a year or for a semester to accumulate funds and then to return to work under more favorable conditions. There are certain colleges, such as Law, Medicine, and Engineering, in which library, laboratory, and shop work require attendance for long hours and make it peculiarly difficult for students to find time for outside work. A student who is doing thirty hours a week of outside work, as certain students have reported that they are doing, might easily break down under the excessive schedule which he would be compelled to carry.

A resident nurse at Sanford Hall.—The assignment of a trained nurse to Sanford Hall, the residence hall for women students, is to be regarded as an important forward step. This nurse will not confine her services to residents of the Hall, but will under the direction of the Dean of Women visit in boarding houses women students who may need attention. The nurse will also co-operate in the inspection of boarding places, a policy necessary for protecting the health of students, and securing for them wholesome and safe living conditions. It is hoped that this innovation will prove only the beginning of a complete University public health system.

STATISTICS OF REGISTRATION

Registration, 1883-1913.—The diagram (page 17) shows graphically the registration of students from 1883-84 to 1912-13 inclusive. The college registration is indicated in solid black, the extension registration in shading. The difference in each year between the extension and the collegiate registration indicates the subcollegiate and short-course registration.



Collegiate students.—Table I shows the registration of collegiate students by colleges and schools for the two academic years 1911-12 and 1912-13. The loss of 146 students in the College of Science, Literature, and the Arts is seen to be chiefly in the sophomore-freshman classes. This reduction discloses the influence of the new system of entrance requirements. The reduction in the number of law students is a consequence of the new standard, the full effects of which are now over. From now on the numbers will remain fairly constant and in the future may be expected slightly to increase. There are no significant changes with respect to the other schools. The increase in the School of Chemistry may be attributed in part at least to the fact that this School did not originally announce the same entrance requirements as those adopted by the other colleges.

TABLE I. COLLEGIATE STUDENTS BY COLLEGES AND SCHOOLS, 1911-13

COLLEGE OR SCHOOL	1911-12			1912-13			GAIN	LOSS
	Men	Women	Total	Men	Women	Total		
SCIENCE, LITERATURE, AND THE ARTS:								
Seniors.....	95	165	260	90	186	276		
Juniors.....	121	197	318	82	216	298		
Sophomores.....	193	294	487	217	229	446		
Freshmen.....	305	308	613	284	260	544		
Unclassed.....	28	52	80	14	34	48		
Total.....	742	1,016	1,758	687	925	1,612	.....	146

TABLE I—Continued

COLLEGE OR SCHOOL	1911-12			1912-13			GAIN	Loss
	Men	Women	Total	Men	Women	Total		
ENGINEERING AND THE MECHANIC ARTS:								
Post-Seniors.....	17		17	41		41		
Seniors.....	56		56	44		44		
Juniors.....	66		66	73		73		
Sophomores.....	96		96	77		77		
Freshmen.....	121		121	133		133		
Unclassed.....	21		21	25		25		
Total.....	377		377	393		393	16	
AGRICULTURE:								
Graduates.....	14	2	16	11		11		
Seniors.....	22	14	36	36	18	54		
Juniors.....	29	10	39	46	23	69		
Sophomores.....	64	32	96	56	51	107		
Freshmen.....	70	83	153	83	86	169		
Normal.....		65	65					
Special Students.....	6	6	12	10	7	17		
Total.....	205	212	417	242	185	427	10	
LAW:								
Third-Year Day.....	46		46	56	2	58		
Second-Year Day.....	66	2	68	29	1	30		
First-Year Day.....	22	1	23	27		27		
First-Year Day (Academic Seniors).....	8		8	27	1	28		
Fourth-Year Night.....	24	1	25	8		8		
Third-Year Night.....	15	1	16	13	2	15		
Second-Year Night.....	16	1	17					
First-Year Night.....	6		6					
Special Students.....	116		116	48		48		
Total.....	319	6	325	208	6	214		111
MEDICAL:								
Graduates.....	3		3	11	1	12		
Sixth-Year.....	35	1	36	42	4	46		
Fifth-Year.....	42	4	46	32	2	34		
Fourth-Year.....	38	2	40	50	2	52		
Third-Year.....	60	2	62	50	2	52		
Total.....	178	9	187	185	11	196	9	
SCHOOL FOR NURSES.....								
		22	22		30	30	8	
DENTISTRY:								
Third-Year.....	58		58	62		62		
Second-Year.....	66		66	86	3	89		
First-Year.....	102	3	105	92		92		
Unclassed.....	18		18	11		11		
Total.....	244	3	247	251	3	254	7	
PHARMACY:								
Graduates.....				3		3		
Seniors.....	26	1	27	32	1	33		
Juniors.....	43		43	45	4	49		
Unclassed.....	6	1	7	1		1		
Total.....	75	2	77	81	5	86	9	
MINES:								
Seniors.....	24		24	11		11		
Juniors.....	17		17	7		7		
Sophomores.....	14		14	19		19		
Freshmen.....	22		22	20		20		
First-Year.....	21		21	37		37		
Total.....	98		98	94		94		4

TABLE I—Continued

COLLEGE OR SCHOOL	1911-12			1912-13			GAIN	Loss
	Men	Women	Total	Men	Women	Total		
CHEMISTRY:								
Seniors.....	18		18	16	1	17		
Juniors.....	17	1	18	7		7		
Sophomores.....	7		7	11		11		
Freshmen.....	16	1	17	57	9	66		
First-Year.....	14	1	15					
Unclassed.....	6		6	4	1	5		
Post-Senior.....				2		2		
Total.....	78	3	81	97	11	108	27	
EDUCATION:								
Graduates.....	8	5	13	8		8		
Seniors.....	2	38	40	9	35	44		
Juniors.....	2	33	35	8	32	40		
Unclassed.....	2	13	15	4	8	12		
Total.....	14	89	103	29	75	104	1	
GRADUATE.....	101	58	159	114	69	183	24	
SUMMER SESSION:								
College Section.....	227	250	477	204	290	494		
Agricultural.....	25	45	70	28	64	92		
Total.....	252	295	547	232	354	586	39	
Grand Total (less dupli- cates).....	2,470	1,587	4,057	2,443	1,565	4,008		49

Subcollegiate students.—Table II records the registration of subcollegiate students, i. e., students who offer less than a high-school course for admission. The increase in the attendance at the Northwest School of Agriculture and the West Central School of Agriculture is to be attributed chiefly to the increase in attendance at the summer sessions and short courses. The registration in the short courses at the Central School of Agriculture remains practically the same as for the preceding year.

TABLE II. SUBCOLLEGIATE STUDENTS, 1911-13

SCHOOL	1911-12			1912-13			GAIN	Loss
	Men	Women	Total	Men	Women	Total		
CENTRAL SCHOOL OF AGRICULTURE:								
Intermediate Year.....	18	7	25	13	4	17		
Class A (Senior).....	106	42	148	140	69	209		
Class B (Junior).....	227	98	325	164	83	247		
Class C (Freshman).....	247	135	382	294	131	425		
Total.....	598	282	880	611	287	898	18	
NORTHWEST SCHOOL OF AGRICULTURE								
.....	122	37	159	274	262	536	377	
WEST CENTRAL SCHOOL OF AGRICULTURE								
.....	67	24	91	244	241	485	394	
Total.....	189	61	250	518	503	1,021	771	
Total, Schools.....	787	343	1,130	1,129	790	1,919	789	

TABLE II—Continued

SCHOOL	1911-12			1912-13			GAIN	LOSS
	Men	Women	Total	Men	Women	Total		
SHORT COURSES:								
Traction Engineering.....	38	.....	38	37	.....	37		
Teachers' Summer School.....	51	838	889	69	784	853		
Dairy School.....	96	.....	96	103	.....	103		
Farmers' Short Course.....	122	5	127	129	5	134		
Junior Short Course.....	203	107	310	244	84	328		
Total, Short Courses.....	535	995	1,460	582	873	1,455	.....	5
Total, Subcollegiate Students.....	1,297	1,293	2,590	1,711	1,663	3,374	784	.....

Extension students.—Table III reports the percentage of students in the Extension Division. The very marked increase in extension students is due to the special effort made to increase the number of evening courses offered in Minneapolis and St. Paul. The response has shown conclusively that there is a field for the development of work of this type. The experience of other urban universities shows that registration of extension students may easily reach or exceed the total of the students in residence.

TABLE III. EXTENSION STUDENTS, 1911-13

COURSES	1911-12			1912-13			GAIN	LOSS
	Men	Women	Total	Men	Women	Total		
General.....	263	13	276	509	259	768		
Correspondence.....	19	18	37	34	20	54		
Total.....	282	31	313	543	279	822	509	.....

Summary of registration.—Table IV summarizes the total registration for the two years 1911-12 and 1912-13. It should be noted that in the total number of collegiate students there is a slight falling off. The total number a year ago was 4,057, for the year for which this report is made the number is 4,008. The increase of subcollegiate and extension students makes the total gain 1,244. It should be remembered, however, that totals which include subcollegiate and extension students are misleading when comparisons are made with other institutions which do not have work of this sort or report it in other ways. Table V presents a summary in a somewhat different form of the facts which have already been set forth in the tables which precede.

TABLE IV. SUMMARY, 1911-13

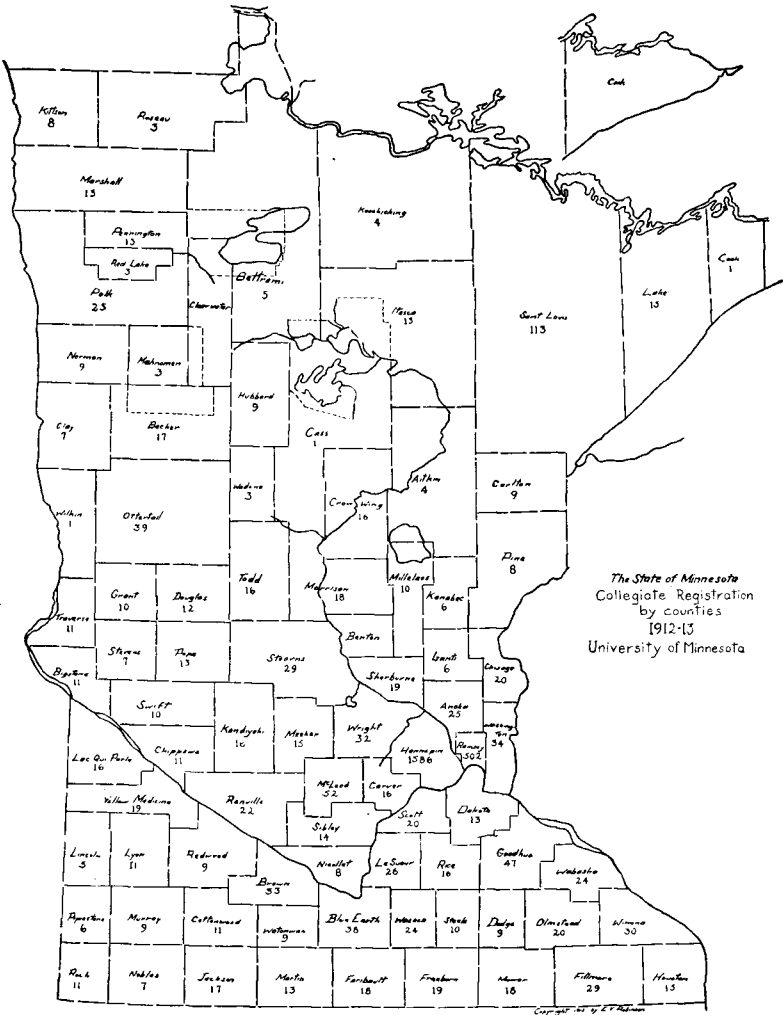
DIVISION	1911-12			1912-13			GAIN	Loss
	Men	Women	Total	Men	Women	Total		
Collegiate Students.....	2,470	1,587	4,057	2,443	1,563	4,008	.....	49
Subcollegiate Students.....	1,297	1,293	2,590	1,711	1,663	3,374	.....	784
Extension Students.....	282	31	313	543	279	822	.....	509
Grand Total.....	4,049	2,911	6,960	4,697	3,505	8,204	1,244	.....

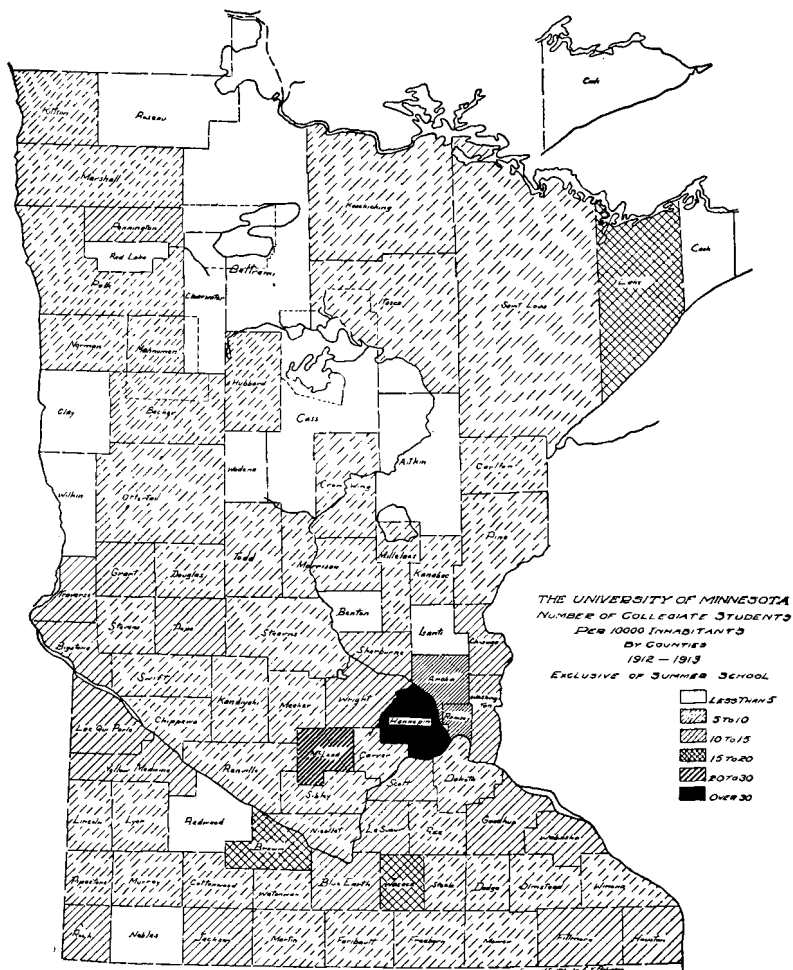
TABLE V. COMPARATIVE REGISTRATION FIGURES, 1911-12 and 1912-13

COLLEGE	1911-12			1912-13			GAIN		Loss	
	Men	Women	Total	Men	Women	Total	Men	Women	Men	Women
Science, Literature, and the Arts.....	742	1,016	1,758	687	925	1,612	.....	.....	55	91
Engineering and the Mechanic Arts.....	377	.....	.....	393	.....	.....	.....	16	.....	.....
Agriculture.....	1,527	1,550	3,077	1,976	1,900	3,876	449	350	.....	.....
Law.....	319	6	325	208	6	214	.....	.....	111	.....
Medical (incl. Nurses).....	178	31	209	185	41	226	7	10	.....	.....
Dentistry.....	244	3	247	251	3	254	7	.....	.....	.....
Pharmacy.....	75	2	77	81	5	86	6	3	.....	.....
Mines.....	98	.....	98	94	.....	94	.....	.....	4	.....
Chemistry.....	78	3	81	97	11	108	19	8	.....	.....
Education.....	14	89	103	29	75	104	15	.....	.....	14
Graduate.....	101	58	159	114	69	183	13	11	.....	.....
Summer Session.....	96	145	241	95	195	290	.....	50	1	.....
Total.....	3,849	2,903	6,752	4,210	3,230	7,440	532	432	171	105
Less duplicates.....	84	26	110	56	2	58	.....	.....	28	24
Net Total.....	3,765	2,877	6,642	4,154	3,228	7,382	532	432	143	81
EXTENSION:										
Evening Courses.....	263	13	276	509	259	768	246	246	.....	.....
Correspondence Courses.....	19	18	37	34	20	54	15	2	.....	.....
Total.....	282	31	313	543	279	822	261	248	.....	.....
SUMMARY:										
Total, Resident Students.....	.....	.....	6,642	.....	.....	7,382	740	.....	.....	.....
Total, Extension Students.....	.....	.....	313	.....	.....	822	509	.....	.....	.....
Grand Total.....	.....	.....	6,955	.....	.....	8,204	1,249	.....	.....	.....

Degrees conferred, 1889-1913.—Table VI indicates the number of degrees conferred from 1889 to 1913 inclusive. There are no particularly marked changes in the year 1913 as compared with 1912. There is an increase from 627 to 681. The variations in the Engineering degrees are due in considerable measure to the introduction of a fifth year in Engineering. This has caused an apparent increase in certain degrees and a decrease in others. The aggregate number of degrees is not seriously changed.

THE PRESIDENT'S REPORT





Geographical distribution of students.—Table VII shows the geographical distribution of students by states. This does not include the collegiate students registered in the Summer Session. It will be seen from this table that 11.4 per cent of the students come from outside the State of Minnesota. This is a slight increase over the 10.4 per cent of a year ago.

A SURVEY OF THE COLLEGES

College of Science, Literature, and the Arts.—A new curriculum has been adopted which seeks to accomplish two things. First, it compels the student to distribute his work over three groups of departments, so that his college course may have a fairly broad foundation. Second, it compels him to select one department in which he must do work for four years and two other departments in each of which he must study consecutively for two years. Thus it is hoped to secure thoroughness and sufficient insight into one subject to gain some grasp of it. An administrative board has been organized in the College with a view to concentrating responsibility and giving more attention to the needs of individual students. An advisory board has also been organized to co-operate with the Dean and the central administration in guiding the policy of the College.

College of Engineering and the Mechanic Arts.—The most significant development in this College has been the re-establishment of the Department of Architecture, which it is hoped to develop into an important educational agency. There has been improvement in the buildings and equipment of the College, which is now in a position to do better work than ever before.

The Department of Agriculture.—This department reports progress in many directions. The most significant have been the experiments in farm management, management surveys, investigations in a wide variety of technical problems, social and economic surveys, studies of marketing conditions of many kinds, forestry investigations in connection with the United States Government, the development of short courses, the introduction of a system of county agents, co-operation with rural schools, the development of agricultural education, and the issuing of a large number of scientific and popular publications.

The Law School.—The Law School reports a decreased attendance due almost entirely to the reduction of numbers in the extension classes. It reports the elimination of special students under twenty-one years of age. It calls attention to the fact that a standardized curriculum has been adopted, expresses the hope that electives may be introduced, and that the standard of scholarship may be steadily raised. Statistics are given which show conclusively that preliminary college work has a direct bearing upon success in the Law School. Attention is called to the introduction of practice and to the progress of the library. The need of foreign law books is emphasized.

The Medical School.—The report of this School outlines the plan of reorganization which went into effect at the beginning of the year. The hospital report shows that 1,454 patients have been cared for during the year. The need of hospital and dispensary development is emphasized. The establishment of a social service department in connection with the out-patient department is urged. The clinical arrangements with the city hospitals are described. The beginning of summer instruction is announced.

The College of Dentistry.—The new building and the equipment are described. The curriculum is declared to be fairly satisfactory under existing conditions. It is pointed out that already it is necessary because the limit of accommodations has been reached, to refuse admission to a considerable number of students who desire to enter the College. The possibility of extending the dental course from three to four years is suggested.

The College of Pharmacy.—Certain changes in the curriculum are reported. The medicinal plant garden and its value to the College are described. The bearing of this service upon the work of the Medical School is mentioned. The importance of the service furnished the dispensary by the College of Pharmacy is pointed out.

The School of Mines.—The work of the Experiment Station is reported. The investigations include brick and clay work; reduction processes for the Mesabi ores, and investigations of a similar character for the ores of the Cuyuna Range. The need of experiments in this field, and consequently of new equipment, is reported. The service which the School rendered to

the Tax Commission, the maps issued, and the need for new testing works are other topics which receive attention.

The School of Chemistry.—Progress on the new laboratory is described and lists of research work completed and in progress are given.

College of Education.—It is reported that normal school graduates who have been received on the recommendations of the normal school presidents have made an excellent showing. The plans for the new building are described. The work of the appointment bureau is reported. Attention is called to the need of teachers of sciences and of manual training as well as of music. The importance of vocational guidance especially in cities is urged.

The Graduate School.—The report of this School deals with the raising of standards, the increasing of registration, and the new requirements for the degree of Master of Arts. The report calls attention to the fact that members of the faculty are still too pressed by teaching to do any considerable amount of investigational work. A list of researches in progress or completed is given.

Report of the Dean of Women.—The report of the Dean of Women shows that out of 1,319 women 860 are living at home or with friends and relatives. The women constitute a scattered group but unifying influences are at work. The organization of a self-government association, the inauguration of a system of senior advisers, are described. The adoption of a "point" system by means of which student activities and honors are more widely distributed is reported. Other topics include Sanford Hall and its influence, the appointment of a resident nurse, the supervision of lodging houses, the problem of the sororities, the need for a new wing for Sanford Hall, and for an emergency fund for the aid of students.

The Library.—The Librarian reports accessions to the Library, but points out that in its library resources Minnesota is far behind other institutions of similar rank. It is urged that in the past good men have been lost because they could not secure library facilities. The need of a new library building is urged. The Librarian reports the increased use of the library by students, progress upon the work of cataloguing, but indicates that there is still need of a large amount of cataloguing and recording.

The Librarian further reports that the departmental libraries are being brought into closer relations with the central library.

UNIVERSITY FUNCTIONS, CONVOCATIONS, PUBLIC LECTURES, ETC.

Commencement exercises.—The Commencement address was delivered by the Honorable W. A. F. Ekengren, Swedish Minister to the United States. Following this address Dr. William Watts Folwell, the first President of the University, made a brief address reminiscent of the earlier history of the institution and looking to the future development of educational ideals in the Northwest. The Baccalaureate address was given by Dr. Cyrus Northrop, President Emeritus of the University, who spoke upon the subject, "A Definite and Noble Purpose in Life." The Sigma Xi lecture was delivered by Dr. C. J. Keyser, Professor of Mathematics in Columbia University, New York City.

University convocations.—Dignity was added to the general assembly of Faculty and students on the first day of the autumn semester by the presence of the President of the United States, who made a brief address. On Senior Cap and Gown Day in the spring the members of the State Legislature were guests of the University at a special convocation in the Armory.

Chapel assemblies.—During the year chapel assemblies were held at 12:00 o'clock on Tuesdays, Thursdays, and Saturdays. Brief addresses were delivered by a number of distinguished men, among whom were Mr. Louis Brandeis, of Boston, Rabbi Stephen S. Wise, of the Free Synagogue, New York, President Harry Pratt Judson, of the University of Chicago, President Albert Parker Fitch, of Andover Theological Seminary, Mr. William Faversham, Dean Arthur Holmes, of Pennsylvania State College, Professor A. V. Williams Jackson, of Columbia University, the Reverend Hugh Black, Mr. Charles Zeublin, of New York, and Dr. Josiah Strong, of the American Social Center Association.

University public lectures.—A year ago a group of professors of the University gave a course of public lectures on Comparative Literature. During the year 1912-13 another group delivered a series of lectures on Modern Developments in Science.

A valuable series of lectures on matters relating to Public Health was arranged under the auspices of the American Medical Association. The lectures were delivered by Dr. Victor C. Vaughan, University of Michigan, Dr. W. T. Councilman, Harvard University, Dr. M. P. Ravenel, University of Wisconsin, Dr. H. M. Bracken, Secretary of the State Board of Public Health, Dr. John B. Murphy, Northwestern University Medical School, Dr. Henry B. Favill, Rush Medical School, Dr. R. O. Beard, University of Minnesota. The University was fortunate in securing single addresses by a number of distinguished visitors to Minneapolis, among whom should be mentioned Dr. Washington Gladden, Dr. Charles B. Davenport, Professor Albert R. Bandini, the Honorable Clifford G. Roe, Monsieur Firmin Roz, of Paris, Dr. Ludwig Sinzheimer, of the University of Munich, Dr. Werner Hagemann, of Germany. The spiritual life of the University received inspiration from the addresses of a number of strong men. The Reverend Hugh Black, of Union Theological Seminary, delivered four addresses to large audiences. At the University Vesper Service held at five o'clock on Sunday afternoons, addresses were delivered by Dean Edward I. Bosworth, of Oberlin Theological Seminary, Dr. Cyrus Northrop, President Emeritus of the University, Dr. John W. Powell, Religious Work Director, and a number of the pastors of Minneapolis and St. Paul churches.

Meetings of societies.—During the year a number of educational meetings were held on the University Campus. In June the American Medical Association held its annual meeting in the new buildings of the College of Medicine and Surgery.

University representation.—During the year the University of Minnesota has been represented at the following meetings, conferences, University functions, et cetera: Congress of Comparative Pathology, National Creamery, Butter and Cheese-Making Association, American Association of Agricultural Colleges and Experiment Stations, National Farmers' Congress, National Society of College Teachers of Education, American Association of Animal Nutrition, International Live Stock Exposition, the American Society of Agricultural Engineers, American Farm Management Association, Conference of State Geologists, Meeting of University Business Managers, Deans of Engineering in Land Grant Colleges, Dedication of Lincoln

Hall, University of Illinois, American Breeders' Association, National Education Association, Meeting of Deans of Arts Colleges in State Universities, American Railway Engineering Association, National Drainage Congress, National Conference on the Marketing of Farm Crops, National Dental Association, North Central Association of College and Secondary Schools, Conference of State Extension Agents, Meeting of the American Home Economic Association, Conference of the American Library Association, Conference of Middle-West Physical Education and Hygiene Association, Council on Medical Education, Annual Meeting of the Fraternity of Operative Millers and the Society of Milling and Baking Technology, Convention of the National Electric Light Association, International Congress on School Hygiene, American Association of Instructors and Investigators in Poultry Husbandry, Canadian Forestry Association, International Medical Congress.

PHYSICAL PLANT AND EQUIPMENT

The Central Heating Plant.—Steam from this plant was turned into the mains on February 22, 1912. The results have been eminently satisfactory. The consumption of coal has been less than expected, the cost of operation has been relatively low, the smoke nuisance has been eliminated. It is expected to use the plant for experimental purposes, in testing fuel, stoking devices, smoke consumption, etc. The building has been so constructed that with the growth of the institution and the demand for greater heating capacity, boiler units may be added to the present equipment and the boiler house extended to cover them. It has been found necessary to line parts of the tunnel which carry the steam pipes to the various buildings.

New buildings.—During the year the Agricultural Engineering Building has been completed and the foundations of the Chemistry Laboratory laid. The legislative budget provides for a number of new structures, among the most important of which are a School of Mines Building, Biology Laboratory, Woman's Gymnasium, Hospital Service Building, Home Economics Laboratory, Gymnasium and Drill Hall at the University Farm.

Equipment funds.—The Legislature of 1913 also made provision for substantial increases in the equipment of Electrical and Mechanical Engineering, in Experimental Engineering, and in Mining. A special appropriation for the College of Science, Literature, and the Arts will be largely expended in important apparatus for the Department of Physics, which is one of the most active centers of research in the University.

Library and books.—The University is seriously handicapped by the lack of a modern library building, and is lamentably weak in its collection of books, which is too small in number and not well distributed over the different fields of knowledge. In these circumstances the only thing to do is to abandon the idea of symmetrical development for a time and frankly to concentrate on a few fields with the idea of bringing these up to a University standard. This does not, of course, mean that other departments are to be neglected; merely that they must be content temporarily with a college status.

Campus improvement.—Grading and seeding have been done on a considerable scale in the neighborhood of the new buildings on the new campus. The medical and engineering quadrangles begin to give an idea of the new architectural scheme. Six additional tennis courts have been laid out.

Trolley connection between Campus and Farm.—In a sense the most significant item in the legislative budget for 1913-15 was an appropriation of \$60,000 for the building of a trolley road from the Como-Harriet line of the Minneapolis Street Railway Company to the University Farm, and the running of a track from 15th Avenue and 4th Street to the center of the main campus. Over this combined route cars will be run in ten minutes from one campus to the other. This service will economize buildings, save duplications of many kinds, and unify the University, educationally and socially.

BUSINESS AND FINANCE

An inventory clerk.—In order to keep accurate records and insure careful oversight of University property, the Regents have appointed an inventory clerk who gives a large part of his time to supervising the University inventory and checking up

the property which is under the charge of various departments. This appointment is a part of the general policy of the University for increasing business efficiency and effecting economies in administration.

Contracts for uniforms.—In order to secure promptness of delivery and to effect economies for students, the University has adopted the policy of accepting a deposit fee of fifteen dollars from each student who is subject to military drill, and of making a contract for the procuring of uniforms, to be charged against this deposit. Students are given the option, however, of securing their uniforms independently from other than the University contractor.

A central storehouse.—The legislature gave its sanction to the plan for a central storehouse by providing that \$10,000 might be set aside for the purpose of maintaining a stock of supplies. It is proposed to establish two sections, one for general supplies, another for apparatus, glass-ware, chemicals and other laboratory materials. By buying in large quantities the University hopes to effect economies, and by centralizing materials, expects to minimize the duplications and excess stocks which are inevitable features of a system of several separate storerooms.

The budget of 1912-13.—This shows an increase in expenditures of \$374,911.00 over the previous year. The budget system has worked admirably. It has prevented any danger of exceeding the resources available. The distribution of funds to the various divisions of the University (see page 149) is not so significant as at first glance it might seem. To base per capita costs of instruction upon these figures is wholly misleading, for each one of these units is giving instruction to students of other units. The consequence is a bewildering complexity of cross-charges.

Modern business methods.—So far as possible the business policy of the University has been brought into line with modern business practice. In some respects, however, it is out of the question to secure the efficiency desired because the law prescribes methods which are obsolete in contemporary business. The Comptroller calls attention to two things, the delay in payment of bills and the signing of the pay-roll, with respect to which it is earnestly hoped revision of the law can be secured.

THE UNIVERSITY AND THE STATE

The legislative budget of 1913-15.—The University in its relations with the Legislature of 1913 adopted a policy which included these principles: (1) no lobbying by individual regents, faculty, or alumni; (2) requests only for what was clearly needed; (3) complete explanations for all items in the budget. The results were gratifying; for the first time in its history the University received every dollar for which it asked. The total was, however, ten per cent less than the sum appropriated two years before. The total appropriation (including the proceeds of the 23-100 mill tax) was \$3,869,950, of which \$1,089,950 was for buildings.

University men and public service.—While the University makes it a policy to abstain from participation in administrative work or the exercise of police powers, it is also true that members of the University faculty are serving on many commissions, committees, etc., which are either officially connected with the state or are of a public character. During the year 1912-13 the University was represented in connection with the following bodies: State Board of Health, State High School Board, State Forestry Board, State Tax Commission, Farmers' Institutes, Stallion Registration Board, State Entomology service, Food and Dairy Commission, State Examining Board for Teachers, State Voting Machine Commission, State Commission to Propose Reforms in Legal Procedure, Committee on Legal Education of the State Bar Association, Board of Examiners of the Minneapolis Civil Service Commission.

University Extension.—The number of extension students has increased rapidly. The plan of conducting "University Weeks," six-day series of lectures, concerts, and entertainments in different cities and towns of the State, was extended this year to include two circuits of twelve towns each, twenty-four in all. Thus, in a fortnight the University reaches twelve or fifteen thousand persons. The agricultural extension work has grown rapidly and is exerting a widespread influence, not only upon technical agriculture, but upon all phases of rural life. Plans for the immediate future include municipal reference service, extended correspondence teaching, night classes in the larger towns outside the Twin Cities and Duluth, a service of stereopticon slides, a division of public debating.

A bureau of statistics.—The University has established a Bureau of Statistics and placed at the head of it the man who has just retired from the directorship of the United States Census Bureau. It is to be hoped that the State will utilize this Bureau to gather accurate statistics of all kinds and to co-operate with the various departments which must rely upon statistical data. The gathering and supplying of such material by an expert, disinterested, scientific agency which has no desire save that of discovering and formulating the exact truth is obviously one of the most important functions which a State University can perform. The University of Minnesota is ready and anxious to render to the State and to the public a service of this kind.

Respectfully submitted,

GEORGE E. VINCENT, *President*

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

To the President of the University:

SIR: I submit herewith my report of the College of Science, Literature, and the Arts for the year ending July 31, 1913.

Faculty.—The active faculty for the year consisted of the following: professors, 43; associate professors, 1; assistant professors, 38; instructors, 43. In addition, there were 15 graduate assistants and 36 graduate scholars. Six of the assistants were in charge of classes, while the others and the scholars rendered service in the way of reading quiz papers and preparing materials in laboratories. One associate professor resigned, and six instructors, holding appointments for one year, were not reappointed, their places being filled by new appointments for 1913-14. Two professors were absent on leave the entire year and one for half of the year. There were no additions to the Faculty for the year, though several new members were appointed to fill vacancies.

Registration statistics.—The registration for the year was as follows:

Seniors - - - - -	276
Juniors - - - - -	298
Sophomores - - - - -	446
Freshmen - - - - -	544
Unclassed - - - - -	48

Total - - - - -	1,612
From the Graduate School taking their work with members of this Faculty - - - - -	139

The following are for single subjects:

From the College of Engineering - - -	661
From the College of Agriculture - - -	921
From the Medical School - - - - -	19
From the College of Pharmacy - - -	62
From the School of Mines - - - - -	157
From the School of Chemistry - - -	318
From the College of Education - - -	346

5)2,484

497

The above is equivalent to full work for - - - 497

Total - - - - -	2,248
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Curriculum changes.—Before the close of the preceding year the Faculty instructed the Curriculum Committee to consider and report upon the desirability of revising the curriculum. After several months of work the committee presented its recommendations. These, after being much modified by the Faculty, were adopted, resulting in what is called the New Curriculum. Its chief requirements are the following:

1. A major subject, consisting of four years of work in one department.
2. Two minor subjects, consisting of two years of work in each of two departments.
3. Selection of subjects, during the freshman and sophomore years, from each of the three groups representing language and literature, science and mathematics, and the humanities. Each of these three groups must be represented in the selection of the major and minor subjects.
4. A total, during the junior and senior years, of thirty-six credits in what are named "starred courses," a starred course being an advanced course, requiring as a prerequisite a year or more of work in the same line.
5. For graduation, a grade of *good* in half of the work of the four years.

Respectfully submitted.

JOHN F. DOWNEY, *Dean*

COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

To the President of the University:

SIR: I have the honor to submit a report for the college year 1912-13.

Quarters.—The quarters of the College were bettered by the occupation in August, 1912, of the still unfinished Main Engineering Building. This new building was during the year occupied by the departments of Civil Engineering, Architecture, Mathematics and Mechanics, Drawing and Descriptive Geometry, and by the Administration of the College. In addition, office room has been supplied to two men of the Department of Rhetoric whose whole time is given to work with engineering students, to the Engineering Division of the State Board of Health, and to the State Commissioner of School Buildings.

Since the burning of the School of Mines Building in February, 1913, the School of Mines has been housed in the Main Engineering Building. To Dean Appleby two offices were assigned on the first floor of the building, and for the department dealing with the Tax Commission a large office with specially built vault was provided. In the basement five rooms have been turned over to the School of Mines (including the full basement space of the north wing) for offices and other purposes, and recitation and lecture rooms have been provided in the Main and Experimental buildings. It was January, 1913, before the wings of the building were finished, the Central Engineering Library in the north wing being the last to be completed. Notwithstanding these delays and some confusion due to building processes so near at hand, the quarters have been most satisfactory during the year.

Equipment.—The Legislature of 1912-13 appropriated \$7,000 for additional equipment for the Experimental Laboratory. This will be utilized in making more efficient the work of the Department of Experimental Engineering. An appropriation of \$10,000 was made for modern machinery and equipment for the shops of the College. An appropriation of \$20,000 was made for the purpose of modernizing and bettering the equipment of the Electrical Laboratory. A small portion of this amount, perhaps \$1,500 to \$2,000, is to be utilized in changes and betterments in the Electrical Engineering Building.

Faculty.—An important addition in the instructional force of the College results from the coming of Professor Frederick M. Mann as Professor of Architecture and Head of the Department of Architecture. Professor Mann's administration of the work in Architecture at Washington University, and later at the University of Illinois, warrants us in predicting a sound growth of the Department of Architecture in this College. During the school year Instructor L. B. Walton handled the freshman

class in Architecture. Mr. Adolph F. Meyer, Consulting Engineer of St. Paul, was engaged as professorial lecturer in second semester Hydraulics. Instructors were appointed in the various departments as follows: In the Department of Electrical Engineering, Mr. H. M. Turner; in the Department of Mathematics and Mechanics, Mr. R. W. Brink; in the Department of Drawing and Descriptive Geometry, Mr. L. L. Thurstone.

Architecture.—Work in Architecture was given in the freshman year alone with seventeen students registered; but preparations were made for offering both the freshman and sophomore years for the year 1913-14.

Post-Seniors.—The year is made memorable by the graduation of our first class of post-seniors in the five-year course. The return of the post-seniors, after having received the Bachelor of Science degree at the end of four years' work, was most satisfactory, forty-six men out of fifty-six coming back for the fifth year. The class graduated twenty Civil Engineers, thirteen Electrical Engineers, and nine Mechanical Engineers.

Entrance requirements.—I desire to repeat my protest of last year against the present entrance requirements. During the year the College of Engineering withdrew its requirement of examinations in Mathematics. With the abandonment of the requirement of an examination in English the year before and the acceptance of three years' work in Manual Training and allied subjects, the entrance requirements have become reasonable, aside from the scholarship standard adopted in conference with, and upon the recommendation of, the high-school principals of the state of Minnesota. The most rational procedure appears to call for careful exclusion of the unfit, but the determination of the actual unfitness of the individual should take into consideration all the evidence available, not a meager record of high-school scholarship alone. Demonstrated unfitness after entrance calls for efficient mechanism for ejection. Such efficient mechanism will correct any error coming from the entrance of students whose fitness was in doubt. It appears proper that the applicant should always be given the benefit of the doubt.

TABLE I. REGISTRATION IN THE COLLEGE, 1873-1913

Year	No.	Year	No.	Year	No.
1873-74	4	1886-87	15	1899-1900	195
1874-75	7	1887-88	28	1900-01	246
1875-76	4	1888-89	25	1901-02	312
1876-77	3	1889-90	33	1902-03	371
1877-78	5	1890-91	74	1903-04	395
1878-79	3	1891-92	78	1904-05	399
1879-80	2	1892-93	154	1905-06	412
1880-81	2	1893-94	147	1906-07	458
1881-82	9	1894-95	149	1907-08	473
1882-83	15	1895-96	201	1908-09	467
1883-84	8	1896-97	186	1909-10	407
1884-85	7	1897-98*	129	1910-11	420
1885-86	None	1898-99	143	1911-12	378
				1912-13	393

*Prior to 1897-98 students in Mining and Chemistry are included.

TABLE II. SCHOLARSHIP STATISTICS, 1912-13

1. Total number of students.....	393
2. Number of conditions	411
3. Number of failures	255
4. Number of students dropped	34
5. Number of students left.....	15

Geographical distribution of students.—The 360 students from Minnesota were distributed by counties as follows: Anoka, 5; Becker, 5; Bigstone, 3; Blue Earth, 2; Brown, 1; Carlton, 2; Chippewa, 4; Chisago, 1; Cottonwood, 3; Crow Wing, 1; Dakota, 2; Dodge, 3; Douglas, 2; Fairbault, 3; Fillmore, 9; Freeborn, 3; Goodhue, 4; Hennepin, 165; Houston, 1; Isanti, 2; Kanabec, 2; Kandiyohi, 2; Kittson, 1; Lac qui Parle, 1; Lake, 2; Lesueur, 1; McLeod, 3; Marshall, 2; Martin, 2; Meeker, 2; Morrison, 1; Mower, 2; Murray, 2; Nicollet, 1; Norman, 2; Olmsted, 1; Ottertail, 3; Pennington, 1; Pine, 1; Polk, 1; Ramsey, 45; Redwood, 2; Renville, 1; Rice, 2; Rock, 3; St. Louis, 14; Sherburne, 4; Sibley, 3; Stearns, 3; Steele, 1; Stevens, 2; Swift, 1; Todd, 3; Wabasha, 3; Wadena, 1; Waseca, 3; Washington, 4; Watonwan, 2; Winona, 2; Wright, 5; Yellow Medicine, 2. The 28 from other states were distributed as follows: Colorado, 1; Indiana, 1; Iowa, 3; Kentucky, 1; Massachusetts, 1; Michigan, 3; Missouri, 2; Ohio, 1; South Dakota, 4; Washington, 1; Wisconsin, 10. Canada, Norway, and Siberia were represented by one student each and Peru by two students. This distribution shows the student body to be made up of over 91 per cent of Minnesota men.

Respectfully submitted,

FRANCIS C. SHENEHON, *Dean*

THE DEPARTMENT OF AGRICULTURE

To the President of the University:

SIR: I submit herewith my report of the Department of Agriculture for the year ending July 31, 1913.

ORGANIZATION

The report for 1911-12 went fully into the history, organization, and aims of the Department of Agriculture. It will not be necessary to repeat what was then presented. The designation *department* is somewhat misleading as it is used generally to refer to a subdivision of a college. In the University of Minnesota, the designation Department of Agriculture is used in the same way as in the National Department of Agriculture and includes all the work of the University in Agriculture, Forestry, and Home Economics. The designation *division* in the Department of Agriculture corresponds most nearly to *department* as used in other colleges. The Divisions are subdivided into Sections. The accompanying chart (page 40) shows the plan of organization and relationship.

College of Agriculture.—The demand for teachers of agriculture is every day becoming more acute. There are at present 134 high schools in the State teaching agriculture and 25 counties with agricultural agents. College-trained men are required by the regulations of the State High School Board. Salaries range from \$1,200 at the start to \$1,800 and \$2,000 for the more experienced men. The county agents command from \$1,500 to \$3,000, according to experience. The extension work of the agricultural high school furnishes a good training, leading to county agent work. There is also a strong demand for men with college training and experience as managers of large farms. An arrangement has been perfected for giving a year's practical experience to selected men finishing the Farm Management Course in the management of a farm. The student becomes personally and financially responsible for the whole project under the general supervision of the Farm Management Division. He pays interest and rental and maintains the property as shown by the inventory. At the close of the season he receives the profit up to \$600. All over that is divided between the student and the college. The share, if any, falling to the college will be used as a reserve fund for the furtherance of the work.

College of Forestry.—Minnesota has considerable land in the State not suited to general agriculture but adapted for forest crops. Much of the state school land is included in this area. If scientifically managed, it will yield a good profit on the investment. The College of Forestry trains men for this service. The demand for such service, while not great at present,

is gradually increasing. There is also demand for men trained in the management of forestry work in parks and large estates and for railroads and other corporations. The farm wood lot is receiving more attention and the planting of windbreaks in the prairie country is becoming increasingly important. The College coöperates closely with the State Forestry Service and is able to give students practical training of the highest order at the Summer School at Itasca Park Reserve, and at Cloquet Forest Experiment Station.

Schools of Agricultural Technology at University Farm, Crookston, and Morris.—As the College of Agriculture focuses its attention on training for teaching, research, and special leadership, so the schools of technology focus their attention on the training for direct practice. Eighty per cent of the graduates of these schools return to or take up farming or work closely allied, as a business. They find interest and pleasure as well as profit in the work. These schools fill a place not covered by the high schools or college. As the agricultural work in the high schools develops, the demand on the schools of technology increases. They are also the agricultural organization centers of their districts and take the lead in general improvement and development projects.

The Experiment Station, University Farm.—The work of the Central Experiment Station at University Farm is divided into eleven divisions: (1) Agronomy and Farm Management, (2) Agricultural Chemistry, (3) Research in Agricultural Economics, (4) Agricultural Engineering, (5) Botany and Plant Pathology, (6) Dairy and Animal Husbandry, (7) Entomology, (8) Forestry, (9) Horticulture, (10) Soils, (11) Veterinary Science.

The Experiment Station also includes work at the substations at Crookston, Morris, Grand Rapids, Duluth, and Waseca, the Fruit-Breeding Station at Zumbra Heights, Lake Minnetonka, the Fruit-Testing Station at Owatonna, the Forest Experiment Station at Cloquet. All of these are quite fully described in the last annual report. The further statement here will be confined to the progress made in the research projects during the year.

(1) Division of Agronomy and Farm Management.—The work in Agronomy and Farm Management has been along the lines of plant breeding, farm crops, crop rotation studies, cost of producing farm products, farm management surveys, farm equipment studies, and weed eradication.

The work in plant breeding includes investigations with a large number of crops. The centgener plan of breeding is followed in the main. A total of 386,230 plants of different grains have been handled. The United States Department of Agriculture is coöperating in the barley breeding and has supplied new stocks of cereals and forage plants which have added to the value of the work. The main effort has been to secure increase of yield, hardiness, and resistance to disease.

The farm crops work this year has been conducted under favorable conditions. In all a total of 582 varieties of cereals and forage crops have been under test; 878 plots are devoted to these investigations.

The rotation studies are proving of great value, not only in the soil

management problems, but in making comparisons of different schemes of cropping. They are also useful in giving data from which to prescribe rotations in farm management organization work. The principal questions under consideration in this work were methods of applying manures to the land, comparing commercial fertilizers with manures in keeping up the production, and comparing different methods of preparation of the land for crops.

The cost of production studies have been continued in organized form. The Northfield route was closed on January 1 and the statistician transferred to Cokato on April 1. A special form of book for keeping records has been placed with the farmers. The data secured will be used in determining the costs of certain farm products. This, however, is an experiment in securing data and may not be complete enough to be of value.

Farm management survey work was started last year in Rice County and data were secured from four townships, providing records from between 600 and 650 farms. It is expected to compile these data during the coming year.

Farm equipment investigations started two years ago have been continued through the year. The cooperative relations existing with the office of Farm Management, United States Department of Agriculture, will be discontinued, but we shall continue the work in connection with our farm machinery class work. Inventories and descriptions will be prepared during the winter by the students and checked up during the summer season. It is expected that this material will give information on the proportion of investment in machinery advisable on farms of different types.

The problem of quack grass eradication has been given further study during the year and the results obtained show that this pest may be controlled by adopting rotations permitting of thorough cultivation. The grass is easily smothered if kept below the surface. This work will be continued during the coming year. Work with the perennial sow thistle has also been continued and indications are that this can easily be controlled by short rotations and thorough cultivation.

(2) Division of Agricultural Chemistry and Soils.—The work in connection with industrial alcohol was discontinued as it became clearly evident that the operation of a plant of this capacity, using corn as raw material, could not be carried on at a profit.

The general project on cereal and flour investigations has been reorganized into several subprojects. Some very striking variations were found in the baking quality of the flour of the rust-resistant hybrid wheats grown by the Division of Botany and Plant Pathology in their plant disease nursery. Many of the samples of wheat obtained for analysis came from localities where weather bureau observation stations are located, and afford an excellent opportunity for correlating the composition of the wheat with climatological data. The analyses and tests of the first season's work with the crop of 1911 were published as Bulletin No. 131. A careful study of the comparative milling and baking value of winter varieties of wheat was inaugurated this year. The first year's study seems

to indicate that while comparative yields per acre of winter wheat were greater than those of spring-grown grain, the milling value of the former is considerably inferior. It is planned to continue this investigation through a series of years and to extend it until it takes in every section of the State where winter wheat is grown. Arrangements have been made with the State Board of Grain Inspection for carrying on extensive investigations of the problem of grain storage. The cooperation of the Great Northern Elevator at Duluth has also been secured and arrangements perfected for the use of a considerable number of its steel storage bins and the necessary grain to fill them. A study of the various factors which enter into the property commonly designated as strength, that is, the ability of a flour to produce a large, well-expanded loaf of bread of good texture, was inaugurated this year, and its phases formulated into a series of definite problems for study by different members of the staff.

In our soil absorption studies, also an Adams Fund project, work was confined to the development of a method for determining the relation between the capillary rise of moisture and the diameter of the soil particles. A study of the surface tension of water and of organic liquids of varying density resulted in the establishment of a definite constant for the relation of this surface tension to the absolute surface tension as given by authorities on this subject.

In our soil fertility investigations, an Adams Fund project, the effect of different systems of cropping upon the humus content of the soil and upon the associated plant in Field C of the University Farm, was completed and results have been prepared for publication. There has been a marked loss of organic matter in the cultivated soils as compared with virgin soils.

A soil survey of the twenty-five demonstration farms undertaken last year was completed this year. Both chemical and mechanical analyses were made and pot experiments were completed with the use of fertilizers. Fertilizer experiments outlined to cover periods varying from five to twenty-five years, have been inaugurated at Crookston, Grand Rapids, and at Farmington, and the progress has been very satisfactory.

In our peat soil studies, chemical analyses have been made of samples from fifteen different counties. These analyses show that all the soils are low in potash content, fairly well supplied with phosphorus, and very rich in nitrogen, while the lime content is extremely variable. Fertilizer experiments on peaty soils have been continued on four different farms but the results have been somewhat unsatisfactory because of local difficulties of drainage or lack of attention on the part of the cooperating farmers. In general, however, barnyard manure and phosphate fertilizers have given increased yields.

A large amount of statistical data was gathered in connection with our sorghum syrup investigations, and they indicate that the industry is not yet developed to anything like the degree which its importance and possibilities would warrant. Analyses of the plants at various stages of growth have been made to ascertain the stage of growth at which the canes are best suited to syrup manufacture and the stage best suited to their use as fodder. Determinations were also made of the potash, phosphorus,

and nitrogen in the plants in order to secure information regarding the amounts of these elements removed from the soil by each part of the plant, with the view of ascertaining whether certain parts may not be profitably returned to the soil as fertilizer. This work will be continued the coming year.

In our study of sodium silicate as an egg preservative, analyses were made of practically all of the water glass on the Minnesota market as represented by samples submitted by the wholesale drug companies of the State. Eight lots of eggs were kept for an entire year in water glass solutions, under different conditions, with periodical examinations and analyses of both eggs and preserving solution. These solutions are now being re-used for another year, along with additional lots put up in fresh solution for comparison. A method of restoring deposited silicate to solution and a rapid and easy method by means of which the housewife may determine the condition of the preserving solution have been devised and will be published in press bulletin form.

A study of the composition of wild rice and its possible use as human food was arranged for as a coöperative project with the Division of Agronomy and Farm Management. The latter division will investigate the methods of cultivation and harvesting the crop, while the Division of Agricultural Chemistry will study the methods of preparation of the grain for food. Four samples of commercial products derived from wild rice were collected and analyzed during the year. Several important fields of the crop were located and arrangements have been made to secure samples of the entire plant for next year's work.

(3) Division of Research in Agricultural Economics.—The principal work has been in making social and economic surveys of rural counties. The results of one of these have been published in bulletin form. Investigations have also been made of egg-marketing and the results published in two forms, a technical edition appearing as Bulletin No. 132, and a popular edition as Extension Bulletin No. 36. Data were also collected on various marketing problems, coöperation, agricultural credit, etc. Reports from all coöperative organizations in Minnesota will be secured the coming year in compliance with a new law passed by the last legislature.

(4) Division of Botany and Plant Pathology.—A disease survey of the State was conducted on somewhat broader lines than in previous years and valuable assistance has been rendered by county agents and agricultural high-school instructors. Diseases of seedling cereals were common and in some localities quite destructive. Oat blast, rusts, and smuts, wheat scab, leaf blight of barley, and corn smut were also quite prevalent. Flax wilt and flax rust caused a considerable loss. Among the fruit diseases the most serious were apple scab, brown rot of plum, shot hole, plum pocket, and fire blight. On potatoes the *Fusarium* and *Rhizoctonia* wilts were found, although they were quite serious only in a comparatively small number of places. On truck crops bacteriosis and anthracnose of bean, ascochytose and septoriose of pea, fusariose and septoriose of tomato were all of considerable economic importance, while bacterial soft

rot of vegetables and bacterial wilt of cucumber appeared in a number of localities.

The work on rusts of cereals constituted the Adams Fund project. Phases of this work are also carried on in coöperation with the Office of Grain Investigations, Bureau of Plant Industry. Some important results were obtained, a number of very desirable hybrids were developed. These are being tested further and some are also being grown in the increase plots. The work on physiological races and nature of resistance has neared completion. It has been shown that the resistance offered by a wheat to the attacks of *Puccinia graminis* is of the same nature as that offered by a given cereal to an uncongenial biologic form. Resistance has been shown to be due not to morphological but to physiological causes and varies somewhat with the metabolism of the host. Certain characteristic differences have been discovered which will enable one to distinguish accurately the seeds of *A. repens*, *A. tenerum*, *A. smithii*, and *A. caninum*. The study of the "Hard Seeds" of clover and alfalfa has been continued. Coöperation has been arranged for with the Division of Animal Husbandry in an experiment to discover what seeds will pass through the digestive organs of different animals and still retain their viability. Work has also been started in determining the percentage of germination of weed seeds which are commonly found in crop seeds and the depth in the soil at which weed seeds will germinate and develop. Seed Case III has been added during the year to the weed seed collection and a large number of seed cases have been distributed during the year.

The last legislature passed a law regulating the selling, offering, or exposing for sale of agricultural seeds and authorizing this station to inspect, examine, and make analyses of these seeds and publish the results. A special appropriation of \$5,000 for each of the years of the biennium was set aside for this work. It is expected that our work in this line will be greatly increased this year.

Our seed herbarium has been increased by about 500 samples during the year. Our weed herbarium has also been materially increased this year by specimens collected from different parts of the State.

(5) Division of Dairy and Animal Husbandry.—The principal studies have been in connection with animal nutrition. This has been carried as an Adams Fund project. The work has been a continuation of the work in meat production commenced in 1907. From the results of this work much information in regard to the composition of the body of a steer at all stages of growth has been gained and valuable data are being secured in regard to the composition of gain during the growth and fattening period of a steer. From this information feeding standards will be formulated showing the nutrients provided through these stages of growth and fattening. Incidental to some of the nutrition work, much information has been brought out on the cost of growing calves and it is expected to publish this in the near future. The effect of environment has also been considered and it is very evident that the steer is much more susceptible to external influences than feeders commonly believe.

The dairy herd has been handled according to the plan formulated

when the work was started twenty years ago. During the past fiscal year the records for twenty years, 1893-1912, were completed. We hope to publish the results soon. The main line of research carried on has been the determination of the net nutrients required for milk production. Special attention has been paid to the protein requirements, not only for milk production, but as having an important bearing upon the development of the animal body. From the results so far secured, feeding standards have been prepared giving the net nutrients required for the production of milk containing a given per cent of butter fat and these have been published as our Bulletin No. 130.

Investigations during the year have been in connection with the use of roots in the feeding of cows in order to determine to what extent these may be made to take the place of grain in the ration of the milking cow. From experience thus far gained it is safe to recommend the use of root crops as a substitute for part of the grain ration. Not only has it been shown that the nutrients in roots are easily available but the general effect is so favorable that their use should be encouraged, especially by any farmer without a silo. The investigation will be continued for the purpose of determining the limit to which roots may be profitably used and also to determine the production value of a unit amount of dry matter in roots as compared with farm grains.

Feeding experiments in the Animal Husbandry section were confined to swine husbandry. The question of the value of annual pasture as compared with grain for maintaining brood sows from the time they wean their pigs in early summer to the breeding season in late fall was considered. Young sows showed more gains and less losses in weight than old sows. No breed showed superiority over the other breeds as pasture animals. The sows that had been on grain without pasture proved just as good breeders as those on pasture without grain for the same period. This experiment is being continued.

The widespread popularity of the most prolific laying breeds of fowls in this State has been brought very forcefully to the attention of our section of Poultry Husbandry and records of chicks of several varieties grown under analogous conditions have been kept, but no noticeable difference has as yet been found. A few records were also kept to demonstrate the efficiency or non-efficiency of the two simplest rations that could be thought of, namely, cracked corn and beef scraps, and wheat and beef scraps, fed in the simplest manner possible (that is, by the hopper system, eliminating both wet and dry mashes as well as all hand feeding) to chicks that had been fully fledged, and the results were especially satisfactory when the obvious saving in labor is considered. The entire flock was reared without loss from disease and no disease was apparent at any time. The question of the effect of confinement upon egg production has also been considered.

(6) Division of Entomology.—Field studies of crop pests were continued, but, owing to the favorable spring in 1912, all crops as well as weeds grew luxuriantly and the ravages of the grasshoppers were not so apparent. Heavy rains also occurred in part during the hatching season

and this may have caused some mortality amongst the young grasshoppers. We find the greatest destruction by this insect, in every case, to occur in proximity to large tracts of land which have been perhaps under tillage some years but have been allowed to revert to natural conditions. Such tracts are really the direct cause of all the trouble which we experience with grasshoppers. An attempt has also been made to get an idea of the number of injurious Orthoptera of Minnesota. Altogether about eighty-five different species were collected and important data obtained in connection with habits and life histories. So far only seven have been found strikingly injurious. We find many natural enemies at work among the grasshoppers, notably a Meloid known as *Macrobasis unicolor*.

Among truck crop insects, the onion maggot is on the increase. White grubs, the larvae of May beetles, have been abundant in 1912, whereas cutworms were not nearly as injurious as in 1911. The study of the feeding habits of the plum curculio and the control of this insect have been given attention and will be made the subject of a report later. A series of coöperative spraying experiments has been carried on with the leading nurserymen and orchardists. This work will be continued during the coming year.

Adams Fund work consisting of investigations upon the clover-seed chalcid, *Bruchophagus funebris*, has been continued. Two parasites of this insect have been discovered.

In connection with the larch sawfly, Adams Fund project, we find that only about three per cent of this species captured in Minnesota are found to be males and from specimens reared from cocoons, only one per cent were males. One species of parasite insect, also a fungous disease, has been noted on this forest enemy.

Plans are being made for increased greenhouse space for this work in the near future.

(7) Division of Forestry.—Work on the preservative treatment of fence posts has been continued. The increased life obtained by the different treatments can not be determined for a number of years, but the data obtained on the amount of oil used, the penetration attained, and the cost have been published as Extension Bulletin No. 40. Arrangements have been made with many of the high-school agricultural teachers of the State to push the work in their districts. Posts treated five years ago at the Zumbra Heights Fruit Farm were inspected and found to be perfectly sound with the exception of two or three basswoods, while many of the check posts had completely rotted out.

Most of the work now carried on at the Forest Experiment Station at Cloquet is done in coöperation with the United States Forest Service. Work will be undertaken to determine the cheapest and best methods of extracting, cleaning, and storing pine seed, compatible with the highest quality of seed. An extraction plant with a capacity of twenty-five bushels of pine cones a day was built. Studies were carried on with cones collected at this station and the germination of the seed extracted at different temperatures. This work will be continued. A nursery has been established where the young trees are raised under different conditions. Ex-

periments in seed spotting, broadcasting, and testing of different species have also been undertaken, as well as studies of natural reproduction, thinning, etc.

(8) The Division of Horticulture has been partially reorganized for the coming year and includes sections in Landscape Gardening and Horticulture, Fruit Breeding, Fruit and Vegetable Instruction, and Fruit and Vegetable Investigation, and these will be managed on the committee plan of organization.

During the year the test of the common vegetable varieties has been continued, with two main objects in view; first, to compare the novelties with the standard sorts; and, second, to secure information for future experimental purposes in regard to the uniformity and variability of types. The onion has been given much attention. In addition to the tomato variety tests, tomatoes of the first- and third-generation crosses have been grown for comparison with their parents and it is hoped that an early productive tomato, suitable to Minnesota conditions, may be produced. The potato has received the greatest amount of attention. Several promising seedlings have been put under trial at the Fruit-Breeding Farm at Zumbra Heights and five thousand new seedlings have been planted on the University Farm; the prospect of securing a desirable new strain is excellent.

The past season has been especially good for all horticultural crops. Plants and shrubs came through the winter in excellent condition and have fruited and generally made a good growth this season. Apples and small fruits bore heavily. Plums bore a fair crop, although not as heavy as last year. Ornamental plants, with the exception of peonies, have done very well this season. A test has been made of a large number of annuals and perennials as well as berried plants with the purpose in view of making use of many of these more generally for ornamental purposes. Quite a large quantity of seed of the various fruiting ornamentals was planted so that many of the less common varieties may be distributed more widely another season.

The fruit breeding under the Adams Fund has been carried forward much as in former years. Considerable new stock has been added for breeding work, especially with the apple. A number of selections have been made of the most promising of the strawberry, raspberry, plum, and grape stock and sent out to the trial stations for testing before introducing them generally.

Work on the study of the sterility in the grape is ready for publication. This has proved particularly interesting in that for the first time the nature of sterility in the grape was determined. The studies carried forward with the grape show that in those forms which are self-sterile, the generative nucleus degenerates early and thus prevents the further functioning of the pollen grain. Work on fruit characters will be continued. Some statistical work with the strawberry was begun this season and material was collected from a large number of crosses and species from the genus *Prunus*.

(9) Veterinary Division.—Work on ventilation under the Adams Fund

was continued. The main object of the investigations carried out this year was to determine, if possible, the effect of lack of ventilation on body resistance to disease. One series of investigations was made to determine possible loss of body resistance, due to lack of ventilation, by determining the phagocytic variations that occurred in the leucocytes of the steers in the closed stalls. Another series of experiments was conducted to determine the effect of lack of ventilation on the bactericidal properties of the serum of the confined steers. While the results have not been fully tabulated and conclusions drawn, the probable indications are that but very little, if any, differences occurred between the phagocytic properties of leucocytes of the confined and check animals. The bactericidal properties of the serum of the confined and check animals showed but little variation in their power to destroy organisms. During the coming year the work will be continued and a study made of the existing conditions and working efficiency of ventilation systems in typical dairy stables. New work to be undertaken will include a study of the normal blood of the hog for the purpose of establishing the histological variation in normal hog's blood concerning which comparatively little work has been done. This project is preliminary to future similar studies in connection with the diseases of swine, especially hog cholera.

During the latter half of 1912 hog cholera was quite prevalent in localities through the southern half of the State. In many places the disease persisted through the winter. The results of treatment with station serum were good, even better than in former years. Considerable experimental work was planned and started, but this was hindered by the necessity of serum production and only some preliminary observations were made.

Swamp fever work has been continued in coöperation with the United States Department of Agriculture and with the Minnesota Live Stock Sanitary Board. Efforts have been concentrated especially on diagnosis, since it is now generally conceded that we have no accurate method of diagnosing other than plain clinical cases. Scientific research work based on uncertain diagnosis is, of course, greatly impaired in value and all research work appears to be blocked until we have an accurate method of diagnosis.

Northwest Experiment Station, Crookston.—Work on experimental rotations was continued, with both major and minor rotations, and so far the latter show to advantage. Experiments in rate of seeding have also been continued with both wheat and oats. While this experiment has not been carried on long enough for any accurate data, present indications go to show that under the conditions of the past two seasons, the best results are obtained by sowing 60 pounds of wheat per acre and that the greatest yield of oats comes from seeding between 96 pounds and 112 pounds of oats to the acre. Experiments with subsoiling with a deep tillage plow, using winter wheat as the crop, continue to show increased yields in comparison with the same crops grown on land plowed in the ordinary way. The work of testing out varieties of wheat, oats, barley, flax, corn, and alfalfa, which was begun in 1912, has been continued with the addition of

tests of millets for forage. The pure seed work has reached a point where, beginning in 1914, all the farm fields will be sown to pedigreed seed that has been raised at this station. Fertilizer experiments have been commenced and these bid fair to produce valuable data as to the soil needs of the particular conditions prevalent in many parts of the Red River Valley. Three acres of fruits were planted and all made a good healthy growth. The fruit trees planted during 1910 and 1912 are now in excellent condition and in good shape for the winter. The ornamental trees and shrubs and the trees in the windbreak planted some time ago are making satisfactory growth. Additional windbreaks will be planted next year as well as trees and shrubs which will be used to protect the farmyards. Variety test work with potatoes begun in 1911 was continued as well as the potato-breeding and potato-spraying experiments. The hill selected seed fields yielded 177 bushels per acre as compared with an average of 101 bushels from common run seed. The work in animal husbandry has been a continuation of the work previously started. There has been a gradual increase in the amount of stock kept at the station and the quality of the animals has been raised each year. The work with poultry has been largely a continuation of last year's work. The experiment of determining whether wet or dry feeding of little chicks is preferable resulted in the conclusion that wet-mash-fed chickens made a greater gain in weight than the dry-mash-fed lot.

West Central Experiment Station, Morris.—The work with cattle has had for its object the building up of a common herd of dairy stock. During the past year material progress has been made in the improvement of the general field crops both in yield and quality. The acreage devoted to small grain correspondingly decreased. Ten acres of alfalfa have been seeded and present indications point to a successful stand. A large number of apple and plum trees have been set out, as well as raspberry plants, grapes, and strawberries. One thousand evergreen seedlings have also been set out in the nursery.

North Central Experiment Station, Grand Rapids.—The growing of field crops common to the timbered section of northern Minnesota has been continued. The clearing of land and the testing of the value of muskeg swamp lands for general farming have also been undertaken. The dairy herd, built up from common cows and pure-bred Guernsey sires, now contains heifers that are practically equal to pure-bred Guernseys. The station has specialized in raising one breed of hogs, the large improved Yorkshire, a bacon breed, and results are considered very favorable. The poultry plant has been greatly enlarged. A new building has been erected with a capacity of from five to seven hundred hens and the results of this year's work indicate very favorable possibilities for the poultry industry in northern Minnesota.

Northeast Demonstration Farm and Experiment Station, Duluth.—This farm, consisting of 252 acres, was started on August 1, 1912. The land was heavily covered with a growth of birch and balsam trees and elder and hazel brush. The soil is typical of a large area surrounding Duluth. During the year 55 acres have been cleared. Oats, corn, potatoes, millet, and rutabagas were put in this spring and give promise of

a good yield, except the millet which was sown on the very wet land.

Southeast Demonstration Farm and Experiment Station, Waseca.—This farm consists of 246 acres. Operations were begun here on August 1, 1912. The land is comparatively level with some wet pockets and a system of tile drainage is being provided for. Spring wheat, oats, barley, potatoes, and corn have been put in this spring and indications are that good yields will be secured. It is planned to develop this farm into two separate units, a model farm with farmstead and buildings complete, as would be required for a well-equipped farm, and an experiment substation unit.

Short Courses.—Aside from the regular college and school courses there are offered each year at University Farm the following short courses: a Summer Session of the College of Agriculture, a State Teachers' Training School, each lasting six weeks; a Short Course for Farmers, a Dairy School for Butter- and Cheese-Makers, each continuing four weeks; a Traction Engineers' Course of five weeks, and a Junior Short Course for one week.

Summer Session of the College of Agriculture and the Teachers' Training School.—These sessions are held at the same time, beginning about the middle of June. In the College Session a limited number of regular college courses are offered in order that those desiring to complete college work in agriculture and home economics may utilize the usual vacation period for that purpose. Last summer 92 students availed themselves of this opportunity. In the Teachers' Training School the College of Agriculture and the State Department of Public Instruction unite in giving to rural and elementary teachers instruction in methods, organization, and management, and a review of the common school subjects, together with some special work in agriculture, manual training, home economics, drawing, and music. At the same time special courses are offered for principals and superintendents of consolidated schools. Last summer's attendance at the Training School was 853.

Short Course for Farmers.—This special course is held during the four weeks beginning with the third week in January. It is designed for the benefit of those who are actively engaged in farming and who are ambitious to become familiar with the most recent agricultural thought and practice. The work is given in lecture form and as much ground is covered as possible in the four weeks in the subjects of stock and grain judging, horticulture, soils and fertilizers, and other matters of vital interest to the farmer. The attendance during this course last year was 134.

The Dairy School.—A course for those who have had experience in creameries or cheese factories and who wish to become familiar with the latest methods used in up-to-date factories and to study the many problems which have a direct bearing upon their line of work. For the past twenty years the average number of butter- and cheese-makers taking this course has been about 100; the number last year was 103.

The School of Traction Engineering.—Covers five weeks of study and practice with farm engines of various kinds in May and early June. This course offers an opportunity to young men interested in mechanics to get

a practical working knowledge of gas and steam engines and their application to farm work. The last class numbered 37.

Junior Short Course.—A one-week course known as the Junior Short Course for boys and girls is held annually at University Farm, opening the last Monday in March. The mornings are devoted to classroom work and the afternoons to excursions to points in the Twin Cities. Last year 328 boys and girls attended this course.

Agricultural Extension Service.—During the past year the Agricultural Extension Division had in its employ thirteen itinerant lecturers. Nine of these were employed full time, two half time, and two quarter time. This is in addition to the office and editorial force. As has been stated before, several additions to the force have been made for the coming year.

The Farmers' Institute work has been handled through the same organization as the Agricultural Extension work, although supported by a separate appropriation and administered by a separate board. During the year 158 one- and two-day institutes have been held with a total attendance of 77,545. Two hundred seventy-five Farmers' Clubs, lecture circuits, and similar meetings have been held, with a total attendance of 15,110, and 42 demonstrations in orchard work have been held with a total attendance of 2,620. Fifty thousand copies of the Farmers' Institute Annual No. 25 were published and distributed free at the Institutes held in the State.

During the year three special trains were equipped and operated in the State; the first over the Minneapolis, St. Paul, and Sault Ste. Marie Railway, November 6 to 20, 1912, making 40 stops, and having a total attendance of 22,000; the second over the lines of the Duluth and Iron Range Railway, Duluth, Messabe, and Northern, and the Great Northern Railways in St. Louis County, April 6 to 16, 1913, making 32 stops, and having a total attendance of 21,160; and the third, a "Live Stock Special," over the Northern Pacific Railway, July 9 to 21, 1913, making 24 stops and having a total attendance of 14,705. Each of these trains was equipped with a home economics car showing modern conveniences in the home, and two or more cars for live stock. The length of the stop varied from one and a half hours to one-half day. From eight to fifteen instructors accompanied each train.

During the year two men have devoted the greater part of their time to rural school work. They have promoted industrial contests, the teaching of agriculture in rural schools, the organization of boys' and girls' clubs, and the general improvement of educational facilities in the country with special reference to industrial lines. These men have worked in coöperation with the county superintendents, teachers, and the local school boards. During the year the State Industrial Contest was held in St. Paul, at which there were between five and six thousand entries by boys and girls from twenty-six counties. One thousand two hundred and eighty-five dollars was distributed as prizes in this contest. An Acre-Yield Corn Contest was conducted and about 1,300 boys started out in the contest. About 300 of them secured sufficiently large yields to warrant their

plots being checked. Fifteen prizes were awarded in each of three sections of the State to the winners in this contest. A scholarship in the Minnesota School of Agriculture was offered as grand championship by the *Minneapolis Tribune*. The boy winning this produced a yield of 135 bushels per acre. Twenty-one boys secured over 100 bushels per acre. Similar contests were conducted in potato- and tomato-growing and in canning.

Judges were furnished for 108 county and street fairs and festivals during the fall of 1912. This is becoming an important feature of Extension work. Most of the judges sent out are prepared to explain in detail the reasons for their placing of each class judged, thus helping to make the fair an important educational feature.

Speakers have been furnished for 690 meetings during the year. The total attendance at these meetings has been 63,670. These meetings include rural school meetings, farmers' clubs, farmers' picnics, farmers' elevator meetings, live stock shippers' meetings, poultry and horticultural meetings, teachers' and school officers' meetings, and development meetings.

A decidedly valuable addition to the Extension work has been made by placing eleven county agents in as many counties during the year and by the passing of a bill making appropriation for this work. The West Central Minnesota Development Association has been an active force in getting the county agent movement started in many of the west central Minnesota counties. This work is a logical step in the direction of bringing the farmers on the farms in close touch with the investigators of the State Experiment Station and the United States Department of Agriculture. The work as organized brings into coöperation the county, state, and nation, and makes it possible for any farmer on any farm to bring to his assistance quickly the services of any specialist in the public service. The Office of Farm Management of the United States Department of Agriculture is coöperating in the supervision of this work.

Special instructors were furnished County Teachers' Training Schools during the year. Instruction was given in agriculture or home economics for one or two periods per day for five or six days at each school. While this Summer School work does not reach a large number of people, we believe that it is very effective in final results, because a large percentage of the teachers reached in this way will carry some of this work to their pupils, thus eventually affecting a very large number of people.

During the year, 31 Short Courses were held. The attendance at these Short Courses consisted of 19,630 men and 9,625 women, making a total of 29,255. Most of these Short Courses were held in cooperation with the local high schools, and continued for five days. In each case the Short Course consisted of live stock and agronomy work, and, with a few exceptions, home economics.

The demonstration farm work has been continued as previously planned. Eighteen farms have been under the direction of the Division during the year, and the attempt has been so to direct the operations of the whole farm that the land, labor, and capital of the farm owner will produce maximum results.

Considerable time has been devoted to the organization of Cow Testing Associations. There are now twelve associations organized in the State. They are being furnished with records and are assisted in every way possible.

Live Stock Shipping Associations are proving a very valuable factor in marketing of live stock and the Extension Division has been helping to organize these associations and helping associations already organized. At present there are 96 associations in the State. During the year they shipped a total of over \$3,500,000 worth of live stock at an average cost of about 32 cents per hundred. These associations when properly managed are much more efficient than the old system of handling cattle through a local buyer who would travel from farm to farm and pick up the animals as he could. This system tends to encourage the breeding and feeding of good stock, because every man gets paid according to the quality of the stock delivered.

Publications.—The following publications have been written by members of the staff of the Department of Agriculture:

Research Publication: Studies in Economics, Bulletin No. 1. Social and Economic Survey of a Rural Township in Southern Minnesota, by C. W. Thompson and G. P. Warber.

Experiment Station Bulletins: Bulletin 129. Minnesota Weeds, Series I. Descriptions and Identifications by W. L. Oswald, Assistant Botanist, Division of Plant Pathology and Botany, and Eradication, by Andrew Boss, Chief of Division of Agronomy and Farm Management.

Bulletin 130. Feeding Dairy Cows, by T. L. Haecker, Dairy and Animal Husbandman, in regular bulletin form and in pocket form.

Bulletin 131. Minnesota Wheat Investigations, Series I. Milling, Baking, and Chemical Tests, Crop of 1911, by C. H. Bailey, Cereal Technologist, Division of Agricultural Chemistry and Soils.

Bulletin 132. Studies in Egg-Marketing, by C. W. Thompson, Bureau of Research in Agricultural Economics.

Bulletin 133. Spore Germinations of Cereal Smuts, by E. C. Stakman, Assistant Plant Pathologist, Division of Botany and Plant Pathology.

Bulletin 134. Land Clearing, by A. J. McGuire, Superintendent of North Central Experiment Station.

Bulletin 135. Woodworking Exercises for the Agricultural School Shop, by Hall B. White, Instructor, Division of Agricultural Engineering.

Minnesota Farmers' Library: Extension Bulletin 32. Tuberculosis of Cattle. A reprint, with slight rearrangement, of bulletin prepared by the International Commission on the Control of Bovine Tuberculosis.

Extension Bulletin 33. Some Knots and Splices, by J. M. Drew.

Extension Bulletin 34. Bundle-Corn and Beef Production, by Ray P. Speer.

Extension Bulletin 35. Potato Diseases, by E. C. Stakman and A. G. Tolaas.

Extension Bulletin 36. Egg-Marketing, by Carl W. Thompson.

Extension Bulletin 37. Hog Cholera, by H. Preston Hoskins.

- Extension Bulletin 38. Potato Growing in Minnesota, by A. R. Kohler.
- Extension Bulletin 39. The Minnesota Seed Law, by E. M. Freeman and W. L. Oswald.
- Extension Bulletin 40. The Preservative Treatment of Fence Posts, by E. G. Cheyney.
- Extension Bulletin 41. Two Types of Silos at Northwest Experiment Farm, by C. G. Selvig, Superintendent Northwest Experiment Farm, Crookston, Minn.
- Extension Bulletin 42. Coöperative Creameries and Cheese Factories, by James Sorenson, Manager Albert Lea State Creamery.
- Extension Bulletin 43. Flies and Their Control, by F. L. Washburn.

In addition to these bulletins there were issued twenty-four numbers of the *University Farm Press News*, made up of short articles primarily to be copied by papers of Minnesota and adjoining states.

A somewhat similar page with illustrations has been prepared for the American Press Association, which distributes the matter in plate form to such papers as wish to purchase it at a nominal price.

One number of a four-page leaflet called *Rural School Agriculture* has been published for each of the nine months of the school year. Each outlined rural school work for one month on corn, poultry, and nature study.

The Experiment Station Bulletins were printed in editions of from 5,000 to 20,000; the earlier numbers of the *Minnesota Farmers' Library*, in an edition of 45,000, and the later ones, 60,000. Each issue of the *University Farm Press News* has been 3,500, and *Rural School Agriculture*, 10,000 copies.

During the year reprints of several of the Extension Bulletins were made as the supply had been exhausted and there was great demand for them.

IMPORTANT CHANGES

Faculty.—A number of important changes in the faculty have taken place during the last year. Ralph Hoagland, Professor of Agricultural Chemistry and Soils, resigned to accept a position with the United States Department of Agriculture. It was decided to separate the soils and chemical work and form two divisions. R. W. Thatcher, M.A., Director of the Washington Experiment Station, was appointed Professor and Chief of the Division of Agricultural Chemistry. F. J. Alway, Ph.D., head of the Department of Agricultural Chemistry and Soils of the University of Nebraska, was appointed to take charge of the Division of Soils, beginning August 1. A. R. Kohler, potato expert of the Division of Horticulture, resigned to go into commercial work, and Richard Wellington, M.S., Assistant Horticulturist of the New York Experiment Station at Geneva, was appointed in his place. W. G. Brierley, M.S., of the Washington Agricultural College at Pullman, was appointed to take charge of the general college teaching in horticulture, in order that the research and teaching

work might be more definitely segregated. Alva H. Benton, M.S., of State College (Pa.), was appointed Assistant Professor of Farm Management and will have special charge of the investigations relating to farm accounting. In the Division of Dairy and Animal Husbandry, E. W. Major, B.Agr., former Professor of Animal Husbandry in the University of California, was appointed to take up work on breeds and breeding and to assist in the nutrition investigations. Stephen Anthony, Chief Chemist in Nutrition Research, has been in Europe on leave of absence for almost a year and is expected to return in the fall. C. W. Thompson, Associate Professor in charge of the Division of Research in Agricultural Economics, resigned to take charge of similar work with the Bureau of Markets in the National Department of Agriculture, and L. D. H. Weld, Ph.D., of the Department of Economics of the University of Minnesota, was appointed to take charge of this division. E. Dana Durand, Ph.D., former director of the United States Census, will also coöperate. Professor Ruggles was granted leave of absence without pay to undertake some special work for the Pennsylvania Chestnut Blight Commission, but has now returned. J. H. Allison, M.F., of the United States Forest Service, and W. H. Kenety, B.S. in For., were appointed to assist in the forestry station work. Mr. Kenety will have immediate charge of the work at the Forest Experiment Station at Cloquet. Dr. J. T. Dinwoodie was appointed to assist in the serum plant and hog cholera investigations. E. Louise Jensen, M.A., was appointed mycologist in the Division of Botany and Plant Pathology. Josephine T. Berry, M.A., formerly in charge of Home Economics in the Washington College of Agriculture, has been appointed to take charge of Home Economics in the College, the work in this line in School and College having been completely segregated. Louise McDaniel, M.A., formerly Assistant Professor of Foods and Cookery of the Washington College of Agriculture, has been appointed to the same position in this department. Several other instructors have also been appointed in Home Economics to take the places left vacant by resignations. George A. Works, M.S., and Edward C. Davis, B.S. in Agr., have been appointed to assist in the work in Agricultural Education. Some permanent additions have been made to our Extension force. F. E. Balmer, B.S.A., has been appointed District Supervisor of the West Central District and A. B. Hostetter, B.S., of the Northeastern District. R. L. Donovan, B.S. of Agr., R. S. Mackintosh, M.S., and T. B. McCulloch have also been appointed to this Division. Julian Gist, M.A., has been appointed to assist in college English. M. J. Thompson has been appointed Agriculturist of the Northeast Demonstration Farm and Experiment Station at Duluth.

Curriculum.—The most important changes in the curriculum have been made in the Home Economics Course. The number of required hours per week has been changed from eighteen to seventeen. Many old courses have been dropped and new courses substituted in their place. Especially noteworthy is the development of the work in nutrition, for which a strong basis has been laid in the curriculum. In the Agricultural Course advance has been made in the possibilities for specialization along various lines. A senior year in Agricultural Education has been added

and a senior year of specialization in Agricultural Chemistry has also been planned. The entrance requirements for the Colleges of Agriculture and Forestry have been slightly altered. The entrance requirements for the course in Home Economics have been changed by the omission of Physics as a required entrance subject. In the courses in Forestry and Agriculture, Higher Algebra and Solid Geometry are no longer required for entrance, but, if these subjects are not presented for entrance, a special semester of mathematical work must be taken. The same requirement also applies to Physics in these two courses.

Administration.—Previous to this year, the sectional organization of the divisions had been established only in the Division of Dairy and Animal Husbandry. During the past year, the following divisions have been organized under the sectional system:

Agronomy and Farm Management into Section of Agronomy and Section of Farm Management.

Home Economics into Section of Foods and Cookery, Section of Textiles, and Section of Nutrition.

Botany and Plant Pathology into Section of Seed Laboratory and Agricultural Botany, and Section of Plant Pathology and Bacteriology.

Entomology into Section of Spraying and Forest Insects, Section of Insect Diseases and Forage Crop Insects, Section of Greenhouse and Truck Crop Insects, and State Nursery and Orchard Inspection Service.

Reorganization has also been effected in the Horticultural Division. No chief of division has as yet been appointed, but the division has been placed under the management of a committee, consisting of the four heads of sections, who serve as chairmen of the committee in a regular system of rotation. The division has been organized under the following sections: Section of Floriculture and Landscape Gardening, Section of Fruit Breeding, Section of Fruit and Vegetable Instruction, and Section of Fruit and Vegetable Investigation.

In most of the other divisions sectional organization is being completed. It had been planned to segregate completely the work of the School from that of the College. A complete segregation has been found to be impossible, but such steps as were possible have been made towards this segregation and the instructors have been assigned more largely to the work of either the College or the School.

The division which was formerly known as the Division of Agricultural Chemistry and Soils has been divided into two correlative divisions, namely, Division of Agricultural Chemistry and Division of Soils.

The Division of Home Economics was completely reorganized during the year, the work of the College and School being segregated. The plan provides a pure science basis for the college work with practice teaching under expert supervision as to subject matter and method. The course is valuable not alone as a training for teachers and leaders in this field of work but its educational and cultural value is equal to that of any course in the University.

Buildings.—The Agricultural Engineering Building was completed toward the end of the year and has been occupied by the Division of

Agricultural Engineering. Room has been provided in this building for most of the English work and for the work in design in the Home Economics Course. Provision has also been made in this building for the gymnasium work for the coming year, pending the erection of the new gymnasium, for which an appropriation is available in 1914. Alterations have been begun in the Drill Hall which is to be occupied by the Division of Botany and Plant Pathology with the Seed Laboratory and it is expected that the building will be ready early in the fall. Alterations have been made also in the Chemistry Building in order to house the two divisions, Agricultural Chemistry and Soils. The removal of the Agricultural Engineering Division from the Administration Building has made possible some expansion in the office room of the Agricultural Extension Division and the Division of Agronomy and Farm Management. An addition to the Dairy Hall has been begun and will be completed during the winter.

An appropriation of \$60,000 was provided by the last legislature for the construction of a trolley line between this campus and the main campus. Plans have not yet been completed for this, but it is hoped that everything may be completed early in the spring. This trolley line will permit of a speedy exchange of classes between the campuses and enable us to conduct work which would otherwise involve a duplication of expensive buildings and equipment.

By special arrangement with the city of St. Paul, in accordance with provision made by the Legislature of 1911, the sewerage system at University Farm was connected with the St. Paul system and we have been able to do away with the local sewage disposal plant.

With the completion of the new Engineering Building, the main entrance to the grounds has been changed to Carter Avenue and the central plaza in front of the Administration Building and the Engineering Building enlarged and regraded.

Plans for the electric lighting of the campus have been completed and will be carried out in the near future.

Legislative appropriations.—The year included the session of the legislature, at which appropriations were made for the next biennium, beginning August 1, 1913. The general appropriations for Experiment Station work were increased approximately \$40,000, not including increases for repairs and alterations and minor buildings, which amounted to about \$35,000. The appropriations for Extension work were increased \$20,000 and, in addition to this, a total of \$25,000 was appropriated for the appointment of county agents in twenty-five counties. In addition, at least \$1,000 must be provided by each county either by appropriation or subscription. A special appropriation of \$6,000 for the biennium was secured for the inauguration of work in bee culture. An appropriation of \$8,600 was also made for the purchase of timber at Cloquet, and \$15,000 for campus grading, fences, etc., at University Farm; \$75,000 was appropriated for a Home Economics Building, \$26,000 for an addition to the Heating Plant, and \$22,000 for a greenhouse. Other building appropriations were made, available August 1, 1914. Considerable increases in funds for building and maintenance were also secured for the substations.

REGISTRATION STATISTICS

TABLE I. SUMMARY OF ATTENDANCE

College of Agriculture—	MEN	WOMEN	TOTAL	
Graduate Students	11	.....	11	
Special Students	10	7	17	
Agricultural Course	174	.....	174	
Forestry Course	47	.....	47	
Home Economics Course .....	.....	178	178	
	242	185	427	427
School of Agriculture (Central)	611	287	898	898
Dairy School	103	.....	103	
Farmers' Short Course	129	5	134	
Junior Short Course	244	84	328	
Traction Engineers' Course	37	.....	37	
Teachers' Training Course	69	784	853	
College Summer School	28	64	92	
	610	937	1,547	1,547
School of Agriculture, Crookston	111	25	136	
Farmers' Short Course, Crookston	112	16	128	
Junior Short Course, Crookston	36	11	47	
Teachers' Training School, Crookston	15	210	225	
School of Agriculture, Morris	78	51	129	
Farmers' Short Course, Morris	87	.....	87	
Junior Short Course, Morris	74	71	145	
Teachers' Training School, Morris	5	119	124	
	518	503	1,021	1,021
Total in Department of Agriculture.....				3,893
Less duplicates				17
Total				3,876

TABLE II. GRADUATES

	MEN	WOMEN	TOTAL	
Bachelors of Science in Agriculture.....	19	.....	19	
Bachelors of Science in Forestry.....	13	.....	13	
Bachelors of Science in Home Economics.....	.....	17	17	
	32	17	49	49
Doctor of Philosophy	1	.....	1	
Masters of Science	2	.....	2	
	3	.....	3	
Graduates, Central School of Agriculture.....	140	69	209	
Graduates, Northwest School of Agriculture.....	19	1	20	
Graduates, West Central School of Agriculture.....	14	7	21	
	173	77	250	250

TABLE III. GEOGRAPHICAL DISTRIBUTION OF STUDENTS

County	College	Central School	Central Short Course	Crookston School	Crookston Short Course	Morris School	Morris Short Course	Total
Aitkin.....	2	7	.....	.....	.....	.....	.....	9
Anoka.....	.....	11	2	.....	.....	.....	.....	13
Becker.....	1	3	.....	2	2	.....	.....	8
Beltrami.....	2	2	1	.....	.....	.....	.....	4
Benton.....	.....	3	.....	.....	1	.....	.....	4
Bigstone.....	1	5	.....	.....	.....	.....	1	7
Blue Earth.....	3	10	2	.....	.....	.....	.....	15
Brown.....	2	18	1	.....	.....	.....	.....	21
Carlton.....	2	3	.....	.....	.....	.....	.....	5
Carver.....	.....	6	.....	.....	.....	.....	.....	6
Cass.....	.....	8	.....	.....	.....	.....	.....	8
Chippewa.....	2	16	.....	.....	.....	.....	.....	18

TABLE III—Continued

County	College	Central School	Central Short Course	Crookston School	Crookston Short Course	Morris School	Morris Short Course	Total
Chisago	2	21	...	...	...	...	...	23
Clay	2	...	...	1	1	...	...	4
Clearwater	...	3	...	...	...	...	...	3
Cook	2	6	3	...	...	...	...	11
Cottonwood	1	2	...	...	...	...	...	3
Crow Wing	3	13	...	...	...	...	...	16
Dakota	2	1	1	...	...	...	...	3
Dodge	2	6	...	...	...	...	...	8
Douglas	1	7	6	1	...	...	...	15
Faribault	1	11	2	...	...	...	...	14
Freeborn	2	4	1	...	...	...	...	7
Goodhue	6	24	5	...	...	...	...	35
Grant	2	2	2	2	...	3	13	22
Hennepin	129	164	16	...	...	...	...	309
Houston	1	11	1	...	...	...	...	13
Hubbard	1	...	1	...	...	...	...	1
Isanti	1	2	1	...	...	...	...	3
Itasca	1	...	...	...	...	...	...	1
Jackson	3	3	1	...	...	...	...	7
Kanabec	2	...	...	...	...	...	...	2
Kandiyohi	1	13	2	...	...	5	2	23
Kittson	3	4	...	15	5	...	...	27
Koochiching	...	...	...	...	...	...	...	...
Lac qui Parle	1	10	1	...	...	...	...	12
Lake	1	...	...	...	...	...	...	1
Lesueur	3	7	...	...	...	...	...	10
Lincoln	1	8	5	...	...	...	...	14
Lyon	1	9	...	...	...	...	...	10
McLeod	13	8	...	...	...	...	...	21
Mahnomen	...	...	...	1	...	...	...	1
Marshall	1	4	2	16	15	...	...	38
Martin	1	10	4	...	...	...	...	15
Meeker	2	6	2	...	...	...	...	10
Millelacs	1	6	1	...	...	...	...	8
Morrison	2	6	...	...	...	...	...	8
Mower	3	14	...	...	...	...	...	17
Murray	4	4	...	...	...	...	...	8
Nicollet	...	8	2	...	...	...	...	10
Nobles	2	4	...	...	...	...	...	6
Norman	...	4	...	19	10	...	...	33
Olmsted	3	13	...	...	...	...	...	16
Ottertail	2	17	4	...	1	2	...	26
Pennington	1	...	...	1	...	...	...	2
Pine	2	6	1	...	...	...	...	9
Pipestone	...	7	...	...	...	1	...	8
Polk	4	1	...	45	81	36	22	131
Pope	...	6	...	...	...	...	...	64
Ramsey	81	99	5	...	...	...	1	186
Red Lake	...	...	...	9	3	...	...	12
Redwood	1	16	4	...	...	...	...	21
Renville	5	19	3	...	...	...	...	27
Rice	6	23	1	...	...	...	...	30
Rock	...	7	...	...	...	1	...	8
Roseau	...	7	...	7	1	...	...	15
Saint Louis	11	8	...	1	...	...	...	20
Scott	4	1	...	...	...	...	...	5
Sherburne	2	5	2	...	...	...	...	9
Sibley	3	4	2	...	...	...	...	9
Stearns	1	8	2	1	...	...	...	12
Steele	3	7	3	...	...	...	...	13
Stevens	1	1	...	...	...	55	44	101
Swift	1	11	1	...	...	14	3	30
Todd	3	5	1	...	...	...	...	9
Traverse	...	3	...	...	...	...	...	3
Wabasha	3	10	1	...	...	...	...	14
Wadena	7	7	...	...	...	...	...	7
Waseca	2	10	2	...	...	...	...	14
Washington	6	21	1	...	...	...	...	28
Watonwan	2	7	...	...	...	...	...	9

TABLE III—Continued

Counties	College	Central School	Central Short Course	Crookston School	Crookston Short Course	Morris School	Morris Short Course	Total
Wilkin.....	...	2	...	...	...	...	...	2
Winona.....	1	4	1	...	...	...	...	6
Wright.....	5	3	1	...	...	...	...	9
Yellow Medicine.....	8	10	4	...	...	1	...	23
States and Countries								
California.....	1	1	...	...	...	...	...	2
Colorado.....	1	...	...	...	...	...	...	1
Illinois.....	5	4	...	...	...	...	...	9
Indiana.....	1	...	...	...	...	...	...	1
Iowa.....	12	3	...	...	...	...	...	15
Kansas.....	1	...	...	...	...	...	...	1
Maryland.....	...	1	...	...	...	...	...	1
Michigan.....	1	...	...	...	...	...	...	1
Missouri.....	...	...	1	...	...	...	...	1
Montana.....	...	...	1	1	...	...	...	2
Nebraska.....	...	1	...	...	...	...	...	1
New York.....	1	3	...	...	...	...	...	4
North Carolina.....	1	...	...	...	...	...	...	1
North Dakota.....	2	1	1	6	3	...	1	14
Pennsylvania.....	...	2	...	...	...	...	...	2
South Dakota.....	5	5	1	...	...	...	...	11
Washington.....	...	1	1	...	...	...	...	2
Wisconsin.....	8	16	1	1	...	...	...	26
Canada.....	2	1	1	...	...	...	...	4
Mexico.....	1	...	...	...	...	...	...	1
Switzerland.....	1	...	...	...	...	...	...	1
India.....	1	...	...	...	...	...	...	1
Peru.....	1	1	...	...	...	...	...	2
South Africa.....	1	...	...	...	...	...	...	1

RECOMMENDATIONS AND SPECIAL NEEDS

There is still need for considerable increase in the size of the Faculty of the College and School, in order that there may be a greater segregation of the two branches of the work. The classes are still much too large. Additional help is also needed in the Experiment Station. Requests for extra assistance in the examination of soils and in the control of diseases of crops and live stock are increasing rapidly as the Extension work develops. The station should be ready to meet all reasonable requests. The hog cholera epidemic, which developed at the close of the year, is a good example of what it means to be prepared insufficiently in these matters. By reason of having too small a plant, insufficiently manned, the farmers of the State lost much more heavily than would otherwise have been necessary.

With the large number of students resident on the University Farm grounds, better facilities for taking care of outbreaks of contagious diseases are necessary. At such times the city hospitals are usually filled with their own patients and it becomes necessary to take care of such diseases as diphtheria, scarlet fever, measles, typhoid, etc., in the dormitories where other students are housed. While every possible precaution is taken to prevent the spread of such diseases, the danger is evident, and

provision should be made at the earliest possible moment for suitable isolation buildings.

Additional land, as stated in detail in my report for 1911-12, is essential to the proper development of University Farm, both from its educational and experiment station standpoints.

The most important need of the substations is for additional live stock. The Crookston Station is now fairly well supplied, but at the Morris School and Station provision must be made for good representatives of the important breeds, both for school and station purposes.

Respectfully submitted,

A. F. Woods, *Dean and Director*

THE LAW SCHOOL

To the President of the University:

SIR: I beg leave to submit the following report of the work of the Law School for the year ending July 31, 1913.

Registration.—As was anticipated, because of the operation of the higher entrance requirements and the higher standards of classroom work maintained, the total attendance shows a decided decrease from that registered in the preceding years. The total number registered during the session was 214, as compared with a total of 325 for the session 1911-12. The following analysis of the attendance for these two sessions clearly shows the effect of the changes mentioned, together with the abolition of the night class, upon the attendance of the Law School.

TABLE I. REGISTRATION

	Regular		Special		Total	
	1911-12	1912-13	1911-12	1912-13	1911-12	1912-13
First Year.....	31	55	44	27	75	82
Second Year.....	68	30	24	9	92	39
Third Year.....	46	58	7	8	53	66
Third-Year Night.....	16	15	7	2	23	17
Fourth-Year Night.....	25	8	5	2	30	10
					273	214

The remaining 52 matriculates for the session 1911-12 will be found in the first- and second-year night classes not shown in the above table. An inspection of this table clearly shows that the number of regular day students was almost as large in 1912-13 as in 1911-12, the totals being respectively 143 and 145. The loss in attendance, therefore, is to be found in the smaller number of special students admitted and in the elimination of a large number of night students. In short, there is no considerable decrease of students receiving instruction under the conditions which we think are most desirable for the welfare of the University and of the legal profession in the State. It may be expected that under the conditions now obtaining in the Law School, with the greater expenditure of time and labor required of students in the classroom, the special students will steadily decrease in numbers and ultimately almost disappear. The experience of years prior to 1912-13 had demonstrated that special students under the age of twenty-one were, with rare exceptions, unable to carry the work of the Law School. On that account the Faculty adopted a regulation, first put into effect in 1912-13, excluding from the Law School any applicants for admission as special students who were under the age of twenty-one.

Faculty.—During the past session several changes were made in the Faculty. William R. Vance, elected during the previous year to be Professor of Law and Dean of the Faculty, entered upon his work August 1, 1912. Professor Robert S. Kolliner resigned in September following and was succeeded by Professor Edmund M. Morgan. Mr. W. M. Jerome was elected professorial lecturer in charge of the class in Evidence. Messrs. F. H. Stinchfield and John P. Devaney were likewise selected to take charge of the Practice Court, each with the rank of professorial lecturer. After one month Mr. Devaney was compelled by the pressure of his practice to relinquish his work in the Law School, and thereafter Professor Morgan and Mr. Stinchfield carried on the work of the Practice Court without other assistance. Mr. R. S. Wiggin, then Deputy Clerk of the District Court of Hennepin County, and later Assistant Attorney to the County Commissioners, was appointed Clerk of the Practice Court, and very materially aided in giving instruction to the students in the Practice Court. In May, 1913, Assistant Professor Hugh E. Willis resigned to accept the deanship of the Southwestern University College of Law at Los Angeles, California. Professor Eldon R. James, then Professor of Law at the University of Wisconsin, was selected as successor to Professor Willis.

Lecturers.—The regular course of instruction, as given by the members of the Faculty mentioned above, was supplemented by lectures delivered upon special topics by the following members of the Minnesota bar: Rome G. Brown, Charles W. Bunn, Homer B. Dibell, E. S. Durment, Arthur L. Helliwell, Charles S. Jelley, Hugh V. Mercer, Christopher D. O'Brien, Thomas D. O'Brien and John W. Willis.

Curriculum.—With the close of the session 1912-13, the plan for the readjustment of the curriculum in the Law School so as to bring it into substantial correspondence with that of the recognized leading law schools of the country, was practically completed. The curriculum as thus readjusted requires of the first-year students a minimum of fourteen hours a week and of the second- and third-year students a minimum of twelve hours each week. The total number of classroom exercises in the entire course leading to the degree of Bachelor of Laws thus aggregates about twelve hundred, which may be regarded as the standard amount of work represented by that degree.

During the session 1912-13, the practice always pursued in this school of requiring students to pursue an absolutely fixed curriculum without any right of election was adhered to. Beginning with the session of 1913-14, a certain number of elective studies will be offered. It is probable that the right of election will be considerably broadened in the future.

Scholarship.—While the tabulated statistics with regard to scholarship given herein show a distressingly large number of conditions and failures in the Law School during the session just passed, we have every reason to hope and believe that the standard of scholarship obtaining in the Law School has been distinctly advanced. It is to be feared that law students in this University have not heretofore taken their professional

studies with sufficient seriousness. They appear to have regarded the work of the Law School as requiring only half time of a serious-minded person. The present policy is to exact of the student as much work as a reasonably intelligent, well-prepared student may do in a day of eight hours of serious application. Many of the students, not realizing what was the amount and character of the work expected of them, suffered disastrous failures in the examinations. I am glad to report, however, that almost without exception the students accepted their failures manfully, and manifested a determination to recoup their misfortunes by greater industry in the future. On the whole it seems to me that the spirit manifested by the students justifies the hope that the standard of scholarship maintained in the Law School may very soon be comparable with that of the best law schools in the country.

Table II, given below, shows the scholarship statistics with reference to all the classes. Item 5 in this table, showing the number of students delinquent in three or more subjects, indicates roughly the number of students whose work in each year was so unsatisfactory as to demonstrate their unfitness for the profession and make advisable their being dropped from the Law School. It seems unduly severe to apply this rule of exclusion too suddenly; but it is the opinion of the Faculty that the best interests of the State, as well as of the unsuccessful students concerned, will ultimately require the enforcement of such a rule.

TABLE II. SCHOLARSHIP STATISTICS

	First Year		Second Year		Third Year	
	1st sem.	2d sem.	1st sem.	2d sem.	1st sem.	2d sem.
1. Total enrollment.....	76	64	38	36	65	66
2. Number taking examinations.....	65	63	35	33	65	65
3. Number passing all examinations.....	29	29	16	12	34	40
4. Number delinquent in one subject only.....	7	10	7	8	12	5
5. Number delinquent in three or more subjects.....	19	16	9	9	10	11
6. Percentage of failures and conditions to total examinations taken.....	33	28	27	30	16	15
7. Percentage of successful students to total enrollment.....	38	45	42	33	52	61

Table III, which concerns only the first-year class, is intended to show to what extent the preliminary training of the law student is reflected in his work in the Law School. For this purpose the total membership of the first-year class is divided into three sections: first, those of graduate standing, that is, academic graduates or academic seniors, candidates for graduation; second, those who have had as much as two years of college work; and third, special students who have had less than two years of college work, being mostly high-school graduates. It should be further observed that the third class mentioned includes only those high-school

graduates who were twenty-one years of age or more. An inspection of the table shows at once that comparatively few of the high-school graduates, although of mature years, are able to carry the work as now done in the Law School. Of the 53 regular students registered in the first semester, all having had two or more years of college work, 51 remained in the School throughout the semester and took the examinations; while of the 27 special students, only 15—scarcely more than half—survived until the examination period.

TABLE III. PRELIMINARY TRAINING AND SCHOLARSHIP (First-Year Class)

	Regular				Special	
	Academic seniors and graduates		Having two years of college		Less than two years of college	
	1st sem.	2d sem.	1st sem.	2d sem.	1st sem.	2d sem.
1. Number enrolled.....	33	32	20	18	27.0	14
2. Number taking all examinations.....	32	30	19	18	15.0	14
3. Number passing all examinations.....	19	21	8	5	2.0	2
4. Percentage of failures and conditions to examinations taken.....	20	17	29	33	60.0	54
5. Percentage of successful students to total enrollment.....	58	66	40	28	7.4	14
6. Number delinquent in three or more subjects.....	5	3	7	5	8.0	6

Noting item 4, which shows the percentage of failures and conditions to all examinations taken, the immense advantage possessed by the students who have had some preliminary training in the college, becomes apparent. The advantage which those who have completed an academic course have over those who have had only two years of such a course, is also noticeable. Thus, taking the percentages of the first semester, we find the delinquencies of those having graduate standing to be 20 per cent; those of the students with two years of college work are 29 per cent, while those of the special students are 60 per cent of the examinations taken. The effect of superior preliminary training is still further shown by item 5. Regarding the student that passes all his examinations as successful, the percentages of successful students for the three classes mentioned in the mid-year examinations were respectively 58, 40, and 7.4.

Item 6 shows the number of students who, in the judgment of the Faculty, display such poor scholarship as to justify their being dropped from the School. Five out of 32 graduates, 7 out of 19 two-year college men, and 8 out of 15 high-school graduates were deemed unfitted to continue their work in the Law School.

Of the 59 regular students in the regular day class, 39 were graduated in June, while of the 8 in the fourth-year night class, 5 were graduated. Seven other members of the third-year class removed their conditions by passing reexaminations in September, 1913.

Table IV, given below, shows the incompletes, conditions, and failures received by law students in such manner as to be comparable with similar statistics given in the report for 1911-12.

TABLE IV. CONDITIONS, FAILURES, AND INCOMPLETES

	Regular students	Special students	Total
First Semester:			249
Incompletes.....	2	8	10
Conditions.....	148	52	200
Failures.....	18	21	39
Second Semester:			252
Incompletes.....	18	18	36
Conditions.....	137	46	183
Failures.....	13	20	33

Instruction in Practice.—It is generally recognized that the greatest weakness in the modern law school is to be found in its practice courses. Some law schools frankly declare that instruction in practice has no place in the law school curriculum; that practice can best be learned in the office, while the alleged science of the law can best be learned in the law school; that consequently it is economically wasteful for the law school to attempt to teach practice. There is undoubtedly great inherent difficulty in the task of teaching practice in the law school; but inasmuch as many of our graduates must necessarily start into practice on their own account, instead of going into some well-established office as is usually the case with a graduate of an eastern law school, it becomes necessary for us to attempt to teach practice and to prepare the student as best we can to enter successfully upon the actual practice of law. With this end in view a very serious effort has been made to maintain in the Law School practice courts having the same organization as the corresponding courts in the State, in which the conditions of practice and the methods of procedure are made as nearly like those in actual courts as possible. Professor Morgan, who came to the Law School after several years of a very active practice in Duluth, is in charge of the Practice Court, having as his assistant Mr. F. H. Stinchfield, an active practitioner at the Minneapolis bar. These two gentlemen, in collaboration with the Dean, have given earnest consideration to the problem of conducting the work of the practice court in such manner as to fit the student who is graduated from the course to conduct the ordinary kinds of litigation successfully in the courts of the State. It is believed that their work is on the whole decidedly successful and gives reasonable ground for the hope that it is possible to work out a scheme by which something of the art of practice may be taught in this Law School.

Library.—In no department of the work of the Law School has there been such a noteworthy improvement as in the library. Mr. A. C. Pulling, who assumed his duties as law librarian with the beginning of the session 1912-13, is entitled to great credit for his diligent and skillful conduct of the affairs of the library during the session. At the beginning of the session the library was in very great confusion. Mr. Pulling has literally

brought order out of chaos. The books have been rearranged and the library so ordered as to make such books as are to be found in it readily accessible to the student. Reports of most of the states, the digests, encyclopedias, and dictionaries are placed in the large reading room where they are easily accessible to all of the students. The other reports and textbooks less frequently used have been put in the stack-room, to which the student body does not have access. The card catalogue of the entire library is almost completed.

The greatest need now felt in the effort to bring about the highest degree of efficiency in the conduct of the library, is additional shelf room. Five hundred feet of shelving was added during the past session; but even with this there is insufficient space for the books already on hand, so that many useful volumes repose in the basement. Additional shelving will undoubtedly have to be installed during the present session.

During the session 1,560 volumes were added to the library, bringing the total number now in the library up almost to 19,000. Of the 1,560 new volumes, 622 were presented as gifts and 19 received by exchange. The Librarian has exercised great ingenuity in securing these gifts, most of which were session laws of the several states and of the Canadian Provinces. A conservative estimate of the sum necessary to purchase these gift books in open market would be \$1,000. Furthermore the Librarian, through the business office, has succeeded in making arrangements whereby our books are purchased on terms quite as advantageous as are given to the greatest libraries in the country. He has also succeeded in purchasing at surprisingly small cost certain valuable out-of-print volumes.

At the present time the library of this Law School may be regarded as a fairly satisfactory working library. We have nearly all the books that will ordinarily be consulted by students in the pursuit of their regular law school courses. The most striking weakness of the library is in textbooks, of which we have but a small and ill-chosen collection. This must be improved as rapidly as the funds available for the library will permit. The library is also very weak in foreign law. In fact it may be said that we have practically no books on foreign law. We have some of the Canadian Reports, but none of the reports of other English Colonies. We have not even all of the Scotch and Irish Reports, and some of the important English Reports are lacking. On the whole, however, I can report that the progress made during the past session towards the making of a first-class law library in the Law School is highly encouraging.

Instruction at Night.—During this session there still remained to be cared for in the Law School two classes of night students, aggregating 27 members. The work as originally outlined for these students when they entered as candidates for the degree, was scrupulously carried out; but of course no new students were admitted to any night classes as candidates for a degree.

For the first time instruction in law was offered at night under the auspices of the General Extension Division, in accordance with the gen-

eral plan to provide a course of instruction in law at night extending over a period of three years. This plan contemplates giving at night the same amount of instruction in the several branches of substantive law as was formerly given to the night law school, now discontinued. The plan does not contemplate the giving of any instruction in procedural subjects, since it is believed that the majority of students who will apply for such instruction will desire the legal training in aid of their business careers rather than as a means of preparation for the bar. Such students as intend to make use of the Extension law courses in preparation for the bar will be under the necessity of taking the procedural courses in the regular Law School during a fourth year.

The result of the work done during this first year hardly justifies any conclusion as to the value of the plan adopted. Thirty-one students all told were registered in these Extension classes during both semesters, 23 being in attendance during the first semester and 21 during the second. Of the 31 students registered, 22 were newly entered. The other 9 had previously been connected with the Law School in some capacity. The average member of these classes was ill prepared for the difficult work expected of him so that the results obtained in the classroom and on examination were scarcely such as to raise one's hopes of the success of this kind of night instruction. I think it probable that we shall be compelled frankly to admit that the work done by such students must necessarily be very limited in amount and superficial in character. It will be probably necessary to discard case books as a means of instruction and in their stead make use of textbooks.

Mr. H. S. Mitchell was appointed instructor in charge of the subject of Contracts given to the night students in the General Extension Division.

Respectfully submitted,

W. R. VANCE, *Dean*

THE MEDICAL SCHOOL

To the President of the University:

STR: As Acting Dean during the last part of the school year, 1912-13, I beg to present to you the report of the Medical School for the year ending July 31, 1913.

Faculty.—The Faculty records with regret the death, on February 2, 1913, of one of its original members, Dr. Parks Ritchie, who filled the chair of Obstetrics for twenty-five years, and the deanship of the College from 1897 to 1906. His long and faithful service commands the gratitude of the University and gives his name a fitting place in the annals of medical education in this State.

The School has suffered serious misfortune in the retirement of Dr. Frank Fairchild Wesbrook, who, on July 1, 1913, resigned the headship of the department which he had conducted for eighteen years, and the deanship which he had held for seven years, in order to accept the presidency of the University of British Columbia. His colleagues measure the enviable gain of the Canadian province by their sense of the loss of his leaving, not only to the University of Minnesota, but to the interests of medical education and medical science in America. The vacancy he has left is no less keenly felt because his place has been fortunately filled.

On June 11, 1913, Elias Potter Lyon, Ph.D., M.D., was elected Dean of the Medical School to succeed Dean Wesbrook, and was also appointed Director of the Department of Physiology. The scientific work that Dean Lyon has already done testifies to his ability as an investigator, and the satisfactory results of his deanship in the St. Louis University Medical School promise much for his skill as an administrator. The Faculty anticipates a new era of progress under his leadership.

Reorganization.—In the spring of 1913 the Board of Regents directed the reorganization of the College of Medicine and Surgery and appointed a committee, consisting of three members of the Medical Faculty, Dr. F. F. Wesbrook, Dr. Charles Lyman Greene, and Dr. James E. Moore, and of three alumni, Dr. Louis B. Wilson, Dr. Edward L. Tuohy, and Dr. Theodore Bratrud, charged with the duty of determining the principles of this reorganization. Their work, modified at certain points and approved by the President and by the Board of Regents, may be briefly stated:

1. The title of the former College is changed to that of the Medical School.

2. The following titles, in ranking order, are established: (1) Professor and Chief (of clinical) or Director (of laboratory) Department; (2) Professor in charge of Division; (3) Associate Professor in charge of Division; (4) Associate Professor; (5) Assistant Professor; (6) Instructor; (7) Assistant.

3. Dr. C. Eugene Riggs, Dr. Thomas S. Roberts, and Dr. James T. Christison are named as Emeritus Professors.

4. The School is reorganized under eight departments, namely, the Department of Anatomy: Director, Clarence Martin Jackson, M.S., M.D.; the Department of Physiology: Director, Elias P. Lyon, Ph.D., M.D.; the Department of Pharmacology: Director, Arthur D. Hirschfelder, B.S., M.D.; the Department of Pathology and the Department of Bacteriology and Public Health (temporarily re-combined): Acting Director, Dr. Harold E. Robertson, B.A., M.D.; the Department of Medicine: Chief, Charles Lyman Greene, M.D.; the Department of Surgery: Chief, James E. Moore, M.D.; the Department of Obstetrics: Chief, Jennings C. Litzenberg, B.S., M.D. Diseases of the Eye, Ear, Nose, and Throat, Orthopedics, Dermatology, and Urology constitute Divisions of the Department of Surgery; Nervous and Mental Diseases and Pediatrics become Divisions of Medicine; and Gynecology is merged with Obstetrics and with Surgery.

5. The Faculty consists of eleven professors, eighteen associate professors, sixteen assistant professors, and twenty-five instructors; a total of seventy-one members, a substantial reduction from the former total of one hundred and eighty-four. Clinical and laboratory assistants, not accounted members of the Faculty, number thirty-two.

6. An Administrative Board, consisting of the President of the University, the Dean and the Secretary of the Medical School, the superintendent of hospitals, the directors or chiefs of departments, and of one member-elect from the Faculty at large, is charged with the immediate conduct of the affairs of the School. This body reports its official actions to the Faculty, which holds the privilege of review and advisory action.

7. Dr. R. O. Beard has been appointed Secretary of the Medical School. In addition to assisting the Dean in his administrative duties, he is given charge of the medical buildings and oversight of requisitions, of equipment and supply funds, and of the inventories of the School.

Registration statistics.—During the year 1912-13, 283 students have taken the combined Academic and Medical Courses; 177 have matriculated in the Medical School proper; 18 have received the degree of Bachelor in Science; and 46 have earned the degree of Doctor of Medicine.

The Shevlin Fellowship in Medicine has been filled during the year; and twelve students have carried on graduate work in the Medical School.

Graduate work.—The School has enlarged its field of graduate work by the initiation of a Summer School in Medicine, offering six weeks' courses in clinical and laboratory branches to medical graduates. These courses represent definite unit values by which they may be credited, upon the fuller development of the proposed summer quarter, toward a degree. The Summer School affords an opportunity also to undergraduates who may wish to equalize or advance their standing in the regular courses. Sixteen graduates and one undergraduate student entered the Summer School of 1913.

Clinical service.—The Clinics of the Medical School have been centered at the University Hospitals, the Minneapolis City Hospital, and the

City and County Hospital of St. Paul. With the direct ownership and control of its own hospital organization, it is unnecessary for the University to accept further the hospitality of the private hospitals of the Twin Cities. The City Hospital of Minneapolis has given the University a continuous service commanding one half of its patients, who are placed, under the direction of the Superintendent, Dr. Herbert O. Collins, in the care of a clinical staff nominated by the University. The City and County Hospital of St. Paul has accepted a proposal for a similar half service, for six months of the year, beginning October 1. It has confirmed the appointments of University clinicians, who serve under the direction of the Superintendent, Dr. Arthur B. Ancker.

American Medical Association Session.—The University, represented by the Faculty of this School, assisting the medical profession of Minneapolis and St. Paul, had the privilege of entertaining the American Medical Association in its sixty-fourth annual session last June. Thirty-three hundred physicians, accompanied by many ladies of their families, attended this gathering. Upon this occasion the University invited a conference of University Medical Schools, nine of whom were represented in person and six by letter. Graduate courses in medicine and the problem of the migration of medical students were subjects of discussion by the Conference. A committee was appointed to consider a permanent organization of the Conference of the University Medical Schools.

UNIVERSITY HOSPITALS

I submit the annual report of the University Hospitals and the Out-Patient Department Service in the following tabulated form:

UNIVERSITY HOSPITALS ANNUAL REPORT, JULY 31, 1912, TO JULY 31, 1913

ADMITTED :	Male	Female	Total
Medical	236	141	377
Neurological	14	5	19
Pediatrics	4	0	4
Surgical	255	274	529
Eye and Ear	30	10	40
Nose and Throat	20	29	49
Obstetrical (parturient)		223	223
Obstetrical (puerperal)		8	8
Births (alive)	93	98	191
Births (stillborn)	5	4	9
Infants	4	1	5
	661	793	1,454

DISCHARGED :	Male	Female	Total
Medical	196	125	321
Neurological	12	2	14
Pediatrics	6	0	6
Surgical	234	254	488
Eye and Ear	27	10	37
Nose and Throat	18	30	48
Obstetrical (parturient)		204	204
Obstetrical (puerperal)		9	9
Infants	93	91	184
	586	725	1311

DEATHS :

Medical	33	19	52
Neurological	0	0	0
Pediatrics	0	0	0
Surgical	11	8	19
Eye and Ear	0	0	0
Nose and Throat	0	0	0
Obstetrical (parturient)		3	3
Obstetrical (puerperal)		0	0
Infants	9	5	14
	53	35	88

AVERAGE NUMBER DAYS IN HOSPITAL. PATIENTS DISCHARGED :

Medical	42
Neurological	36
Pediatrics	106
Surgical	25
Eye and Ear	19
Nose and Throat	3
Obstetrical (parturient)	21
Obstetrical (puerperal)	18
Infants	13
OPERATIONS	590
AUTOPSIES	45
Daily Average	108

Signed, L. B. BALDWIN, *Superintendent*

OUT-PATIENT DEPARTMENT ANNUAL REPORT, JULY 31, 1912, to JULY 31, 1913

Date	Medicine		Surgery		Skin		Nose and Throat		Eye and Ear		Gynecology		Obstetrics		Nervous		Children		Genito-Urinary		Orthopedics		Total		No. of Days
	First Entries	Attendance	First Entries	Attendance	First Entries	Attendance	First Entries	Attendance	First Entries	Attendance	First Entries	Attendance	First Entries	Attendance	First Entries	Attendance	First Entries	Attendance	First Entries	Attendance	First Entries	Attendance	First Entries	Attendance	
1912																									
August	143	484	140	497	53	197	112	329	137	457	41	329	9	16	26	206	101	200	28	153	8	26	798	2,894	27
September	133	407	114	443	71	206	76	194	155	441	35	273	21	45	19	169	81	175	20	156	14	20	739	2,529	24
October	161	528	132	547	59	226	119	348	179	509	46	284	6	28	20	177	120	272	19	101	13	34	874	3,054	27
November	169	490	151	547	74	275	99	287	187	460	53	331	15	33	21	210	90	213	40	158	18	30	917	3,334	24
December	154	547	144	559	66	310	92	279	158	441	41	407	18	46	19	183	95	225	35	190	9	30	831	3,212	25
1913																									
January	159	515	151	609	87	307	116	306	209	637	31	328	34	71	17	189	117	255	26	223	8	25	955	3,465	26
February	178	568	113	424	75	284	126	337	188	618	43	297	25	66	28	166	113	249	19	135	18	38	926	3,182	22
March	244	731	120	500	92	385	137	354	273	897	56	407	23	59	30	194	115	268	31	162	19	45	1,140	4,002	25
April	211	625	122	489	101	393	154	501	252	865	55	403	23	47	25	170	124	276	37	163	15	46	1,119	3,978	26
May	228	635	154	588	97	374	136	430	279	974	54	371	23	51	16	134	129	282	32	146	28	55	1,176	4,040	26
June	220	597	151	514	91	356	119	373	193	777	43	278	24	49	25	172	103	221	46	197	26	54	1,041	3,588	25
July	182	566	178	631	81	287	107	294	168	613	48	380	31	56	23	140	113	275	36	190	18	47	985	3,479	26
	2,182	6,693	1,670	6,348	947	3,600	1,393	4,032	2,378	7,689	546	4,083	252	567	269	2,110	1,301	2,911	369	1,974	194	450	11,501	40,457	303

Total Number of Entries 11,501. Daily Average 37.96.

Total Number in Attendance 40,457. Daily Average 133.52.

Comparative Totals for 1911 and 1912, 9,229 and 33,190.

Needs of the University Hospitals.—Both the In-Patient and Out-Patient services of the University Hospitals have outgrown their capacity. A waiting list for the occupancy of twenty to thirty beds is continually on file. The Dispensary clinics are crowded to actual congestion. The patients in attendance are constantly increasing in number. It is impossible properly to treat all classes of cases or to utilize them for purposes of clinical instruction. Patients who should be referred to the Hospital are often necessarily denied.

Plans for the new Service Building, provided in the appropriations by the last legislature, are in preparation. The completion of the building may be expected within the year. This will free further room in the Elliot Memorial Building, increasing its capacity to some two hundred beds.

Urgent need is felt for a system of hospital externships, by means of which semi-ambulant and acute cases, appearing in the Out-Patient Service, may be followed to their homes and transferred, on occasion, to the Hospital wards. Close coöperation in this field with the work of the Visiting Nurses' Association should be sought.

A committee of the Faculty is studying the development of the Social Service side of the Hospital and Out-Patient work. Its organization within the year is anticipated.

The University Hospitals and the School for Nurses, alike, are suffering for want of suitable housing for their growing force of nurses, who, to the number of thirty-eight, are now quartered in three temporary dwelling houses. The matriculation in the School for Nurses has increased, during the past year, to thirty, and is satisfactory in point of quality as in point of numbers.

The Medical School is standardizing the hospitals of the State for the purpose of extending, by their aid, its opportunities of internships to meet the requirement of its seventh, or clinical, year. In this effort it is acting in harmony with committees of the American Medical Association and the American Hospital Association, dealing with the same problem.

Respectfully submitted,

RICHARD OLDING BEARD, *Secretary*

THE COLLEGE OF DENTISTRY

To the President of the University:

SIR: I herewith submit my report as Dean for the year ending July 31, 1913.

With the beginning of the year 1912-13 the College of Dentistry began the occupancy of its more permanent quarters, the remodeled Medical Science Building. Owing to the fact that Millard Hall was not in readiness for the College of Pharmacy, the latter occupied one quarter of the building for the year. The installation of new equipment took place during the reconstruction of the building as well as during the college year. It included pedal lever chairs, fountain cuspidors for the operating rooms, benches, lathes, hoods, and mechanical appliances for the laboratories. A workshop was fitted up with equipment for metal work, and toward the close of the year an X-ray apparatus was also installed.

As the curriculum stands at present and with the limited number of students admitted, the equipment is excellent and adequate, and the space is sufficient. However, this status must of necessity be modified when any change is made in the present limitation of students to the freshman class. Furthermore, the applications for advanced standing and graduate work are already so numerous and our capacity so limited that this problem must soon receive serious attention.

From time to time changes must be made as a result of modern development, and not the least of our future difficulty in regard to space, equipment, and staff will be the possible extension of the course to four years. This is now also being considered by the Faculties Association of American University Dental Schools.

As to our general needs and recommendations for the future, I can merely repeat those made in my 1911-12 report.

Respectfully submitted,

ALFRED OWRE, *Dean*

THE COLLEGE OF PHARMACY

To the President of the University:

SIR: I herewith submit my report for the year ending July 31, 1913.

Registration.—The twenty-first year of the existence of the College of Pharmacy closed with July 31, 1913. The University commencement on June 12 was the twentieth commencement of the College. Twenty-five students graduated from the regular course and one from the graduate. The total registration during the year reached 86: 49 juniors, 33 seniors, 1 unclassified, 3 graduate students. The enrollment of the previous year was 77. Eleven students dropped out of the course during the year, mostly for sufficient reasons. Samuel H. Abramovitz, a junior, died October 16, 1912. During the year the College faculty gave instruction to 121 students, including 35 fifth-year medical students.

Geographical distribution of students.—The student body represented the following political divisions: Canada, 1; Illinois, 1; Iowa, 4; Minnesota, 67; North Dakota, 2; South Dakota, 3; Wisconsin, 8. Minnesota counties: Brown, 1; Goodhue, 1; Hennepin, 31; Houston, 1; Hubbard, 1; Lesueur, 1; Lincoln, 1; Marshall, 1; Meeker, 1; Millelacs, 1; Morrison, 1; Nobles, 1; Norman, 1; Ottertail, 2; Pennington, 2; Ramsey, 4; Red Lake, 1; Rice, 1; Sibley, 2; Stearns, 1; Stevens, 1; St. Louis, 3; Todd, 1; Waseca, 1; Washington, 1; Watonwan, 1; Winona, 1; Wright, 2.

Courses of instruction.—The courses were conducted in a way to yield to the students the usual and total amount of instruction, although the sequence and logical continuity of some of the courses had to be impaired on account of the confusion arising out of lack of room and the remodeling for the College of Dentistry going on in the building. The elementary work in quantitative analysis was added to the courses in pharmacopoeial testing. The work in mineralogy and crystallography was much abridged and much of it was given in connection with inorganic pharmaceutical chemistry. It became necessary for the College to provide for its new students instruction in general chemistry to enable those students who came without high-school preparation in chemistry to go on with the advanced course jointly with the students in dentistry. The work in general botany was reduced from six hours per week throughout the year to six hours per week throughout the first semester and two hours per week for part of the second semester for greenhouse work. The time thus released was needed for junior pharmacognosy and was added to that course. Work in pharmacognosy and plant cultivation was carried on much as during the preceding year, except that it was somewhat more comprehensive owing to the added equipment which included charts, microtomes, demonstration eyepieces, three new microscopes, etc. The perma-

ment collection of drugs was increased by the addition of specimens presented by Messrs. M. H. Haynes and F. A. U. Smith and others. During the preparation of drugs from plants grown in the medicinal plant garden many problems arose which presented opportunity for research work and some of these were studied by Messrs. Blosmo, Handy, and Ostedt, who were doing graduate or special work. The results were given to the classes. The Medicinal Plant Laboratory was practically completed by the beginning of the fourth quarter and immediately work on the propagation of new plants for spring planting in the garden was begun by students. Altogether in the neighborhood of 30,000 plants were produced and most of these were transplanted two or three times. Throughout the year the department of pharmacognosy coöperated with other departments of the College as well as with other colleges of the University by supplying their needs of plants, plant material, and drugs. Mr. F. A. Upsher Smith, formerly associated with Professor Greenish, of the Pharmaceutical Society of London, and now editor of the *Northwestern Druggist*, St. Paul, has been a frequent visitor at the College and has given freely of his broad information on drugs and drug-production in England. Mr. Smith presented Dr. Newcomb with a collection of lantern slides illustrating the production of Cinchona and the cultivation of a number of other medicinal plants, which collection Dr. Newcomb gave to the College to be added to the collection of lantern slides.

Faculty changes.—Mr. John A. Handy, B.S., Ph.C., was appointed to the Faculty in the spring of 1912 and began his duties with the beginning of the school year, but before the year was out he accepted a call to a large commercial establishment in the East, under financial auspices which the University could not meet. Mr. C. H. Rogers was appointed his successor.

Free Dispensary drug room.—The drug room of the Out-Patient Department of the University Hospitals did a business beyond that of the previous heavy year, 15,621 prescriptions having been dispensed during the year.

Special lectures.—Because of the interruption of the regular work and the necessity of frequent changes in the curriculum on account of the unsettled building situation, not as many special lectures as usual were provided. The more important special lectures were given by Mr. F. A. Upsher Smith on "Medicinal Plant Cultivation in England," illustrated by many very beautiful lantern slides; by Mr. E. A. Tupper, Secretary of the Minnesota State Board of Pharmacy, on "The National and State Pharmacy Laws"; and by Mr. Winthrop G. Noyes on "Things to Consider before Entering upon a Pharmaceutical Business Career."

Outside activities.—Of the outside activities of the Faculty intimately connected with the work of the College during the year the following may be mentioned: identification of drug specimens and preparations sent in by pharmacists; special lectures on medicinal plants to nurses, medical students, and high-school classes; work on the preparation of federal standards for the drugs Thymus, Pimpinella, and Petroselinum Root; comments on

federal standards prepared by others; illustrative material for the annual convention of the American Pharmaceutical Association at Denver; exhibit, demonstrations, and six papers before the Minnesota State Pharmaceutical Association, the formulation and provision of the program of the Scientific Section of the Minnesota State Pharmaceutical Association's annual meeting, the conduct of the proceedings (a member of the faculty is the chairman of the section) and the correcting and editing of the text constituting the published proceedings; lectures and papers before the Minnesota Academy of Sciences, the American Conference of Pharmaceutical Faculties, the American Pharmaceutical Association, the American Medical Association, the Minneapolis Public Library, the Minneapolis Retail Drug-gists' Association, the Minneapolis Drug Club, the College of Pharmacy of Columbia University, etc.; numerous contributions to current pharmaceutical literature and much association committee work; lecture to the Phi Delta Chi fraternity; exhibit of 8,000 medicinal plants before the American Medical Association.

New buildings.—The reconstruction and fireproofing of old Millard Hall ruins into a substantial fireproof building for the College of Pharmacy began early in the fall and was completed in July. The building is practically entirely new, nothing remaining from the old ruins except the greater part of the outer walls and the central hall walls. The building is equipped with hot and cold water, steam under pressure, gas, electric current for light and power, electric clocks and bells in the main rooms, steam heat under thermostatic control, vacuum cleaning system, elevator, telephones, fire hose, electric fans for ventilating, metal weather stripping, metal screens on all windows, specially imported washable window shades, etc. The new furniture and fixture equipment is of steel substantially constructed. The complete equipping of the building will take another year at least and more likely two. The main building is hereafter to be known as the Pharmacy Building, the word "Pharmacy" having been engraved upon the stone immediately over the entrance portico.

Respectfully submitted,

FREDERICK J. WULLING, *Dean*

THE SCHOOL OF MINES

To the President of the University:

SIR: I herewith submit my report as Dean for the year ending July 31, 1913.

Registration.—The total registration during the year was 94, distributed as follows: seniors 11, juniors 7, sophomores 19, freshmen 20, first-year students 37.

Geographical distribution of students.—During 1912-13 students have been registered from Minnesota counties as follows: Beltrami, 1; Brown, 2; Crow Wing, 2; Chippewa, 1; Goodhue, 1; Hennepin, 36; Hubbard, 1; Jackson, 1; Kandiyohi, 1; Meeker, 1; Morrison, 3; Nobles, 1; Olmsted, 1; Ottertail, 1; Pope, 1; Ramsey, 19; Rice, 1; St. Louis, 4; Wabasha, 1; Wadena, 1; Washington, 3; Watonwan, 1; Winona, 1; Wright, 1. Students were registered also from outside the State as follows: Arizona, 1; North Dakota, 1; South Dakota, 1; Wisconsin, 4; Peru, 1; total, 94.

During the year 17 students withdrew. Such students were distributed by classes as follows: seniors, 1; juniors, 0; sophomores, 1; freshmen, 6; first-year students, 9. The reasons for such withdrawal are as follows: deficient, 7; to other colleges, 0; financial, 4; health, 1; unknown, 5.

The curriculum.—The changes in curricula as outlined in my report for 1911-1912 have been administered with benefit to the School. For the coming year the work in Metallography will be under the direction of Assistant Professor Samuel L. Hoyt, and courses will be offered as electives to students in other colleges.

Changes in staff.—George J. Young, formerly Professor of Mining at the University of Nevada, has been secured to take charge of the Department of Mining. Samuel L. Hoyt has been appointed Assistant Professor of Metallography and John F. Murphy to fill the position made vacant by the resignation of Merton S. Kingston.

Destruction of School of Mines Building.—On February 14, 1913, the School of Mines Building was destroyed by fire. A large part of the contents together with the library was saved. Through the courtesy of the College of Engineering and the Mechanic Arts temporary quarters were secured in the Main Engineering Building and the regular classroom work has been carried on in a satisfactory manner. Our laboratory work has of necessity been carried out under difficulties owing to the crowded condition of the Testing Works.

Needs.—The legislative appropriation now available for a new building will provide suitable classrooms, drafting rooms, laboratories, and research rooms in the Department of Metallography. The distance of the Testing

Works from our new building, together with its crowded condition and the demands made upon us for research work in connection with the concentration of iron ores, renders it imperative that provision be made in the near future for a new Testing Works to be located at some point convenient to the site of the new building.

EXPERIMENT STATION

Examination and assay of specimens.—During the period beginning August 15, 1912, and ending August 15, 1913, 252 specimens were submitted for examination or assay. The total time spent on this work was 477.5 hours. The work included the examination of specimens submitted; assays for gold and silver; burning clay for the Minnesota Geological Survey, and analytical work for the State Mine Inspector.

Specimens examined.—There were 146 samples submitted which required merely an examination or simple blowpipe tests to identify. Approximately four-fifths of these were samples of decomposed granite or mica schist; the mica being mistaken for gold. This work required 173 hours. Much of this time was taken up in consultation with the interested parties.

Work done by the Minnesota Geological Survey.—During this period two drill cores were submitted to the Minnesota Geological Survey by the Experiment Station to decide whether certain material was taconite or quartzite. One specimen of granite was submitted for a report on its qualities as a building stone.

Work done by the School of Chemistry.—During the above period 18 samples were submitted to the School of Chemistry, requiring 31 separate chemical analyses.

Gold and silver assays.—Twenty-four gold and 17 silver determinations were made on samples submitted. This work required 41 hours.

Burning clay for the Minnesota Geological Survey.—Twenty-one separate "burns" were made, in which 479 sample bricks were subjected to various high temperatures. The bricks were prepared for burning by members of the Geological Survey. The actual burning was done by the Experiment Station. This work required 88.5 hours.

Analytical work done for the State Mine Inspector.—Upon the request of Mr. F. A. Wildes, State Mine Inspector, 178 determinations were made. This work required 275 hours. It was of the utmost importance to Mr. Wildes that these results be obtained without delay. As a consequence the members of the staff worked 14 to 15 hours a day in order that the results might be reported promptly.

Study of Low-Grade Iron Ores

Mesabi Range.—In the excitement of the early days on the Mesabi Range, while new bodies of high-grade ore were constantly being sought for and discovered, public interest was naturally centered upon the exploration of new territory in the hope of finding rich deposits. The in-

dividual need of quick returns on heavy investments led to the selective mining of the best grade ore, resulting in enormous waste of natural resources.

To-day the range has been very carefully explored. The outlines of the iron-bearing formation are quite accurately known. The location of both low-grade and merchantable ore bodies has been determined by thousands of drill holes. Very few new deposits of high-grade ore are being discovered. In mining the idea of greatest ultimate profit has replaced that of quick return on investments. Cheap transportation, the rapid mining of the higher grade ore and lowering of the "base grade" on which the ores are sold has resulted in an increased interest in the utilization of the vast tonnages of low-grade ore already proven.

Because of the very general interest in this problem and the vague ideas very generally existing as to why some ores running 45 per cent iron will concentrate and others will not, the School of Mines Experiment Station has taken up the study of the low-grade Mesabi ores. Through the courtesy of many of the mining companies approximately 1,800 sacks of ore, holding 100 pounds each, have been secured for this purpose. This has involved several trips to the ranges by members of the Experiment Station staff in order to superintend the selecting and shipping of this ore for experimental purposes. Very material assistance has been rendered by the mining companies in this regard.

No apparatus was available for the testing of these ores. Before any work could be done it was necessary to design and construct suitable machinery for this purpose. This necessarily consumed much time and, when the machinery was built, numerous modifications were necessary for the successful operation of the several units. In spite of this fact, 37 washing tests were made during the period beginning August 15, 1912, and ending August 15, 1913. Incidentally it was necessary to make 111 screen analyses to determine the distribution of material on different size screens, 1,200 determinations for iron and 111 for silica. Determinations for phosphorus, alumina, and "loss on ignition" would have made the data more valuable but were impossible on account of the lack of funds. A bulletin describing in detail this work was prepared and placed in the hands of the University printing authorities in April, 1913.

During the above period no large scale concentration tests were made upon the request of mining companies. In view of the interest shown by certain of the companies and the exploration of new low-grade ore land, it is very probable that the Experiment Station will be called upon to make such tests in the near future.

Cuyuna Range.—The development of the Cuyuna Range presents a new and much more complex problem in concentration. Drill holes have shown up large tonnages of material running from 40 to 45 per cent iron. In fact, there appears to be more of this material than merchantable ore. Ores of this iron content on the Mesabi Range have been successfully brought to merchantable grade by the relatively simple and cheap "washing process." It was believed that the same would be true of the Cuyuna

ores. Actual development of the ore bodies has shown that the structure and other physical characteristics are quite different from the low-grade Mesabi ores. The leaching of the silica is very incomplete in most cases. A portion of this Silica is "sand," the remainder, large chunks which would not be eliminated on a log washer. Crushing followed by jiggling or possibly magnetic concentration, are the most likely solutions.

In April, 1913, the Experiment Station was requested by certain parties to make a concentration test on certain Cuyuna ores. It was impossible to do so, however, at that time, owing to the fact that there were no concentrating machines of the proper character available. It is highly probable that in the near future there will be many more requests of this nature. There exists an excellent opportunity for the Experiment Station to do pioneer work along the lines of concentrating the Cuyuna ores. Such work would be of the greatest value to the operating companies if done immediately. Unfortunately, there are no funds available at present for the purchase of suitable concentrating machines, and the complexity of the units would make it unsatisfactory to attempt their construction in the School of Mines shop. The crowded condition of the Ore Testing Works and the number of activities which are being carried on present no little difficulty to the successful work of the Experiment Station along the above-mentioned lines.

Service to the Tax Commission.—The work of making ore estimates as a basis for the assessed valuation of mineral properties by the Tax Commission has continued in progress until now nearly 1,400,000,000 tons of ore have been estimated. This service has been satisfactory to the members of the Commission as well as to the mining companies, as evidenced by many expressions of approval from operators throughout the State. At the present time the work of estimating the ore, merchantable and non-merchantable, upon the new range, known as the Cuyuna, is rapidly going forward.

Maps.—The Experiment Station issues a set of maps showing the Iron Ranges of Minnesota, of which 200 have been distributed to date. It is intended that these maps shall be revised yearly. Judging from the number of requests made, and complimentary remarks passed upon them, they are of considerable value to the citizens of the State.

Respectfully submitted,

W. R. APPLEY, *Dean*

THE SCHOOL OF CHEMISTRY

To the President of the University:

SIR: Herewith is submitted my report for the School of Chemistry for the year ending July 31, 1913.

Registration.—The total number of students enrolled in chemistry during the past year has been about the same as in previous years. There has been a very slight increase, from 90 to 108, or nearly 20 per cent.

Buildings.—During this year construction of the new chemical laboratory has begun. At the present moment the foundation and basement are all but complete. Unfortunately only three fourths of the building as originally planned (but reduced 30 feet in length and 20 feet in width) can be built by the appropriation granted. Owing to a mistake in the estimated cost of construction made by the consulting architect of the Board of Regents, a building of the original dimensions can not be built by the appropriation. The one fourth of the building left out on account of lack of funds had to include some of the large laboratories. This was necessary on account of the fact that the part of the building left out had to be on the rear of the building and away from the mall, for the reason that it would have ruined the appearance of the front of the building to have built only one half at the present time. Our large laboratories are therefore only one half the size indicated in our original plan.

The new laboratory as completed by the present appropriation will necessarily leave us in a badly crowded condition. The difficulties are magnified for the further reason that we are compelled for the present to use our old tables which accommodate only two thirds as many as the new ones planned.

Notwithstanding the above facts, the conditions under which both instructors and students can work in this new building will mark a new era in the chemistry of the University.

Research work.—During the year several monographs have been completed:

The Phase Rule.—A little more than a year ago work was begun on the phase rule. The first monograph has been published, the second one is ready for press, and further work is in progress.

Catalysis.—About a year ago work was begun on an entirely new phase of catalysis. The first monograph is now in press and several more are in progress.

Thermodynamics.—Work has been in progress along the thermodynamic line for several years. For the last two or three years the work was practically dropped, but has been resumed during the last year and much entirely new data obtained.

The Terpenes.—Work on the terpenes has been continued during the last year. Only one paper has thus far been published, but a large amount of work has been done preparatory to publication during the coming year.

Industrial Work.—In addition to the above lines of research, several

papers have been published during the past year along industrial lines: (a) Determination of Zinc in Treated Ties; (b) New Apparatus for Determination of Hydrogen Sulphide in Illuminating Gas; (c) Determination of Phosphorus in Steel; (d) Electrolysis of Silver.

Respectfully submitted,

GEORGE B. FRANKFORTER, *Dean*

THE COLLEGE OF EDUCATION

To the President of the University:

SIR: I herewith submit my report as Dean for the year ending July 31, 1913.

Registration.—During the year the College enrolled 41 seniors, 42 juniors, 5 unclassified students, and 18 graduates taking a major or minor in education. In addition the College gave instruction also in education to a considerable number of students in the Colleges of Science, Literature, and the Arts and of Agriculture. Our records show the following semester registration in various typical courses: History of Education, 337; Secondary Education and Principles and Organization of Secondary Teaching, 58; Theory of Teaching and Organization of Elementary Teaching, 22; School Administration, 30; School Sanitation, 79; seminar courses for students taking advanced studies, 9; total number of registrations, 535.

Scholarship.—Students admitted to this College on the recommendation of the presidents of the state normal schools of Minnesota have uniformly proved good in scholarship. The students admitted after two years of college study in other schools of the University or from other institutions have come to a degree of maturity and self-direction in study which, coupled with their earnestness in preparation for teaching, result in almost no difficulty in regard to low scholarship among the students of the College.

Geographical distribution.—Three students came from outside of Minnesota this year and the counties of this State were represented as follows: 31 from Hennepin, 8 from Ramsey, 7 from Blue Earth, 4 from Stearns, 3 from Kandiyohi, 3 from Wright, 2 each from St. Louis, Fairbault, Cottonwood, Fillmore, Brown, Chisago, and Carver, and 1 each from Morrison, Koochiching, Carlton, Waseca, Goodhue, Jackson, McLeod, Yellow Medicine, Ottertail, Houston, Renville, and Hubbard.

Faculty.—Two additions were made during the year to the Faculty of the College. Raymond A. Kent, formerly Superintendent of Schools of Winona, Minnesota, was elected Assistant Professor of Education and Principal of the University High School, being given at the same time leave of absence for one year to act as Secretary of the Minnesota Educational Commission. Mr. B. F. Pittenger received an appointment as instructor in the College with more particular assignment to the courses in the History of Education.

New building.—An appropriation was received during the year for the erection of a building for the College and for the housing of the University High School on the site of the old School of Mines Building. Plans for the new structure were promptly prepared and have been for some months in the hands of the architect. It is hoped that the building will be finished by September, 1914.

Extension work.—To this College has been assigned for a number of years \$5,000 annually (being the first special appropriation for its needs in 1907). By this assistance the College has been enabled to supervise the work of its graduates throughout the schools of Minnesota, to inspect secondary schooling of the State, to meet with teachers, parents' associations, school officers, and public gatherings in order to find out what the people need and desire and to bring definitely to the public the opportunities for community growth through better educational facilities.

Appointment bureau.—The office of the College of Education has acted during the past year as a bureau for the appointment of teachers in Minnesota, serving the different communities as far as possible and providing positions more particularly for the graduates of the University. Ninety-two teachers have enjoyed the services of the bureau in securing appointments or promotions during the past year. This number includes 27 graduates of the College of Education in the class of 1913, all of whom except those going on to advanced studies have, I believe, received excellent appointments at salaries varying from \$65 for the inexperienced women graduates to \$1,200 or \$1,500 for the men with some experience in teaching.

Immediate needs.—The schools of Minnesota are in urgent need of (1) teachers of commercial branches, (2) manual training teachers, (3) teachers and supervisors of music and drawing. The College should make provision for theoretical and practical courses coupled with opportunity of practice teaching in all of these lines in order to begin to meet this part of its duty towards the State. In addition, Minnesota needs teachers of agriculture and teachers of the household arts in the preparation of whom this College should coöperate more closely with the College of Agriculture in order that candidates may be thoroughly grounded in sound principles of teaching and methods of presentation as well as in the subject matter of instruction. There are on the main University campus a great many young women and some men who can probably be drawn into this field of work if the chance for training be brought more directly to their attention.

Vocational education.—The State of Minnesota has made generous provision for the vocational training of boys and girls in the rural districts in agriculture and household art. The next step will doubtless be as full and adequate support of vocational training for the boys and girls living under urban conditions. In order to avoid the difficulties which were incident to the very rapid extension of agricultural education it is vitally necessary to make plans now for vocational training of the urban type. A great responsibility rests upon the University in this particular and can be first met by the appointment of the best expert available in vocational education whose duty it shall be to study the situation in Minnesota and to develop the soundest plan of procedure. I would call attention in the strongest terms possible to this duty of the University and to the opportunity which lies before it if a man of this type can be immediately secured to work in connection with this Faculty.

Summary.—The College is manifestly better fulfilling each year some

of the purposes for which it was founded but it needs a much more thorough organization and more ample equipment in order to become reasonably level with its obligations.

Respectfully submitted,

GEORGE F. JAMES, *Dean*

THE GRADUATE SCHOOL

To the President of the University:

SIR: I beg to submit the following report on the Graduate School for the year ending July 31, 1913.

General.—The Executive Committee has continued its policy of gradually raising still higher the standards in the School. More strict rules have been adopted for the admission of courses of study to the Bulletin, a low limit has been set for the maximum amount of outside work a candidate may do and still be considered in full residence, and the regulations governing the previous training of candidates have been enforced more rigidly.

Registration.—There has been a satisfactory increase in the registration, as is shown by Table I below. A considerable portion of the candidates for degrees are engaged a part of their time in outside work or in assisting in the various departments, and consequently the number of degrees conferred annually is not as large as might be expected from the registration. The number of students registered in the School is given in Table I, arranged according to the degree for which they were registered, and for the sake of comparison like data are given for the preceding five years.

TABLE I. REGISTRATION

Year	1 Master	2 Doctor	3 Graduate study	4 Men	5 Women	6 Total
1908.....	60	12	35	74	33	107
1909.....	73	19	35	78	49	127
1910.....	67	18	43	78	50	128
1911.....	60	18	68	96	50	146
1912.....	84	21	54	101	58	159
1913.....	103	28	52	114	69	183
Men.....	65	25	24	...	...	...
Women.....	38	3	28	...	...	...

TABLE II. DISTRIBUTION OF STUDENTS AMONG COLLEGES

	Number registered	Number receiving degrees
College of Science, Literature, and the Arts.....	138	20
College of Engineering.....	1	0
Department of Agriculture.....	12	3
Medical School.....	3	1
School of Chemistry.....	18	6
College of Education.....	11	2

Of the total of 183 students registered, 114, or 62.3 per cent, were men, and 69, or 37.7 per cent, were women. Approximately one half of all of these students had received their Bachelor's degree from this University.

The number of advanced degrees conferred at the last commencement was 32, distributed as follows: Master of Arts, 24; Master of Science, 5; Doctor of Philosophy, 3.

Table II gives the distribution of the students in the School according to the college in which the major line of work was taken, both for the total registration and for the degrees conferred.

The Master's degree.—Some radical changes in the regulations governing the Master's degree were put into force for the first time during the year. The chief innovation in these regulations is contained in the provision that all candidates shall devote at least one half of the prescribed time of study to work on some original problem, the results of which are to be embodied in a thesis. The placing of so much emphasis upon the thesis makes the character of the work to be done much more similar, than was formerly the case, to that required of a candidate for the Doctor's degree. The new requirements aim to develop initiative in the student, and to bring out his capacity or lack of capacity for original work, so that he may know as early as possible his fitness for a scholastic career.

The change in the regulations was felt most by departments other than those included under the natural and physical sciences, since in these latter the work for the degree had already been made to approach more or less closely the present requirements.

The new regulations have operated as well as could be expected for the first year, and have, on the whole, resulted in more scholarly work. Such difficulties as developed were due for the most part to the inexperience of advisers in dealing with the new form of thesis. If an acceptable thesis is to be completed on time, it is essential that a problem for investigation be assigned promptly to the candidate, and that he be given careful guidance in so limiting its scope that at least some portion of the given field may be thoroughly covered by the end of the year.

Some demand exists still for the kind of training that was obtained under the old requirements for the degree. This comes chiefly from students who expect to engage in teaching in secondary schools, and, if the demand persists, it should receive due consideration.

Fellowships and scholarships.—In order to conform to the recommendation of the Association of American Universities, the final date for the filing of applications for fellowships and scholarships has been changed to March first. The elections are to be made about April first. The number of applications for these honors has not been as large as is desirable and departments should bring them to the attention of worthy students.

Research and publication.—Out of the fund of \$10,000 available for the year, \$3,000 was apportioned to the Botanical Survey and \$1,055 was set aside for Research Publications. The remainder of the fund, \$5,945, was allotted, on recommendation of the Committee on Research and Publication, in amounts ranging from \$50 to \$750 to 28 members of the teaching staff to aid them with their researches by providing needed apparatus,

material, or research assistants. A list of the various grants with a statement in each case of the problem under investigation and the progress made toward its solution is appended to this report. In a number of cases the sum granted for a research assistant has proved too small to obtain the services of any one competent to do the required work. A larger fund is needed for this purpose. The time required for the completion of a research of any value is always more or less uncertain, but nevertheless the reports on progress made during the year indicate that most of the members of our faculties are able to devote far too little time to research. The improvement of this condition is most essential for the advancement of the Graduate School.

The Editorial Board has started the publication of several series of research monographs. After some delay, the work is now well under way and about \$2,500 has been spent thus far on the publications. The funds available have been sufficient for the purpose, but the number of valuable papers offered for publication promises to increase considerably in the near future and more money will be needed to take care of them.

Respectfully submitted,

JOHN ZELENY, *Acting Dean*

SUMMARY OF REPORTS ON RESEARCHES RECEIVING AID FROM THE FUND FOR RESEARCH AND PUBLICATION, 1912-13

Budget 187a. \$150. T. G. Lee: Problem, Embryonic Development. Some sections of embryos were prepared, but the investigation is not completed and the work is to be continued.

Budget 187b. \$300. J. B. Johnston: Problem, Cerebral Cortex. Some of the results obtained have been published in the *Journal of Comparative Neurology*, April, 1913, under the title, Nervus Terminalis in Reptiles and Mammals. Another paper which is nearly finished will also be published in the above journal under the title, The Morphology of the Septum, Hippocampus, and Pallial Commissures in Reptiles and Mammals.

Budget 187c. \$120. R. E. Scammon: Problem, Embryonic Growth. Progress made, but investigation is not completed and is being continued.

Budget 187d. \$250. H. Downey: Problem, The Blood. A paper on the Origin of Blood Platelets was published in the *Folia Haematologica*, March, 1913; another paper on the Development of the Histogenous Mast Cells of Adult Guinea Pig, and the Structure of the Histogenous Mast Cells of Man, is in the press for the same journal; and a third paper is ready for publication, on the subject, the Granules of the Polymorphonuclear Leucocytes of *Amblystoma*, with a few Notes on the Spindle Cells and Erythrocytes of this Animal.

Budget 187e. \$75. C. E. Johnson: Problem, Embryological Studies. Grant not used.

Budget 187f. \$100. O. W. Oestlund: Problem, Aphidae. Work completed without the use of any of the fund.

Budget 187g. \$500. G. B. Frankforter: Problem, Catalysis. A paper on Catalysis is now in press, and work on a second paper is well under way.

Budget 187h. \$300. F. Bass: Problem, Ventilation. Preliminary experiments were completed on the purification of air in a school room by admixture of a small amount of ozone. Research is to be continued with aid received from outside sources.

Budget 187i. \$500. E. V. Robinson: Problem, Development of Industries in the Northwest. Most of the work on the section relating to agriculture has been completed.

Budget 187j. \$300. W. A. Schaper: Problem, Commission Form of Government. Progress made but results are not ready for publication.

Budget 187k. \$100. H. Craig: Problem, York Plays, and Ludus Conventriae. The origin of the so-called Coventry Mysteries has been discovered, and an article published on the subject in the *Nation*, Oct. 2, 1913. Progress has also been made on other work.

Budget 187l. \$750. F. R. McMillan: Problem, Concrete. Deformation measurements were carried out for getting Poisson's ratio in metals, but computations are not yet completed. Work on concrete specimens has been begun. Fund not all expended, owing to difficulty of getting a properly trained assistant.

Budget 187m. \$200. G. D. Shepardson: Problem, Telephony. An artificial telephone line is nearly completed and progress has been made on installing the remainder of the apparatus needed for the research on the Performance of a Telephone Line.

Budget 187n. \$200. F. W. Springer: Problem, Metering Electric Power. Preliminary work completed and final form of apparatus is now being installed.

Budget 187o. \$50. O. Bowles: Problem, Opaque Minerals. Various methods of obtaining perfectly polished surfaces were tried, but the problem of the identification of the minerals by optical methods has not yet been solved.

Budget 187p. \$50. F. F. Grout: Problem, Origin of Ore Deposits. The general chemical principles of the problem have been studied, and a paper on the subject has been submitted for publication in *Economic Geology*.

Budget 187q. \$250. W. Notestein: Problem, The Sources for the Parliament of 1629, with Special Reference to the Character of the so-called True Relation. Progress made and results will be ready for publication in a few months.

Budget 187r. \$50. A. B. White: Problem, Origin of Parliament. Grant returned.

Budget 187s. \$50. F. M. Anderson: Problem, Enforcement of Alien and Sedition Laws. Grant not used.

Budget 187t. \$250. J. B. Miner: Problem, Mental Development

Tests. Experiments have been conducted with the object of improving mental development tests on school children. Work not yet completed.

Budget 187u. \$250. F. Klaeber: Problem, Beowulf. Work has been completed on an extensive systematic bibliography. A paper on Beowulf is ready for publication in the *Journal of Germanic Philology*. Work along other but similar lines has also been completed and published.

Budget 187v. \$100. G. Bothne: Problem, Scandinavian Settlements in the United States. Some source material has been purchased and progress made on research.

Budget 187w. \$100. J. F. Corbett: Problem, Experimental Surgery. The following papers have been completed: Further Study in Kidney Suture, published in *Annals of Surgery*, June, 1913; Blood-vessel Anastomosis, published in *Journal-Lancet*, October, 1912; Experimental Nephritis, to be published in *Urological and Cutaneous Review*; Changes in the Bone-Marrow following Splenectomy, to be published in the *Transactions of the Minnesota Pathological Society*; Transplantation of the Thyroid, to be published in the *St. Paul Medical Journal*.

Budget 187x. \$50. H. E. Robertson: Problem, Inflammatory Processes. A paper on the Effect of Intramuscular Injections of Salvarsan and Neosalvarsan is ready for publication, having been read before the American Medical Association.

Budget 187y. \$300. W. P. Larson: Problem, Contagious Abortion in Cattle. Some very important results have been obtained showing that it will be possible to vaccinate effectively against the disease.

Budget 187z. \$100. E. T. Bell: Problem, Fats and Lipoid Substances in Animals. Work on Cloudy Swelling completed and to be published in the *Journal of the American Medical Association*. Progress also made on work on Lipoids of the Kidney.

Budget 187aa. \$250. A. Zeleny: Problem, Cause of Absorption in Electric Condensers. The absorption in condensers of various construction was determined for a range of temperatures, but work is incomplete and is being continued. For lack of a suitable assistant, a considerable part of the grant was not expended.

Budget 187bb. \$250. J. Zeleny: Problem, The Electrical Discharge from Liquid Points. Grant returned, as a competent assistant could not be secured.

In addition to the appropriation for the year, balances from the preceding year and such funds as were returned during the year by those who for various reasons were unable to use them, were available for redistribution. Additional grants for purposes already specified above under the various names, were made as follows: H. Downey, \$60; J. B. Miner, \$75; W. Notestein, \$106; E. V. Robinson, \$50.

The following allotments were also made for projects not included in the previous list:

Budget 187cc. \$130. F. P. Leavenworth: Problem, Nebulae in Lyra and Orion. Progress made but investigation not completed.

Budget 187dd. \$186.88. D. Ford: Problem, Heywood's Plays. Progress made but investigation not completed.

Budget 187ff. \$100. R. H. Mullin: Problem, Serum Reactions. Grant returned.

Budget 187gg. \$401.73. A. E. Jenks: Problem, Ethnological Survey. Detailed reports on many unassimilated Americans have been collected and material has been gathered on amalgamation of races in Minneapolis. A paper on Asymmetrical Pigmentation is ready for publication.

Budget 187hh. \$150. J. J. Flather: Problem, Drafts in Chimneys. The necessary apparatus has been purchased and installed in the chimney of the new heating plant.

REPORT OF THE DEAN OF WOMEN

To the President of the University:

SIR: The Dean of Women herewith submits the following report for the year ending July 31, 1913.

Distribution of women students.—During this year there were registered in the University 1,578 women. The academic distribution is as follows:

DURING THE REGULAR SESSION OF 1912-13

Science, Literature, and the Arts	925
Education	75
Graduate	69
Agriculture	185
Law	6
Medicine	11
Dentistry	3
Pharmacy	5
Chemistry	11
Nurses	30
Total	1,320

DURING THE SUMMER SESSION OF 1912-13

Science, Literature, and the Arts	195
Agriculture	64
Total	259
Total	1,578

The distribution as to residence is not without significance for the purpose of this report.

DURING THE REGULAR SESSION OF 1912-13

At home	808
With friends or relatives	52
In private families	90
In boarding houses	174
In sorority houses	69
In dormitories	127
Total	1,320

Student organizations.—The problems of administration involved in this varied distribution are at once apparent. Such a scattered residence is hardly favorable to the growth of a strong feeling of solidarity, or productive of a sense of responsibility for maintaining high standards of University life. The present Dean of Women found, however, on taking up her duties last September, that much had been accomplished toward overcoming the effect of such distribution. First, perhaps, in unifying influence has been Shevlin Hall, the women's building. What it has offered in opportunities for study, for wholesome recreation, and stimulating companionship, is too well-known to need repeating. Other helpful influences actively at work have been the Young Women's Christian Association; the Woman's League, organized to promote a spirit of sociability and good fellowship among the women; the Student Government Association, which had for its chief function the care and conduct of Shevlin Hall; the All-University Council, and the Student Council, both of which have acted as a medium in student affairs between the faculty and the student body. The successful work of these separate groups, through closer organization, pointed the way to an even greater efficiency. It seemed advisable, therefore, to form one strong self-government association which would include in its membership all the women of the University. To this end the Woman's League and the Student Government Association voted to dissolve, and in their place the Women's Self-Government Association was established. The duties formerly carried by these organizations were delegated to committees, the chairmen of which became members of the Executive Board of the new association. On this Executive Board every administrative organization dealing with the affairs of the women students, with the exception of the Women's Athletic Association, has its representative.

Senior advisers.—One of the first tasks undertaken by the Women's Self-Government Association was the organization of a system of Senior Advisers. The senior on the Executive Board in charge of this work, after consultation with the secretary of the Young Women's Christian Association, with the members of the Executive Board, and with the Dean of Women, drew up a list of seniors who, by virtue of their character and academic standing, seemed peculiarly qualified for the work. The seniors invited responded with enthusiasm. The plan provided that at least three freshmen should be assigned to each adviser during the week of registration so that they might have from the start the benefit of friendly counsel and companionship. To what degree the experiment will be successful remains to be seen. There is no doubt that in a great University like this there is a real need for just the kind of help which wise and sympathetic upperclass men can give. It is hoped and expected that the system just inaugurated will fill this need.

The point system.—A complete revision of the point system was made by the Student Council at the close of the year. This was submitted to the Executive Board of the Women's Self-Government Association through the president of the Council, who is a member of the Executive

Board. By this revision a new system of rating was adopted, many offices and activities listed which heretofore carried no points, and a scholarship requirement made for the carrying of the full number of points. The revised system, it is expected, will rationalize participation in student activities. The few women who are now practically carrying the entire responsibility of office-holding will be safeguarded from injuring their health and their academic work. On the other hand, many students who have never been given an opportunity to test their powers of leadership will be given, under the new system, a chance to cultivate them.

The House Council.—There has been a growing feeling of the need of closer union and coöperation among the women living on the campus. To accomplish this end the Women's Self-Government Association devised the plan of a House Council, to be made up of representatives from Sanford Hall, the sorority houses, and the lodging houses. The president of the Council will have a seat on the Executive Board, and in this way the Council will become an integral part of the governing body of the whole association. It is hoped that when the details of this plan are fully developed the principle of self-government already operative at Sanford Hall and the sorority houses will be extended in a similar way to lodging houses, and that the adoption of certain uniform house rules for all will result not only in improved living conditions, but in a stronger feeling of unity and good fellowship.

The Home Economics Association.—The women in the College of Agriculture, although nominally members of the Women's Self-Government Association, have an independent organization, the Home Economics Association. It was formed primarily to cultivate a feeling of friendliness among the women and to deepen the interest in the special problems connected with the study of Home Economics. During the past year the association has broadened its functions. It has set itself to regulate, through the principle of self-government, conditions in college life that need betterment. To that end it established the point system, the system of senior advisers, and the House Council, on lines similar to those adopted by the Women's Self-Government Association, but adapted to the special needs of the students in the College of Agriculture. The Dean of Women has met once a week with the cabinet of the Home Economics Association, where questions relating to the social life of the women are determined. In this way she has been able to keep in close relation with many of the more important problems of the student body.

Sanford Hall.—The opportunities offered at Sanford Hall for well-ordered and comfortable living make it in many respects an ideal hall of residence. With the appointment, last March, of a resident nurse, it would seem as if the provisions for health and comfort were complete. The policy of the administration has been liberal not only in providing the necessities which make for material well-being, but in encouraging, through pleasing form and color, an appreciation of the simple and the beautiful. Sanford Hall should exercise, through its standards of taste and simplicity, a refining effect on the character of its inmates. This

influence, however, should not be confined within its own walls. It should make itself felt in the other houses on the campus. By virtue of its superior advantages, Sanford Hall should take the lead in everything that makes for good conduct and the dignified ordering of life. It should stimulate by its example those smaller groups which are struggling to develop a broader conception of community spirit. Sanford Hall, awakened to its opportunities, can be of incalculable service to the University by creating a strong sense of social responsibility among its residents.

Sororities.—There are at present ten sororities at the University, which are under the control of a well-organized Pan-Hellenic Association. While there is a far more friendly feeling toward each other and toward non-sorority members than is frequently found where sororities exist in such numbers, the undemocratic spirit inherent in such a system of segregation tends inevitably to become a disintegrating influence in college life. The more thoughtful members of sororities are aware of this, and are actively engaged in correcting the effect of the system by helpful participation in all movements for the common good. It is expected that the regulation recently enacted by the Pan-Hellenic Association, by which no student may be invited to join a sorority until the beginning of her sophomore year, will so rationalize rushing as to remove some of the gravest objections made against it. If the present agreement be faithfully kept, as the sororities seem determined that it shall be, both sorority and non-sorority women will profit by the more normal treatment of freshmen which it will make possible. A highly commendable beginning in self-government has been made by the adoption of definite house rules by the various sororities. The strictness, however, with which these rules are enforced varies greatly in the different houses, and is dependent, often, on the personality of the chaperon or house-mother. When she is a woman of poise, sympathy, and training, with her position sufficiently established to be authoritative, her administration is usually efficient.

Lodging houses.—The supervision of lodging houses constitutes one of the recognized duties of the Dean of Women. During the past year she visited seventy-five, in order that she might know at first hand exactly the conditions under which students are living, and at the same time become acquainted with the women who have charge of these houses. Naturally, the conditions varied greatly, from that of scrupulous care to no care at all, but the general standard of cleanliness and comfort was fairly high. The few houses with apparently no standards were promptly taken from the list. There are so many houses ready to meet the University regulations concerning segregation and the receiving of callers, that it is possible to select from among them those that maintain conditions most adequate for health and comfort. There is, too, an increasing number of householders who are genuinely interested in making a home for the students and are conscientious in the discharge of their obligations, though, unfortunately, there are still too many who are concerned solely with the necessity of adding to their incomes. Students, on the other hand, have not always been scrupulous in discharging their obligations,

and the Dean of Women has frequently been called in to adjust these cases of equity between students and householders.

Employment for self-supporting students.—During the past year 190 University women were wholly or partly self-supporting. While many were engaged in tutoring and clerical work, a large proportion earned their living expenses by assisting in housework or in the care of children. This office serves as a bureau for students seeking such employment and for persons willing to give it. Only the physically robust, however, are able to carry a full academic program and at the same time to give the domestic service required for room and board. The ambitious are often taxed beyond their strength, and are obliged to lighten either their studies or their outside work. Frequently they seek help from the available loans, the Gilfillan Trust Fund and the Puritan Colony Scholarship Loan; or they become candidates for the scholarships offered by the College Women's Clubs of Minneapolis and St. Paul. The loans and scholarships are too few in number to meet adequately the demands made upon them. There is an urgent need for the founding of more scholarships and for the establishment of an emergency fund to relieve those students who carry the strain of academic work together with the burden of self-support.

Educational administration.—As a member of the Students' Work Committee, or, as it is to be known in the future, the Administrative Board of the College of Science, Literature, and the Arts, the Dean of Women exercises supervision of the academic work of the women of this College. All petitions to take extra work or to drop work are referred to her for approval; also special cases of discipline, for adjustment. All University women delinquent in two or more subjects are required to report to her once a month. In this way she is often able to discover the real cause of unsatisfactory work, and to suggest methods of improvement, according to whether the failure is due to lack of preparation, to too heavy a program, to ill health, or to an excess of social or student activities. One of the commonest causes of poor work, the permitting of students to carry too many extra hours, will in future be removed in the College of Science, Literature, and the Arts by a recent ruling of its faculty which makes eighteen hours the maximum amount that any student may carry.

Physical education.—The report of the Director of Physical Education for Women (pages 120-22) shows that the recommendations made in the last report of the Dean of Women, with the exception of that relating to the sanitary inspection of lodging houses, have been fully adopted. With the building and the equipment of the new gymnasium, a finer development in physical health and well-being will be made possible to the women of the University.

Recommendations.—That a wing be added as soon as possible to Sanford Hall, so that homes directly under the administration of the University may be provided for the young women who are now in lodging houses. As the space of the present dining-rooms and living rooms could adequately serve the needs of almost twice the number now living in the

Hall the new wing could be used almost exclusively for bedrooms. In this way, at an inconsiderable cost, practically all the out-of-town women in the University could be comfortably housed at Sanford Hall.

That one or more model lodging houses be started in connection with the Home Economics Department in the College of Agriculture. Such houses would serve both as laboratories where the working principles of home-making could be tested, and as college homes managed at a minimum expense.

That the chaperons of sorority houses be appointed with the approval of the Dean of Women.

A large part of the effort of the Dean of Women is necessarily directed to the shaping of a student sentiment that will appreciate the real values in a University education. Such values have often been obscured by an excess of student and social activities, less frequently, by the hardships involved in self-support. Whatever the cause, the fact remains that there is much work to be done in awakening students to a fuller realization of the responsibilities, moral and social, as well as intellectual, which a University education imposes. In this delicate, yet important, task of creating a stronger ethical sense, a finer feeling in matters that pertain to good taste and conduct, the Dean of Women needs the hearty support of all who are interested in developing, not only the material prosperity of the University, but those quickening intellectual and spiritual ideals without which no University can become truly great.

Respectfully submitted,

MARGARET SWEENEY, *Dean of Women*

UNIVERSITY EXTENSION

The following statements have been prepared by the directors of the various departments of the University Extension work.

AGRICULTURAL EXTENSION

Personnel.—During the fiscal year ending July 31, 1913, the Agricultural Extension Division had in its employ thirteen itinerant lecturers. Nine of these were employed full time, two half time, and two quarter time. This is in addition to the office and editorial force.

Farmers' Institutes.—The Farmers' Institute work has been handled through the same organization as the Agricultural Extension work. Although supported by a separate appropriation and administered by a separate board, it is in reality but a branch of the Agricultural Extension work. During the year the following Institutes have been held:

	Number of meetings	Attendance
One- and two-day institutes.....	158	77,545
Farmers' Clubs, lecture circuits, and similar meetings.....	275	15,110
Demonstrations in orchard work.....	42	2,620

Fifty thousand copies of *Farmers' Institute Annual* No. 25 were published and distributed free at the Institutes held in the State.

Special Trains.—During the year three special trains were equipped and operated in the State, as follows: Minneapolis, St. Paul, and Sault Ste. Marie Railway, November 6 to 20, 1913: 13 days, 40 stops, total attendance, 22,000. St. Louis County Special, covering the lines of the Duluth and Iron Range Railway, Duluth, Missabe, and Northern, and Great Northern Railway, in St. Louis County, April 6 to 16, 1913: 10 days, 32 stops, total attendance, 21,160. Live Stock Special, on the Northern Pacific Railway, July 9 to 21, 1913: 12 days, 24 stops, total attendance, 14,705. This makes a total of 35 days that the trains were operated, 96 stops, and a total attendance of 57,865.

Each of these trains was equipped with a Home Economics car showing modern conveniences in the home, and two or more cars for live stock, including good specimens of horses, cattle, sheep, swine, and poultry. The length of stops varied from one and a half hours to one-half day. With the Northern Pacific train, special live stock exhibits were arranged by local committees. All of the stops with this train were three hours or more in length, giving ample opportunity for judging demonstrations with the local stock exhibits, as well as showing the desirable

points of the animals taken with the train. From eight to fifteen instructors accompanied each train. It can be readily seen that the special train, reaching as it does so large an audience, is an effective means of bringing available scientific and practical knowledge to the farmers of the State. The chief difficulty involved is the fact that it is somewhat spectacular; many of the people who come to the train are not in a proper frame of mind to make the best use of the instruction given. Like attendance at a county fair, a visit to an agricultural special train is considered somewhat of a holiday excursion. Those who come are looking more for entertainment or excitement than for knowledge.

Rural school work.—During the year two men have devoted the greater part of their time to rural school work. They have promoted industrial contests, the teaching of agriculture in rural schools, the organization of boys' and girls' clubs, and the general improvement of educational facilities in the country, with special reference to industrial lines. These men have worked in coöperation with the county superintendents, teachers, and local school boards. They have been instrumental in interesting thousands of boys and girls in industrial work. During the year the State Industrial Contest was held in St. Paul, at which there were between five and six thousand entries by boys and girls from twenty-six counties. Twelve hundred and eighty-five dollars was distributed as prizes in this contest. An Acre-Yield Corn Contest was conducted: about 1,300 boys started out in the contest, 300 of them securing sufficiently large yields to warrant their plots being checked. Fifteen prizes were awarded in each of three sections of the State to the winners in this contest. In addition to the 45 prizes, one boy won the Grand Championship for the State by producing a yield of 135 bushels per acre. This entitled him to a scholarship in the Minnesota School of Agriculture, furnished by the *Minneapolis Tribune*. The fifteen prize winners in the southern section secured an average yield on their fifteen separate acres of 105 bushels per acre. In the central section the average yield secured by the prize winners was 105 bushels, and in the northern section, 73.5 bushels. Twenty-one boys secured over 100 bushels per acre, or over three times the average yield of corn in the State. Similar contests were conducted in potato- and tomato-growing and in canning.

Judges for fairs.—During the fall of 1912 judges were furnished for 108 county and street fairs and festivals. This is becoming an important feature of Extension work. Nearly every fair association in the State has come to expect the Agricultural College to furnish judges for all lines of exhibits. The general plan is to furnish the judges without cost to the fair association, except for necessary traveling and hotel expenses. Most of the judges sent out are prepared to explain in detail the reasons for their placing of each class judged, thus helping to make the fair an important educational feature. A casual looking-over of the exhibits at a county fair does not give one much of an idea of the good qualities of the animals or farm products because there are usually good and poor types in each class. But if the person interested in any class of exhibits

has an opportunity to have the good and poor points pointed out he can not fail to get a clear idea of what is desired in the various products.

Special meetings.—The Division is being called upon constantly for assistance and instruction at all kinds of meetings that have for their object the betterment of country life. During the year there has been furnished one or more speakers for 690 meetings, with a total attendance of 63,670. These meetings include rural school meetings, farmers' clubs, farmers' picnics, farmers' elevator meetings, live stock shippers' meetings, poultry and horticultural meetings, teachers' and school officers' meetings, and development meetings.

Publications.—The publication work has continued along the same lines as in previous years. Twelve Extension bulletins have been published as follows: No. 32, Tuberculosis of Cattle; No. 33, Some Knots and Splices; No. 34, Bundle Corn and Beef Production; No. 35, Potato Diseases; No. 36, Egg-Marketing; No. 37, Hog Cholera; No. 38, Potato-Growing in Minnesota; No. 39, Minnesota Seed Law; No. 40, Preservative Treatment of Fence Posts; No. 41, Two Types of Silos; No. 42, Coöperative Creameries and Cheese Factories; No. 43, Flies and Their Control. The mailing list for Extension bulletins has increased from 41,000 to 45,000. During the latter part of the year 60,000 copies of each bulletin have been printed. Twenty-four numbers of *University Farm Press News* were published and distributed. Thirty-five hundred copies of each issue are distributed to the local papers of this and adjoining states. Every three weeks copy is furnished for an illustrated plate page which is used by about sixty local papers in this State. During each of the nine school months *Rural School Agriculture* is published and mailed to each rural school teacher in the State. The courses outlined in this publication the past year have been largely along the line of corn and poultry.

County Agricultural Agents.—A decidedly valuable addition to the Extension work has been made by placing eleven county agents in as many counties during the year, and by the passing of a bill which after August 1 will provide liberal state aid for twenty-five counties, and the legalizing of a maximum appropriation of \$1,000 by the commissioners of any county in this State toward the support of this work. This County Agricultural Agent work was started through liberal subscriptions raised locally, supplemented in several counties by \$1,000 from the Council of Grain Exchanges, by a total for the State of \$6,980 from the United States Department of Agriculture, and \$1,797.71 from the Minnesota Farmers' Institutes. The West Central Minnesota Development Association has been an active force in getting the County Agent movement started in many of the west central Minnesota counties. County Agricultural Agent work is a logical step in the direction of bringing the farmers on the farms in close touch with the investigators of the State Experiment Station and the United States Department of Agriculture. The work as organized brings into coöperation the county, state, and nation, and makes it possible for any farmer on any farm to bring to his assistance quickly

the services of any specialist in the public service, a condition which has never before been practicable. The Office of Farm Management of the United States Department of Agriculture is cooperating in the supervision of the County Agent work. The man who acts as supervisor for County Agents has been employed jointly by the Office of Farm Management and the Agricultural Extension Division. It has been this man's duty to travel among the County Agents and give them every assistance possible in their work locally and to help them connect up with the various specialists in the United States in working out the problems of their county.

Summer Schools.—Special instructors were furnished County Teachers' Training Schools during the year as follows: Fifteen different agricultural instructors were employed, giving one week's training in agriculture in twenty different summer schools, with a total registration of 1,050; ten home economics instructors were employed, giving one week's instruction in twenty-four different schools, with a total registration of 1,375. All of the above had instruction in agriculture or home economics for one or two periods per day for five or six days. In addition, small groups met with the instructors at various times during the day for special laboratory work, and considerable individual instruction was given by different teachers. While this summer school work does not reach a large number of people, we believe that it is very effective in final results, because a large percentage of the teachers reached in this way will carry some of this work to their pupils, thus eventually affecting a large number of people.

Short courses.—During the year 31 Short Courses were held at the following places: Ada, Aitkin, Annandale, Beardsley, Benson, Brown Valley, Chatfield, Dodge Center, Fergus Falls, Lakefield, Little Falls, Madison, Mankato, Mantorville, Milaca, Monticello, Northfield, Norwood, Pine Island, Rochester, St. Peter, Sauk Center, Shakopee, Sherburn, Taylors Falls, Tracy, Thief River Falls, West Concord, Wheaton, Willmar, and Winthrop. The attendance at these Short Courses numbered 19,630 men and 9,625 women, making a total of 29,255. Most of these Short Courses were held in cooperation with the local high schools. In each case the Short Course consisted of live stock and agronomy work, and with a few exceptions, home economics. They were conducted for five days each, from Tuesday morning to Saturday evening. The sessions usually lasted from ten o'clock in the morning until four or five o'clock in the afternoon, with from two to four evening programs.

Demonstration farms.—The demonstration farm work has been continued as previously planned. Eighteen farms have been under the direction of the Division during the year. No attempt has been made to conduct spectacular demonstrations, but rather so to direct the operations of the whole farm that the land, labor, and capital of the farm owner will produce maximum results. Little is gained by showing phenomenal yields on a small area due to the application of an excessive amount of capital and labor, when the average farmer is limited in the amount of capital and labor he can secure. The following table shows the yields

secured on demonstration farms compared with the average yields secured in Minnesota. While the increases are not large, they in most cases indicate increased profits, because little additional equipment was used to secure them. They are due in most instances to the use of better seed and better soil management.

COMPARISON OF YIELDS

Grain	Farms	Acres	Yield	Farm's average	State's average
Wheat.....	9	161	3,102	19.25	15.5
Barley.....	8	85	3,185	37.40	28.2
Oats.....	11	228	10,547	46.25	41.7
Corn.....	9	208	8,758	42.10	34.5

Cow Testing Associations.—During the year the Division has devoted considerable time to the organization of Cow Testing Associations. More work has been done along this line by the United States Department of Agriculture than we have been able to do, but they are turning all of the associations organized over to the Division to follow up. There are now twelve associations organized in the State. They are being furnished with records and are assisted in every way possible.

Live Stock Shipping Associations.—Live Stock Shipping Associations are proving a very valuable factor in the marketing of live stock. Some little time of the Division has been devoted to helping organize these associations, and helping associations already organized. At present there are 96 associations in the State. During the year they shipped a total of over \$3,500,000 worth of live stock at an average cost of about 32 cents per hundred. These associations when properly managed are much more efficient than the old system of handling cattle through a local buyer who would travel from farm to farm and pick up the animals as he could. In the association the members report animals they have ready for shipment, and as soon as a car or more has been reported, the local manager notifies them to bring in the stock, which is graded, marked, and shipped, each shipper getting exactly what his stock brings on the market less the actual cost of getting them there. Managers are usually paid a small fee, ranging from 6 to 10 cents per hundred pounds live weight of stock shipped. This system tends to encourage the breeding and feeding of good stock, because every man gets paid according to the quality of the stock delivered, which is not usually true where handled through a local buyer. We believe that the Live Stock Shipping Association is as good a line of work as we can promote.

GENERAL EXTENSION

EVENING EXTENSION CLASSES

For 1912-13 the evening Extension work in the Twin Cities was pushed out into several new lines in addition to the customary classes in Business Economics. This attempted expansion should have been sup-

ported by an increased administrative force, but it was not. On the contrary, there was evidently some misunderstanding of the purposes of concentrating extension effort under an independent department, with the result that some men who had previously been identified with the work and who had valuable business acquaintanceships withheld their coöperation. As a matter of fact there was nothing to build on in the Business Courses. There had been little or no gain from year to year. Much of the advertising had gone wide of the mark because it was not backed up by organized coöperative agencies. With the various commercial associations organized to coöperate and informed as to what the University is able to give, the year 1913-14 should see an adequate response—one proportioned to the effort expended.

The evening courses in academic subjects afforded some valuable experience. It was not made evident that the general public is eager to pursue regular university courses. Public speaking proved popular. Some classes in English attracted reasonably large numbers. Popular courses in sociology made their appeal to teachers and social workers. Beginning French was successful. Public school teachers prefer something inspirational or popular rather than purely technical, and from the teachers these evening groups are generally recruited. Other workers desire to receive direct vocational aid from the evening study. This fact accounts for the popularity of business and engineering branches. It is scarcely possible that regular university courses, aside from the popular and special lines mentioned above, will ever be demanded by large enough groups to make the courses self-sustaining. The evening classes in engineering were not organized until midwinter. The delay was due to the inertia, amounting almost to opposition, within the College of Engineering itself. When at last the way was opened, the enthusiasm and fine spirit of coöperation made failure impossible.

A glance at the tables will show that the enrollment in the various groups of architectural subjects and in electricity was unusually large for an initial effort. The students in these courses were well-trained experienced men. It was more difficult to win the confidence of the men from the machine shops. This is partly due to the fact that scores of such men are merely parts of the machines upon which they work. Very few of them are high-school graduates. They are afraid of University work. This raises the question as to whether the University has a duty to perform toward these men. Wisconsin has answered this question by placing a practical elementary shop course in all of its centers.

The evening Extension work in Duluth was also started after the first semester was nearly spent. It was placed there, however, because of the urgent request of the social workers of that city and because a small beginning would serve as an entering wedge to the fine field which Duluth is proving to be for University effort.

The accompanying tables show the enrollment for each semester and in the classes started late. Among the reasons for the falling off during the second semester the following points should not be overlooked: (1)

The students who have been in the work lack energy to continue. It is not the easiest thing for the average business clerk to accomplish his office service and a full year's course of study besides. (2) Instruction became increasingly uninteresting. Evening work requires more nervous energy than day work, and only a few men are equal to the occasion. The question, Who is going to teach us, often remains unanswered to the satisfaction of prospective evening students when enrollment for a second semester is proposed. (3) There has been a lack of intelligent sequence of courses. The first semester courses have not been given as feeders for those of the second semester; or the advanced courses offered in the second semester have been given without regard to the thoroughness with which the field has been worked by the same courses in the previous year or by essential prerequisites. These difficulties will no doubt be removed by the new organization of courses for 1913-14.

ENROLLMENT FOR FIRST SEMESTER 1912-13

MINNEAPOLIS

ECONOMICS:

	Students	Fees
Advertising and Salesmanship.....	29	\$145.00
Accounting Systems	11	55.00
Banking Practice	26	130.00
Business Law	48	240.00
Elements of Economics.....	30	150.00
Principles of Accounting.....	28	140.00
Labor Problems	9	45.00
Total	181	\$905.00

ACADEMIC:

	Students	Fees
Art Course for Teachers.....	9	\$45.00
Beginning French	15	150.00
Chemistry	7	70.00
English	8	80.00
Public Speaking	15	150.00
Sociology	21	105.00
Short Story	42	215.00
Sociology (American People).....	78	390.00
Total	195	\$1,205.00

ST. PAUL

ECONOMICS:

	Students	Fees
Accounting Systems	13	\$65.00
Advertising and Salesmanship.....	17	85.00

ECONOMICS—Continued:

	Students	Fees
Business Law	21	105.00
Elements of Economics.....	5	25.00
Labor Problems	10	50.00
Principles of Accounting.....	25	125.00
Total	91	\$455.00

ACADEMIC:

	Students	Fees
Public Speaking	18	\$89.00
Rhetoric	12	97.00
Total	30	\$186.00

TOTAL ENROLLMENT FOR MINNEAPOLIS AND ST. PAUL,
FIRST SEMESTER 1912-13

MINNEAPOLIS:

	Students	Fees
Economics	181	\$905.00
Academic	195	1,205.00

ST. PAUL:

	Students	Fees
Economics	91	455.00
Academic	30	186.00
Total	497	\$2,751.00

(Classes in Engineering on the University campus and the class in Economics in Duluth were held from January, 1913, to May, 1913. These can not be listed with the first or second semester reports.)

ENGINEERING:

	Students	Fees
Elements of Architectural Engineering.....	18	\$180.00
Elements of Architectural Engineering.....	15	150.00
Elements of Design.....	9	105.00
Concrete Construction	18	180.00
Dynamos and Motors.....	35	175.00
General Course in Electricity.....	40	200.00
Steel Construction	5	45.00
Machine Shop Mathematics.....	13	65.00
Total	154	\$1,100.00

DULUTH:

	Students	Fees
Economics	24	\$117.50

ENROLLMENT FOR SECOND SEMESTER 1912-13
MINNEAPOLIS

ECONOMICS:

	Students	Fees
Business Law	13	\$65.00
Business Law for Bank Clerks.....	22	110.00
Business Administration	10	50.00
Cost Accounting	15	75.00
Elements of Economics.....	5	25.00
Investments	10	50.00
Practical Economic Problems.....	22	110.00
Salesmanship and Merchandising.....	18	90.00
Social Economics	22	120.00
Total	139	\$695.00

ACADEMIC:

	Students	Fees
Art Course for Teachers.....	6	\$30.00
Beginning French	18	180.00
English	11	115.00
Elements of Psychology.....	13	65.00
Public Speaking	12	110.00
Short Story	16	80.00
Sociology	10	50.00
Total	87	\$630.00

ST. PAUL

ECONOMICS:

	Students	Fees
Business Law	8	\$40.00
Corporations and Finance.....	6	30.00
Cost Accounting	5	25.00
Merchandising	8	40.00
General Economics	6	30.00
Society and Labor.....	4	20.00
Total	37	\$185.00

ACADEMIC:

	Students	Fees
Public Speaking	11	\$39.50
Rhetoric	10	50.00
English	11	110.00
Total	32	\$199.00

THE PRESIDENT'S REPORT

TOTAL ENROLLMENT FOR MINNEAPOLIS AND ST. PAUL,
SECOND SEMESTER 1912-13

MINNEAPOLIS :

	Students	Fees
Economics	139	\$695.00
Academic	87	630.00

ST. PAUL:

Economics	37	185.00
Academic	32	199.00

Total	295	\$1,709.00
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SUMMARY OF ENROLLMENT

TOTAL REGISTRATION FOR MINNEAPOLIS :

	Students	Fees
First semester	376	\$2,110.00
Second semester	226	1,325.00
Engineering (January, 1913, to May, 1913) ..	154	1,100.00

TOTAL REGISTRATION FOR ST. PAUL :

First semester	121	641.00
Second semester	69	384.00

DULUTH :

Economics (January, 1913, to May, 1913) ...	24	117.00
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Total registration for 1912-1913	970	\$5,677.00
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The total registration without duplication was as follows :

MINNEAPOLIS :

Academic	240
Economics	197
Engineering	151

ST. PAUL:

Academic	41
Economics	84

DULUTH :

Economics	24
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Total	737
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THE UNIVERSITY WEEKS, JUNE, 1913

The terms of the contract for University Weeks were slightly different from those given in 1912. Each town was asked to make a flat

guarantee of \$300, to furnish an auditorium, and to pay the expense of such local advertising as might be deemed necessary. The University, however, printed the general programs and the tickets, circularized the communities, and furnished posters and road signs. The University did not finance the boys' camp feature this year. As a consequence only one such camp was held. The organization was modified this season to provide for twenty-four towns in a period of two weeks. This necessitated duplicate program groups, namely, two glee clubs, two dramatic clubs, etc. Thus the complexity of the problem of arranging one series of successful programs was increased one hundred per cent. The advantage of the shorter period on the road was appreciated, however, by the performers. Perhaps, moreover, the disadvantages cited above can be overcome by beginning early to formulate the programs for another year.

From the numerous criticisms and suggestions that have been made about the University Weeks the following points have been selected as of possible service: Have no program before 3 p.m.; give only a three-day program; admit only ticket holders to afternoon sessions; complete the circuits very early so that the local committee may have plenty of time in which to work; complete the program early, six months in advance if possible; organize a large representative local committee in each town and designate the town as a "University Center," providing also for the continuance and permanency of the committee; engage University instructors and assistant professors as local managers; try out the participants before admitting them on the program; remind participants that they are using the people's money; participants must regard their engagement for this work as binding as any other University work—nothing so demoralized the effort of the past summer as the tendency of University men to drop out whenever they felt so disposed; choose from the University only the few lecturers that are able to popularize their subjects; engage only such University and other participants as are willing "to put up with" conditions as they find them in the smaller towns; make an effort to adapt the programs to local conditions; by all means have the College of Agriculture thoroughly represented; change the contract so that more money may be secured from each town or reduce the number of days and the number of participants and the mileage so that the original guarantee may more nearly cover the expense; do not go into a town having a chautauqua unless the people prove well in advance that they will take care of both; in general, go into the small rather than the large towns—there are a few notable exceptions to this.

The true ideal of the University Week has spread throughout the State. People are beginning to look upon it as an educational opportunity and not as a mere entertainment or show of the usual commercial variety. It is reasonable to believe that quite generally the timidity and suspicion of the people in many places have been overcome so that they will now take hold of University Week as the people's affair and support it accordingly. It is worth while to repeat that the small town is generally the best place for this kind of extension effort. The little places have

admitted the University without condescension. Many of the larger towns have merely tolerated her. The villages have not been surfeited with good things. They see and hear gladly. The large town has too many counter-attractions. It must not be understood, however, that all towns are in one class. Some of the most successful Weeks were in large places where the most influential people think they have discovered a real need for University effort.

The following is a summary of University Week receipts and expenditures for 1913:

Town	Guarantee	Local expenses	Unpaid guarantee
Austin.....		\$81.15	.....
(Transfer Point)			
Bemidji.....	\$288.00	131.30	
Brainerd.....	290.00	136.80	\$10.00
Blooming Prairie.....	288.00	104.25	
Coleraine.....	288.00	146.55	
Caledonia.....	288.00	89.45	
Cloquet.....	288.00	122.70	
Duluth.....		14.00	
(Transfer Point)			
Fairmont.....	288.00	103.50	
Graceville.....	300.00	217.65	
Grand Meadow.....	288.00	68.74	
Grand Rapids.....	288.00	123.75	
Hibbing.....	300.00	127.10	
Jackson.....	288.00	120.37	
Lanesboro.....	300.00	100.30	
Litchfield.....	218.80	92.75	69.20
Long Prairie.....	288.00	199.45	
Marshall.....	288.00	173.80	
Morris.....		52.25	
(Transfer Point)			
New Ulm.....	300.00	129.45	
Preston.....		39.50	
(Transfer Point)			
Park Rapids.....	288.00	145.20	
Rochester.....	300.00	98.15	
Staples.....		9.75	
(Transfer Point)			
Stewartville.....	288.00	86.50	
St. Charles.....	288.00	82.50	
St. James.....	288.00	84.60	
Willmar.....	300.00	111.00	
Waseca.....	300.00	120.50	
Totals.....	\$6,928.80	\$3,313.11	
Receipts		Expenditures	
Reserve.....	\$1,900.00	Personal expenses of participants.....	\$1,076.22
Received from towns.....	6,928.80	Mileage.....	2,311.04
Total.....	\$8,828.80	Fees.....	2,470.00
		Express.....	54.75
		Extra office help.....	13.70
		Printing.....	503.15
		Lantern and slides.....	217.14
		Incidentals for Dramatic Club.....	31.46
Deficit paid out of University Support fund.....	\$1,287.02	Postage.....	125.25
		Expenses in towns.....	3,313.11
	\$10,115.82		\$10,115.82

EXTENSION BY LECTURES AND ENTERTAINMENTS

The work in this department naturally divides itself into four groups: First, the Department of Economics followed its custom of giving lectures singly and in courses before commercial clubs and general audiences called

under the auspices of some such club; second, there was the usual work of the College of Education before teachers' associations at school-house dedications, etc.; the farmers' short courses throughout the State afforded a third field for the University lecturer and entertainer; and, finally, there were several calls for lyceum numbers. The number of places reached by each of these types of work is as follows: Department of Economics, 34; College of Education, 80; entertainments for farmers' short courses and miscellaneous lyceum numbers, 29. The approximate total number of people reached by these different agencies was 14,300.

CORRESPONDENCE COURSES

A considerable number of new correspondence courses were offered during 1912-13, but on account of the serious lack of clerical help, it was impossible to push a campaign for enlarging the enrollment in the correspondence-study department.

SUMMARY OF THE CORRESPONDENCE-STUDY WORK

Total number of departments represented.....	12
Number of courses in each department	
Economics and Political Science.....	8
Education and Psychology.....	8
German	6
Greek	4
History	6
Latin	4
English Literature	4
Mathematics	6
Philosophy	3
Science	8
Romance Languages	11
Scandinavian Languages and Literatures.....	4
	—
	72
Number of courses added for 1913-14.....	43

ENROLLMENT BY COURSES

Botany	2
Education	14
Economics	6
English	2
French	4
German	3
History	5
Geology	2

Latin	2
Mathematics	13
Psychology	3
Rhetoric	4
Swedish	1
	—
Total	61
Individuals enrolled	54

The inquiries during the year have emphasized the demand for more courses in vocational or industrial subjects—different phases of engineering, agriculture, and commercial branches, including practical English. The need of special texts in commercial and industrial subjects, the need of instructors capable of making texts, and the necessity of arranging to use texts prepared for this purpose by other institutions have become very apparent. This University could undoubtedly develop a large enrollment in advanced academic lines, history, language, sociology, etc., if suitable courses were to be developed. The extent of the correspondence work in fact is limited only by the limitations in the instructional staff.

EXTENSION WORK BY THE COLLEGE OF EDUCATION

During the year 1912-13, aside from special courses which were instituted on the University campus for the benefit of teachers, the Faculty of the College of Education did a great deal of Extension work throughout Minnesota, visiting 68 towns and giving a total of 94 addresses to an aggregate attendance of about 23,000 people. Of these addresses 40 were public lectures, 12 were given to local teachers' associations, 24 to county teachers' associations, 4 to large section meetings of teachers in various parts of the State, and 14 to school pupils. Inspection visits were made to 27 schools, including one consolidated school, 22 high schools, and 4 state normal schools. In addition, by the aid of the special extension appropriation, a bureau for securing positions and promotions for the graduates of the University engaged in public school teaching in Minnesota was maintained and an aggregate of about 90 such appointments was secured at a saving of more than \$3,000 in agency fees. The registration for correspondence courses was not large and yet this opportunity for study has definitely increased the University enrollment both during the Summer Session and during the regular academic year.

DEPARTMENT OF PHYSICAL EDUCATION FOR MEN

To the President of the University:

SIR: I herewith submit my report for the year ending July 31, 1913, together with some recommendations for the future.

Staff.—No changes were made in the regular departmental staff. This staff is not of sufficient size to dispose adequately of an ever-growing work demanded by the needs of a large student body.

Statistics.—(1) Physical examinations. Eighteen hundred and fifty-six physical examinations were taken by the director of the department during the year. Fourteen hundred and eighty-seven of these were original examinations, which included measurements, strength tests, and medical inspection. Two hundred and forty-four were reexaminations of freshmen taking the required course, and one hundred and twenty-five were special examinations given to students petitioning for excuse from Military Drill on account of physical disability, or students referred to the department by students' work committees to determine if the students' scholastic delinquencies were due to impaired health.

In addition to the regular examination, all students have had the privilege of consulting the director on matters pertaining to health, and of being treated for minor accidents, such as occur in the gymnasium and on the athletic field. A considerable number of students, conservatively estimated at 300, have availed themselves of the privilege. Owing to the great variety of these cases, and the press of time, no accurate or permanent record of them has been kept.

(2) Special lecture on sex hygiene. Ten hundred and fifty-nine students, including first-year students in the School of Agriculture, attended the special lecture on sex hygiene, required of all new matriculants at the beginning of the autumn semester. The lectures were given in six divisions; five on September 23, at 12:00 m., in different buildings on the campus, by the following staff, all members of the University faculty: Dr. J. C. Litzenberg, Dr. Charles A. Erdmann, Dr. S. Marx White, Dr. H. L. Williams, and Dr. Earle R. Hare; a second lecture for late matriculants and first lecture delinquents was given by Dr. Erdmann on October 7. Mr. A. J. Elliott, Western College Secretary of the Y. M. C. A. International Committee, addressed the students at the Farm School on October 9. All of the lecturers gave their services gratuitously. From the observation of this department these lectures have accomplished much more than we expected.

(3) Disease Census. Six hundred and ninety-five students returned their disease census cards, properly filled out and signed, as required of

all new matriculants. Cards were not issued to students in the School of Agriculture. The cards were sent to the Epidemiological Division of the State Board of Health for recordation of data, and later were returned to the files of the Department of Physical Education.

(4) Required Gymnasium Course: (a) Class Enrollment:

Students taking the work over.....	29
Students whose registration was cancelled first semester...	49
Specials (defectives)	39
Advanced class leaders	12
Freshman class leaders	45
Freshmen not included under above headings.....	147
	<hr/>
Total	321

NOTE.—The Leaders' Corps composed of 12 students beyond the freshman year, and 45 freshmen, the former working for University credit, materially assisted the department in practical gymnastic class work.

(b) Personal hygiene lectures. Twelve lectures on personal hygiene were given in the required course, with a written examination at the close. The lectures embraced the subjects of diet, exercise, bathing, housing, first aid, infectious diseases, etc.

(5) Efficiency tests (first semester): (a) Swimming. Two hundred and fifty-two students taking the required course passed the test by swimming two lengths of the pool, 120 feet. Of 142 students who at the beginning of the year could not swim, 98 learned well enough to meet the requirement after ten lessons. The remainder experienced more difficulty in learning, but about two thirds of them qualified, leaving about 15 students who carried the work over to the following year. A total of 127 students, taking the required course, were taught to swim during the year. No record was kept of a large number of students taking optional work in the department who learned to swim during the year.

(b) Apparatus qualifications. Two hundred and forty-four students succeeded in passing the apparatus tests, which are based upon approach, execution, form, and retreat in the performance of set exercises on three pieces of apparatus, namely, the buck, parallel bars, and side horse.

(c) Fence vaulting. Two hundred and thirty-one students passed the qualification in vaulting a bar at the height of their shoulders without touching in going over.

NOTE.—One hundred and eighty-one students met all efficiency tests for the first semester.

(6) Efficiency tests (second semester): (a) Mile run in six minutes; 175 students met the requirement. (b) Running high jump, 4 feet; 181 students met the requirement. (c) 100-yard dash, 11¾ seconds; 166 students met the requirement. (d) Bar cuts, a series of exercises requiring muscular strength and coordination; 160 students met the requirement. (e) Swimming, rescuing and restoring the apparently

drowned; 124 students met the requirement, by carrying a person simulating unconsciousness one length of the pool, 60 feet, and giving a satisfactory demonstration of artificial respiration and restoration.

NOTE.—The discrepancy between the total number of students registered in the department and those who qualified is due to the number of students who did special work (defectives, who are exempt), and the number of students who left school during the year, as well as to the number of students who failed in the tests.

Adjunctive features.—(1) Intramural sports: (a) "Soccer" football. The present year marked the introduction of "soccer" football at the University. An exhibition game was put on as a beginning of our taking up the sport. "Soccer" goals were later provided and nearly every afternoon during the rest of the autumn a considerable number of students played the game for recreation. Impromptu teams were organized out of the freshman gymnasium classes and several games were played during class hours. A University team was also organized and it played one game with the School of Agriculture team before the season closed. No interclass games were attempted as the sport was taken up too late in the season.

(b) Basket-ball. Three basket-ball tournaments were held during the winter: interclass, intercollege, and interfraternity. Team trophies were awarded the winners in each tournament. It is estimated that a total of more than 200 students participated in these tournaments.

(c) Baseball. An interfraternity baseball tournament was supervised in the spring. Practically all the academic fraternities participated. Owing to the grading of the Parade Ground in the spring, no interclass or intercollege games could be played.

(d) Swimming. An all-University swimming meet was conducted during the winter, about 50 students participating. The contest included an interfraternity relay swim, seven fraternities taking part. A handsome silver cup was awarded the winners.

(e) Gymnastic meets. Forty-seven students of the Leaders' Corps participated in the annual meet of the Northwestern Gymnastic Society held in the University Armory, March 23. Minnesota won second place with fourteen institutions competing. In the three previous annual meets of this society Minnesota won first place each year.

(2) Sigma Delta Psi. The Minnesota chapter of Sigma Delta Psi, the honorary athletic fraternity, was founded in January, 1913. The purpose of the fraternity is to stimulate an interest in all-round physical development among college students. The charter members of the local chapter are the President of the University and five members of the Faculty, including the Director of Physical Education for Men. During the second semester 61 students qualified in some of the events of either senior or junior grade. While none qualified in all the events, several candidates for each grade qualified in all but two or three, and they will, no doubt, complete the tests in 1913-14, and be awarded certificates, with the privilege of wearing the key or pin of their respective grades. The

creation of the Minnesota chapter was endorsed by the University Senate.

(3) Annual freshman-sophomore class contest. The annual freshman-sophomore class contest, or "scrap," was conducted early in October. The "tug of war" and the "talking match" were substituted for the cane rush and the boxing events. The wrestling events were retained. The "scrap" as revised is beyond all doubt an improvement over the old one. Interest in the contest has been increased by the presentation by the President of the University to the winning class of a handsome silver cup, which is to be contested for from year to year.

(4) All-University circus. At the urgent request of the Minnesota Union the Department of Physical Education for Men produced the all-University circus, which exhibited on Northrop Field under large tents, May 9-10, in three performances. Over 600 students participated in some way and the show was a pronounced success.

Recommendations.—With at least 1,500 students using the privileges of the department, all of whom are required to be physically examined as soon as possible at the beginning of the year, and some of them several times a year; and because of the conducting of the required course in hygiene and physical education for freshmen, which includes a variety of efficiency tests, the direction of individuals in corrective gymnastics, and the keeping of accurate records of students in these courses; as well as the immense amount of work entailed in the disease census of all new students, the special lecture on sex hygiene, and a variety of adjunctive departmental features such as intramural and intercollegiate athletics, etc., conducted on fields and in "quarters far from meeting the standard of the best institutions," it would seem that the recommendations proposed herein are of sufficient importance to demand urgent attention, inasmuch as they refer directly to the health of all men in the University. In view of the foregoing we therefore recommend the following:

(1) That the departments of Physical Education for Men and Athletics be combined under one head.

(2) (a) That increased facilities be provided for the promotion of intramural sports, in grounds and equipment; (b) that more tennis courts be provided; (c) that a care-taker and custodian of tennis courts be appointed; (d) that an instructor and assistant instructor of intramural sports be appointed; (e) that two baseball fields be laid out on the newly graded Parade Ground.

(3) That the next legislature be requested to make an appropriation for a gymnasium for men in the University of Minnesota.

(4) That positive credit be allowed for required work in Hygiene and Physical Education, given on the basis of laboratory work, two hours for one.

NOTE.—It is suggested that credits for Hygiene and Physical Education be *added* to the total number of credits required for graduation.

(5) That freshmen in all colleges and schools in the University be required to pursue the course in Physical Education twice a week through-

out the year. (The present scheme includes only freshman Academic, Pre-Legal, and Pre-Medic students and Analytical Chemists.)

(6) That sophomores in all colleges and schools in the University be required to pursue the course in Physical Education twice a week indoors from December 1 to March 1 and, from the opening of the autumn semester until December 1, be required to participate in some form of prescribed outdoor exercise twice a week; the outdoor work to be resumed March 1, and continued until June 1.

NOTE.—It is proposed to classify the freshman work in Hygiene and Physical Education under Course B, and the sophomore work under Course A, and to allow a student who is physically fit (to be determined by a series of efficiency tests) to complete both courses in his freshman year. This scheme would require the physically unfit to pursue the course for two years.

(7) That students who are found, when examined, to have defective vision without corrective glasses, defective teeth, or other conditions tending to impair health, be required to have the defect remedied within a specified time, and report back to the department for verification.

(8) That a physical examination be required of each student in the School of Agriculture next year, and in following years of each student of the incoming class.

NOTE.—The urgent necessity of this requirement has been brought to the attention of this department by the fact that at least six of the Farm School students have fainted while taking Military Drill this year, and were referred to this department for emergency treatment. And further by the fact that several Farm School students petitioning to be excused from Military Drill were found to have organic heart trouble or other serious physical defects. No doubt there are students in the Farm School who regularly participate in drill, athletics, and gymnastics, and are unconsciously taking grave risks of serious impairment of health because of some organic defect. It is a fact well known among physical educators that between two and three per cent of college students have organically deranged hearts.

(9) That such additions be made to the staff of the Department of Physical Education for Men as will relieve to a reasonable degree the present over-worked officers and more fully meet the needs of the students as comprehended by the director of the department.

Respectfully submitted,

L. J. COOKE, *Director*

DEPARTMENT OF PHYSICAL EDUCATION FOR WOMEN

To the President of the University:

SIR: I have the honor to present a report of the Department of Physical Education for Women for the year ending July 31, 1913.

Administration.—In the reorganization of the Department of Physical Education for Women which was begun in 1912-13 the maintenance and improvement of the health of the young women of the University was made the center of the scheme. This end has been sought by means of (1) physical examinations and individual consultations with students, (2) courses in hygiene to enable the students to understand their physical needs and to live accordingly, (3) carefully adapted courses in exercise to aid in their physical upbuilding, (4) coöperation with the Women's Athletic Association in order that the girls' ambition for contests, class numerals, and University emblems might be utilized to increase their interest in taking exercise.

(1) (a) Physical examinations were given to (1) all newly entering students, approximately 400, of whom 365 were examined before college opened; this was made possible by the aid of an auxiliary staff of three women physicians; as a result of these examinations the students were graded as to physical condition and those who were found otherwise than in excellent condition were required to enroll in classes of carefully adapted physical exercise; many students were called in later for more detailed advice than could be given at the time of examination; (2) all students who wished to play basket-ball; (3) students who were petitioning the Committee on Students' Work for reduced or expanded programs; (4) most of the girl students at the Farm School; (5) reëxamination was made in the spring of all students in the required physical training classes.

(b) Individual consultations were given to (1) most upperclass women, for whom this consultation, combined with the previous physical examination card as a basis of information, took the place of the routine physical examination; (2) all students who desired to visit the department office at the regular daily office hours; these consultations gradually increased in frequency and gave opportunity for much good advice regarding habit hygiene; frequently, on the other hand, the student was referred to a physician in general practice or to a specialist for further examination as the result of the interview.

(c) Cases of illness were investigated at Sanford Hall and some of the boarding houses. These cases demonstrated the need of a resident nurse at Sanford and a visiting nurse for the boarding houses.

(2) Courses in Hygiene. (a) The freshmen, divided into sections

of 50 each, attended a course of 24 lectures in personal hygiene, illustrated by models of the human body, the use of which was kindly arranged by the Director of the Department of Anatomy; the lectures covered such subjects as the care of the skin, of the digestive system, of the nervous system, of the reproductive system, and the avoidance of contagious diseases. (b) A course of five lectures on subjects related to sex hygiene was given to women of the senior class in the spring. (c) A course of three lectures was given at the School for Nurses.

(3) Exercise. (a) Carefully adapted exercise was required of all freshmen who at the time of their physical examination were found to be otherwise than in excellent condition; 140 took regular class work, 30 did outside prescribed work and made weekly reports; it was impossible to require class work of all of the Agricultural College students on account of program conflicts. The class work was carried on out doors on Northrop Field in suitable weather in the fall and spring. (b) Elective classes were organized in gymnastic dancing, swimming, horseback riding, basket-ball, hockey, tennis, skating, and baseball. About 200 girls participated.

(4) The Department has worked in close coöperation with the Women's Athletic Association in arranging for rational contests in basket-ball, swimming, skating, and tennis, and in helping the association to remodel its constitution and its rules governing emblems. In basket-ball many changes were made, including a change from modified men's rules to women's rules. The final contests were put on a basis which controlled over-exertion and which offered opportunity for many girls to take part. About 100 girls participated in the various contests of the Women's Athletic Association.

Changes during the year.—(1) Three new courses were adopted to begin the year 1913-14. Course 2, Advanced Physical Training, carrying one and one-half credits a semester, Course 4, Personal Hygiene, carrying two credits a semester, Course 5, Hygiene of the Family, carrying three credits a semester; Course 2 should stimulate continued interest in regular exercise among students who had always thought they were too busy with study to devote time to it; Courses 4 and 5 will give an opportunity which should be available for every college woman, that of learning how to take proper care of herself and her children.

(2) A trained nurse was appointed in the spring to the duties involved in personally supervising the health of the girls at Sanford Hall and of assisting in the same way in the boarding houses. This should help simplify the problem of maintaining the health of out-of-town students.

Building and equipment.—During the winter the legislature voted to appropriate \$125,000 for the building and equipment of a new gymnasium for women. The space behind Shevlin Hall was determined upon for a location. Consideration of plans was begun almost immediately.

Officers employed.—The work of this department has been carried on by a director, one assistant, a gymnasium matron, and six hours a week of the time of two students.

Sanitary inspection of boarding houses.—This work, which was included in the plans of reorganization of this department, could not be carried out on account of the limited staff of the department.

Future plans.—(1) The organization of a system of sanitary inspection of boarding houses, using part of the time of the nurse at Sanford Hall for this purpose. (2) The organization of a system of undergraduate health records on which will be recorded, semester by semester, all pertinent information relating to the student's health; her progress through college in its relation to her physical condition can thus be seen at a glance; these records should be valuable in giving information, when needed, to Faculty Administrative Committees. (3) An expansion of the work of keeping in touch with the health and hygiene habits of the women students, by the requiring of filling in of forms periodically. In case of freshmen who are taking physical training this will be done each week, and from time to time individual or class talks will be given for the purpose of bringing about an improvement in health habits; permanent record will be kept of pertinent information. (4) The employment of a trained clerk on half time.

Recommendations.—(1) The requirement that girls who are allowed to carry less than the required number of credit hours for reasons connected with health shall follow out the directions of this department in regard to health; at present there is no obligation on their part to cooperate with any University authority in an effort to build up their physical condition and thereby remove the cause for special reduction of their program. (2) An identical requirement in Physical Training for the women of all colleges and departments after the completion of the new gymnasium.

Respectfully submitted,

J. ANNA NORRIS, *Director*

THE MILITARY DEPARTMENT

To the President of the University:

SIR: I have the honor to submit the following report of the Military Department for the year ending July 31, 1913.

Registration.—A total of 1,090 students were registered for drill during the year, distributed among the different colleges as follows:

College of Science, Literature, and the Arts.....	409
College of Engineering.....	214
College of Agriculture.....	105
School of Agriculture.....	321
School of Chemistry.....	41

Total 1,090

Camps.—The annual encampments were held at Fort Snelling, Minn., the University Camp from September 10 to September 16, 1913, the School of Agriculture from October 2 to October 7, 1913; 192 students attended the former, 98 the latter.

Instruction.—All companies became fairly proficient in close and extended order drill and the ceremonies. One manœuvre illustrating the principles of attack and defense was held on the University campus in which all took part. The theory of outposts advance and rear guards, patrols, etc., was covered in lectures by the Commandant and Cadet Colonel and illustrated on the strategic relief map. The students who attended camp received practical instruction in these subjects. Instruction in guard duty was given to the sophomore companies.

Target practice.—Instruction in rifle shooting was given on the Fort Snelling range during camp and during the fall and spring on specified days. Special effort was made to secure proficiency among the greatest possible number rather than to develop expert teams. Under the rules of the National Rifle Association four men were qualified as expert riflemen, six as sharpshooters and 103 as marksmen, the number in each grade being greater than the total for all the other colleges in the United States combined. This very creditable showing is due largely to the untiring efforts and enthusiasm of Cadet Major Charles B. Rydell and places the University of Minnesota in a class by itself in this very important branch of military instruction. In competitive shooting the outdoor team won sixth place among the colleges of the country, the indoor team secured third place in the western league. Cadet Lieutenant E. Rollman won the individual competition.

Annual inspection.—The annual inspection for the War Department was made on May 19 by Captain W. H. Raymond, General Staff, U.S.A.

A heavy rainfall made it impossible for the Cadet Corps to demonstrate its efficiency in outdoor work to which the most attention had been devoted. No serious criticisms were made except as to the condition of rifles and uniforms. Steps have been taken to correct these deficiencies in the future.

Recommendations.—The most urgent need of this department is a large up-to-date armory, the present one having been constructed for a small battalion only. The law should be complied with by requiring all men to take the prescribed amount of military training as the present exemption of certain colleges creates dissatisfaction among the others.

Respectfully submitted,

J. B. WOOLNOUGH, *First Lieut. 21st U.S. Infantry,*
Commandant of Cadets

THE GEOLOGICAL SURVEY

To the President of the University:

SIR: I submit herewith my report as Director for the year ended July 31, 1913.

Organization.—The Minnesota Geological Survey was allotted \$13,000 for the biennial period begun August 1, 1911, and \$13,000 for the biennial period begun August 1, 1913. The Director assumed his duties September 15, 1911, near the close of the field season for geologic work, and no field studies were attempted until 1912. Two seasons' work have now been completed, for which the total expenditures are about \$12,900. In 1912 certain regulations were proposed by the Survey and adopted by the Regents, forbidding the Director and all members of the Survey to act as agents in the transfer of mineral lands in Minnesota, or to accept fees for expert advice relating to property within the State. These regulations have been rigidly observed and the advantage accruing to the State because of them has been apparent in many instances. Valuable information obtained by individuals at great cost has been given freely to the Survey in connection with the several investigations that it has undertaken. In no case has any information requested been withheld. The Survey takes this opportunity to acknowledge gratefully the many courtesies and hearty coöperation of the citizens in all of the areas where its investigations have been carried on.

Coöperation with the United States Survey.—Arrangements were made in March, 1912, for coöperation with the United States Geological Survey. According to this plan each organization is to share equally the cost of field work and publication of reports, but much of the field work is to be done by the geological staff of the University of Minnesota, and the publication and preparation of reports will fall chiefly to the Federal Survey. The responsibility and the credit for these reports are to be shared equally by the two bureaus, and the joint reports are so announced on the title pages. Parts of the editions will be announced as University publications in coöperation with the Federal Survey, and parts will be announced as United States Geological Survey publications in coöperation with the University. The advantages of this plan are obvious, for the funds available will go twice as far, and, moreover, the Minnesota Survey will have the advantage of the criticism of scientific specialists and of map and manuscript editors. This arrangement may be terminated when unsatisfactory to either bureau, and, when desirable, publications may be issued independently by the Minnesota Geological Survey.

Other coöperative arrangements.—Arrangements have been made also with the School of Mines Experiment Station and with the School of

Chemistry. Numerous burning tests of clays have been made at its testing works by officers of the Mines Experiment Station, and samples of water collected with a view to ascertaining its desirability as municipal supply, have been analyzed by the School of Chemistry. Numerous strength tests of clay products and of building and ornamental stones have been made by the College of Engineering. For several years the State Drainage Commission has coöperated with the United States Geological Survey in making topographic maps. The work has been done by the federal bureau, the two organizations sharing equally the expense. Although no formal arrangements were entered into by the Minnesota Geological Survey with the State Drainage Commission, Mr. George A. Ralph, the Chief Engineer, with generous interest in the geological work, requested the federal bureau to carry on its topographic work in the region of the Cuyuna Range in order that the topographic maps may be used as a basis for geological mapping of this range. A triangulation net has been extended over this region, and several quadrangles have been mapped in the area containing iron ores. Accurate topographic maps are the basis for nearly all substantial survey work of a regional character, whether biological, botanical, agricultural, or geological, and we can not urge too strongly the need for the financial support of the federal topographical work in Minnesota. The federal government offers to do this work and to pay half the cost, and no state can afford to let the opportunity pass. It is earnestly desired that the Legislature of 1914 will see fit to restore the appropriations supporting this work.

Field work.—During the field season, from about June 15 to September 15, 1913, the following geological work was undertaken in coöperation with the United States Geological Survey: (1) An investigation of the superficial formations and soils of northern Minnesota; field work completed; report in preparation. (2) Investigation of the occurrences and uses of clays in Minnesota; preliminary report submitted February, 1913; now in press. Final report in preparation. (3) A report on the structural and ornamental stones of Minnesota; field work completed; preliminary report in preparation. (4) Geology and iron ore deposits of the Cuyuna Range. (5) Occurrences of road materials of Minnesota. Work begun and carried on in connection with other work.

Other services.—In addition to the more comprehensive problems outlined above, inquiries were answered concerning the probability of obtaining artesian waters at several places, and numerous materials forwarded from various localities within the State were examined to determine their availability for various economic purposes. The Director visited several regions in order to plan more intelligently the future work of the Survey.

Detailed report of surveys.—(1) Professor Frank Leverett and Professor F. W. Sardeson were engaged in an investigation of the superficial formations and soils of northern Minnesota. The field work is completed and the report is in preparation. A map prepared by Professor Leverett will be of great service to land companies, colonists, and railroads. Arrangements will be made with the lithographers printing the map, so that

copies may be had in large quantities at cost of printing. This map should benefit particularly the owners of cut-over lands and farmers and settlers intending to purchase such lands with a view to bringing them into a state of cultivation. Incidentally this work will serve the more detailed investigations of the Division of Soils of the Department of Agriculture.

(2) Professor F. F. Grout was engaged in the earlier part of field season of 1913 in finishing the field work for the final report on the clays of Minnesota. This necessitated trips to widely separated regions, since the areas unfinished and newly discovered are scattered. Two weeks were spent in an investigation of clays along the Little Fork River. The latter part of the season Mr. Grout made a plane table survey of the granite outcrops in the central part of the State, east of the Mississippi River, for a report on structural and ornamental stones of Minnesota.

(3) Mr. Oliver Bowles was engaged during the field season of 1913 in field work and in the collection of data for a report on the structural and ornamental stones of Minnesota. Field work was begun about June 1 and ended September 16. Mr. Bowles visited limestone quarries in Goodhue, Dakota, Houston, Fillmore, Mower, Freeborn, and Steele counties; made a brief examination of the building stone resources along the Mesabi and Vermilion ranges; visited granite quarries in Todd, Morrison, Millelacs, and St. Louis counties, and the gabbros of Duluth and Two Harbors. The latter part of the field season was devoted to making a plane table map of the quarries and outcrops in the vicinity of St. Cloud in Stearns County, a detail map of the quarry workings in the west central part of St. Cloud township, and a description of quarries and undeveloped outcrops in Stearns County.

(4) Mr. A. W. Johnston was engaged in the study of the geology of the Cuyuna Range. The outcrops in Morrison, Crow Wing, Cass, Todd, and Aitkin counties were visited and all the mines of the district were studied. The records of exploration by drilling were gathered and studied in considerable detail. The iron-bearing area is large and the extensive data necessitate careful correlation. This work will be continued in 1914.

(5) Mr. E. K. Soper was engaged from August 22 to September 16, testing clays in the laboratory and investigating building stones in the southern part of the State.

Very respectfully,

W. H. EMMONS, *Director*

THE BOTANICAL SURVEY

To the President of the University:

SIR: I beg to submit the following report of the work of the Botanical Survey of Minnesota during the two years ending July 31, 1913.

Field work.—The field work of the summer of 1913 was essentially a continuation of the work done in 1911 and 1912, and along the lines set forth in the report of 1911-1912. The study of the *natural* reclamation of swamp and swamp lands was made a special feature of this summer's work. The study of the evolution of the swamp also required observations on the natural filling-in process of lakes, and the steps involved in the transition from bogs to marshes and marshes to meadows. The work was done by Professor Bergman with the assistance of Mr. Stallard and Mr. Folsom, and was carried on from the 20th of June to the 15th of September. With a view of obtaining the best generalizations on the work, widely separated regions of the State were chosen and surveyed, as follows: Ellsworth township in Meeker County; Star Lake and Dead Lake townships in Ottertail County; Hubert and Gull Lake townships in Crow Wing County; Deer Lake and Bass Lake townships and parts of adjoining townships in Itasca County; and Long Lake township in the northern part of St. Louis County.

Systematic readings of the factors that determine plant growth and their interrelations, such as temperature, water content of soil, humidity of the air, etc., were taken in all the stations visited. Samples of soils were secured for the purpose of determining the edaphic factors affecting plant growth and distribution. Floristic work was carried on along with the ecological work and a considerable number of the native and wild-growing introduced species was collected from the different localities. A full set of these has been deposited in the University herbarium. The purpose of this collection was to add to the knowledge of the occurrence, range, and distribution of the native and introduced plant species of the State. Over 450 vegetation maps, showing the natural plant formations of the five regions explored, were made for the purpose of comparison and correlation. Numerous meter quadrats were plotted for the accurate study of plant associations. The main object of the summer's work was, therefore, to broaden the scope of the work done on swamps during the two preceding years and to correlate it with the results previously obtained. A large amount of valuable material and data has been gathered which is being worked up. The details of the investigations, together with the maps, are to be published for distribution to the regions surveyed in the hope that the facts ascertained may prove of practical application in the respective areas.

Publications.—The publications of the Minnesota Botanical Survey for the year 1913 are: *Guide to Spring Flowers*, 3rd edition, enlarged and illustrated, *Guide to Autumn Flowers, Field and Garden*, illustrated, *Minnesota Botanical Studies*, Vol. 4, Part 3. During the past year over half the edition of 3,000 copies of *Minnesota Trees and Shrubs* has been distributed. A great proportion of these, as well as other bulletins and reports of the Survey, have been distributed among residents of the State, while some have gone to exchanges in this country and abroad, and an increasing number have been purchased by non-residents. The edition of *Minnesota Mushrooms* has been exhausted and requests are coming in daily, both from within and without the State. The present sale of reports approximates \$500 a year and could be materially increased if this seemed desirable. The mailing list of the Botanical Survey numbers about 1,000 entries, consisting of botanical institutions and teachers and investigators in botany and allied sciences. Of this number about 500 are distributed in the United States and an equal number are sent to 45 different foreign countries. The return in the way of publications and exchanges from these amounts to about 500 volumes and pamphlets each year. Of these about 50 are periodicals, exclusive of the experiment station reports received in exchange.

Recommendations.—For the coming biennium it is hoped to extend greatly the work of the classification survey in the belief that this method of taking a definite inventory of the plant possibilities is not only of the first importance in the regions not yet settled, but also of great value in the long-established farming regions of the State. For such work, \$5,000 a year would not seem to be extravagant and it is proposed that this amount be provided in accordance with the terms of the agricultural survey proposed by the College of Agriculture. In addition, an equal sum is needed to maintain the present work of publication and to care for the printing and distribution of the classification survey reports. This sum would also make it possible to continue the botanical investigations of the Survey which are not so immediately connected with the problems of agriculture and forestry, but are of fundamental nature and contribute sooner or later to these fields. Accordingly I wish to recommend that \$5,000 a year for the next biennium be provided for the work of the Survey and that, in addition, provision be made for the Survey to carry on in connection with the agricultural survey such work as is assigned to it as indicated above.

Respectfully submitted,

C. O. ROSENDAHL

In the absence of FREDERIC E. CLEMENTS, *State Botanist*

THE UNIVERSITY LIBRARY

To the President of the University:

SIR: I beg to submit herewith the report of the University Library for the year ending July 31, 1913.

Accessions.—There have been added to the University Library during the fiscal year 18,672 volumes. Of these 1,560 form a part of the Law library and 1,335, the Agricultural library. This represents a notable and very gratifying increase over any previous year. It must be remembered, however, that most of the institutions of our class began their library development earlier than we and have, in consequence, collections which far surpass ours in strength. From the table which follows, it will be seen that our library is smaller than that of any of the institutions which rank with ours in point of size or financial resource. In other words, the facilities of the University for investigational work are far below what they should be and graduate work in most lines is sadly hampered. If we can not offer adequate library facilities, it will be impossible to attract to or to retain in our faculty men of the type most necessary to the upbuilding of the University. To my personal knowledge we have lost during the last few years several men of large ability both as scholars

	Volumes in library	Volumes added 1912-13	Expended for books etc. 1912-13	Appro- priation, 1912-13	Staff	Total salary account
Brown.....	232,000	8,600	\$23,766	\$21,000	18	\$20,010
California*.....	259,737	21,231	36,538	33,950	36	41,650
Chicago.....	402,503	21,936	42,374	41,066	70	52,285
Columbia.....	516,774	26,223	37,548	.....	55	64,075
Cornell.....	423,570	13,870	28,000	28,000	28	27,500
Harvard.....	1,083,750	40,318	106,965	.....	116	99,745
Illinois.....	233,586	24,057	45,000	50,000	42	37,400
Indiana.....	91,591	4,550	9,975	.....	7	7,500
Iowa.....	103,000	8,039	13,680	15,000	9	10,040
Johns Hopkins.....	174,777	8,056	16,064	16,342	15	11,584
Kansas.....	86,235	4,121	10,000	15,000	14	8,190
Leland Stanford, Jr.....	221,720	16,530	42,658	38,645	24	26,010
Michigan.....	322,040	17,713	34,533	34,533	21	29,675
Minnesota.....	177,500	18,672	38,796	43,891	26	29,680
Missouri.....	118,617	8,139	15,000	15,000	13	11,000
Nebraska.....	105,451	5,451	16,000	17,090	13	11,000
Northwestern.....	93,402	5,051	8,083	8,150	10	8,750
North Dakota.....	48,647	4,257	5,628	5,600	11	5,320
Ohio.....	126,634	9,238	20,000	15,000	18	15,140
Pennsylvania.....	375,109	16,236	25,730	20,665	27	20,000
Princeton.....	355,897	18,150	17,243	17,000	50	16,700
South Dakota.....	23,000	2,000	4,000	3,000	2	2,350
Washington.....	52,614	4,310	9,800	12,000	6	8,640
Wisconsin†.....	204,000	11,500	31,306	32,000	19	24,220
Yale‡.....	1,000,000	33,099	27,674	.....	44	37,751

* Figures do not include Bancroft Library, and some department libraries.

† Not including State Historical Society in the same building.

‡ Not including Law School or other department libraries.

and as teachers, who have accepted other positions very largely on account of the better library facilities offered.

The libraries of the state institutions, and in fact all libraries which do not receive large gifts, are handicapped as against those of Princeton, Yale, and Columbia for example. This will be seen by an examination of the table which shows that for every book added, Princeton spent an average of \$.95; Yale, \$.83 and Columbia, \$1.42. Compare with this our own expense of \$2.07, that of Wisconsin of \$2.72, and Illinois of \$1.87. It is needless to say that there was no such difference in the cost of the books actually purchased. It is due solely to the large amount of books received by gift rather than by purchase. It is to be hoped that the time will come when our own alumni and friends will get into the habit of making large gifts to the Library, but in the meantime the handicap must be overcome by relatively larger appropriations.

The Library Building.—During the fall of 1912, we added to our stack capacity by erecting cheap wooden stacks in Rooms 203 and 206. Half of the latter room was separated by a partition and is used as a periodical reading room. In Room 203 have been placed the books in Religion, Philology, Science, including the society publications, the Useful Arts, the Fine Arts, Sociology and Anthropology. The relief is only temporary and in another year still further extension will be necessary. The congestion of space, much as it hampers effective service at the loan desk, is far less serious than the crowded condition of the reading room. It frequently happens that every seat in that room and in the periodical room is occupied and students are obliged to leave for want of a place to read. Every year the condition becomes worse and there is no possibility of adequate relief except in a new building. As a temporary expedient it may be possible to convert the present chapel into an undergraduate reading room, shelving there the books reserved for the large undergraduate courses. Such a plan would of course add considerably to the cost of administration, but it presents otherwise no very serious administrative problem. During the year considerable attention has been given to the decrease of the ever-present fire hazard. Fire extinguishers have been installed and during the next few months the electric wiring is to be, to a considerable extent, renewed and a system of automatic sprinklers installed. Too much emphasis can not be placed on the necessity for a new building. Without rehearsing the arguments contained in my last report, I can not refrain from asserting my belief that the Library can never do its proper work in the present building, however remodeled, and that until such a building is erected, the work of the University, in so far as that work is related to books, will be sadly hampered.

Reading room and loan desk.—Notwithstanding the fact that a considerable part of the reading in the large undergraduate courses in history is no longer being done in the reading room and is not included in the statistics of circulation, the totals for the year are larger than for any previous year.

The recorded use, which it must be remembered, is only that which

passes over the loan desk, for the past five years is given in the following table:

	Over night	Two weeks	Reading room	Total
1908-9	11,124	6,633	68,602	86,359
1909-10	12,576	8,653	83,308	104,537
1910-11	13,545	8,420	103,301	125,266
1911-12	16,143	9,856	119,404	145,403
1912-13	16,619	12,868	128,767	158,274

That these figures indicate a very considerable increase in the amount of reading done by our students, I feel quite sure and by so much it is a matter of gratification. I am inclined to doubt, however, if we are developing, as we should, the habit of reading. To have read as a task is perhaps better than never to have read at all but it is by far from being the ideal. No one can be said to be educated who has not learned to enjoy reading good books just because they are good books and not because they contain so many units of information. Something may be done to stimulate this love of reading by putting in the way of the students attractively printed and bound copies of interesting books. A constantly changing selection of such books is kept on a case in the reading room and, so far as one can judge, it has been of considerable value in stimulating the sort of miscellaneous reading which is most desirable. In the new Library Building we hope to have a room set aside and furnished like a gentleman's library where studying will be *streng verboten* and where reading for its own sake will be its only condition of use.

The catalogue.—The cataloguing staff, under the direction of Miss Sears, has been able during the past year to do little more than to catalogue the current accessions. The only progress that has been made in the recataloguing of that portion of the Library which dates from 1907 and before, has been the completion of French literature, of the Central Engineering collection, and of some further portions of the Law library. Of the older books in the main Library there yet remain uncatalogued those in Religion, in Science, in German, Italian, Spanish, the Classics, and the minor literatures. The college and departmental collections are still largely unrecorded except that in the libraries of Law, Medicine, Engineering, and Mines considerable progress has been made.

The central catalogue contains a record, within the limits stated, of the entire University Library, with the single exception of the Agricultural collection. No attempt has as yet been made to include this library in the central catalogue, but this should be done as soon as possible.

The following table exhibits the work of the year.

	Central catalogue	Departmental catalogue
Titles catalogued	7,806	2,242
Volumes catalogued	18,154	11,804
Printed cards added	21,460	7,118
Typewritten cards added	14,520	2,396
Printed shelf list cards	3,854	1,297
Typewritten shelf list cards	3,890	1,539
Total volumes recorded to date	126,623	

The Library of Congress depository catalogue has been kept constantly up-to-date and it has been enriched by the cards printed by Harvard University and the University of Chicago. The cards for dissertations printed by the University of Berlin have also been filed in the catalogue. We have as yet not had the funds to purchase and file the John Crerar Library cards, but this must be done within a few years. This union catalogue continues to demonstrate its usefulness, not only to the library staff, but to the University at large, and every year it is used more freely.

There is very urgent necessity for the increase in our cataloguing staff. The 1913-14 budget gives us one extra assistant but we should have at least five. With the increased appropriation for books, we shall hardly be able to do more than to keep up with our accessions and can not hope to reduce the bulk of uncatalogued books by any appreciable amount.

There are still thousands of books belonging to the institution which have only a very imperfect departmental record and in many cases even this is lacking. I find it frequently to be true that the department does not know what books it has and either orders other copies or goes without the examination of needed references. This condition will go on until there can be in one place a complete record of the resources of the University.

Binding.—Wherever possible, books purchased abroad are bound before they are shipped to us, a large saving being thereby effected. For example, a book of a certain size is bound for us in Paris at a cost of \$50, in Leipzig at \$.60, and at home at \$1.15.

During the year there have been bound, excluding books bound at the time of purchase, 4,299 volumes. Of these 264 were bound for the Law library and 70 for the Agricultural library.

The distribution of this binding as to material is as follows:

Material	Number	Cost
Cloth.....	2,327	\$1,707.32
Morocco.....	887	1,059.16
Cowhide, pigskin, sheep, etc.....	679	632.07
Boards.....	406	40.60
	4,299	\$3,439.15

On the whole the binding done under our contract has been satisfactory, but for many reasons it should be done more directly under the supervision of the Library and we should look forward to the time when we can have our own bindery.

Exchanges.—The appearance of the first numbers of the Research Publications and the publication of Bulletins of the Mining Experiment Station and of the Survey have made it possible to make a beginning of an exchange system. A general list of exchanging institutions has been prepared on cards, the record showing on the face, aside from the address,

the series sent to the institution and those received in return. On the back of the card is a brief notation of the correspondence. For each series, e.g., Series in Chemistry, there is a mailing list, also on cards, which carries a record of the date when each number of the series is dispatched. To administer adequately an exchange system requires the full time of a trained assistant and the salary expense would much more than be covered by the value of the exchange material received, but thus far we have not been able to assign any assistant to the work and it has had only such attention as can be given to it by the Librarian and his secretary. During the past year we have sent out to our correspondents Studies in Chemistry, No. 1, Studies in Economics, No. 1, Zoological Series, No. 5, Mining Experiment Station Bulletins, No. 1, Annual Report of the President, Biennial Report of the Board of Regents. There is a vast amount of very valuable publications which can be had almost for the asking and which will add very largely to the strength of our Library if we can only spend the time to conduct the necessary correspondence. Enough has already been done to demonstrate its usefulness and resources should be provided so that the work can be done systematically.

College and departmental libraries.—There has been no marked change in the status of these collections during the year. In October, 1912, the Library Committee of the Medical School voted almost unanimously to consolidate the medical collections, but the plan met with some opposition in the Executive Faculty of the School and was temporarily abandoned. Sentiment in favor of the action is steadily gaining ground and it is hoped that the consolidation may be effected during the coming year. The most notable event of the year was the gift by Dr. James E. Moore, subject to a life use, of his very valuable private library of Surgery. The Engineering School has effected a partial consolidation of its resources, but as yet the complete unification has not been accomplished. The fire which destroyed the School of Mines Building on February 14, 1913, damaged the library to the extent of about \$700. The books were at once removed to the Engineering Building and housed in the room under the Engineering library. Under the very efficient direction of Mr. Pulling, the Law library has made great progress, but it has been and is sadly hampered by insufficient funds. The library of the College of Pharmacy has been housed in an entirely adequate room in their remodeled building and the small Dental library has been shelved in a room adjoining the Dean's office. The library of the School of Chemistry has quite outgrown the capacity of the room assigned to it. In the new building now in process of erection, entirely adequate quarters are provided.

Respectfully submitted,

J. T. GEROULD, *Librarian*

THE ACADEMIC FRATERNITIES

To the President of the University:

SIR: I herewith submit my report as president of the Interfraternity Council for the year ending July 31, 1913.

Activities.—The work carried on by the Interfraternity Council during the two years of Professor Nicholson's highly successful and productive presidency was concerned primarily with the creation and organization of the Council and situations connected therewith. The work to which the Council gave most attention during 1912-1913 may be classified as follows: (1) Installation of uniform business methods; (2) the revision and the amending of the by-laws and constitution of the Council; (3) the clarification and definition of standards of pledging and initiation; (4) an investigation of moral conditions; (5) an investigation of self-support of fraternity men; (6) scholarship.

One of the difficulties which the Council has to meet each year is its changing composition. Very few of the academic representatives continue in office for more than one year. There seems to be no remedy at present for this condition. The office of representative is looked upon as carrying with it honor and recognition and is, therefore, given ordinarily to a member of the senior class, a man who has gained recognition and who is regarded as experienced and well-balanced. The result is that the group of men who gather each year, in many cases know little of the rules and traditions of the Council. Consequently progress in all directions must be made at considerable disadvantage. Nevertheless, during the academic year 1912-1913 many important steps were taken.

Installation of uniform business methods.—A card index system was installed and a uniform system adopted for reporting high-school pledgemen, university undergraduate pledgemen, students' grades, and various other matters, a separate series of cards being devised for each class of work. A vast amount of detail is involved in the office of president and it is only through the aid of such a system as now exists that it can be successfully handled.

New and important by-laws.—Very early in the year it became evident that it was desirable to revise and amend both the constitution and by-laws. In preparation for its work the committee appointed to do this made a careful study of the constitutions and by-laws of similar councils throughout the United States. Not only did this committee recommend modifications of by-laws already in existence, but the addition of some entirely new by-laws of extreme importance as follows: By-laws, Article II, Sections 2 and 3; Article III, Section 2. The first of these new by-laws provides that no undergraduate shall be initiated by any fraternity

unless at the time of initiation he is carrying at least eleven hours of work. The purpose of this by-law is to prevent fraternities from initiating men who are not entitled to be considered university students in a real sense. In times past one or two fraternities have initiated men who were carrying only one or two subjects at the University. This will be impossible in the future. The third by-law mentioned provides that each fraternity shall within three days after any man has been pledged place in the hands of the president of the Council a statement of the time when the man was pledged and his standing in the preparatory school which he is attending. The purpose of this by-law is, first, to do away with, as much as is possible, the necessity of fraternities bringing charges against one another in cases of illegal pledging. The president keeps on file a list of all eligible high-school men of the Twin Cities and compares the names reported to him as pledged with his official lists. The second purpose of this by-law is to lead fraternities to be exceedingly careful regarding the pledging of men.

Complete revision of constitution and by-laws.—A serious defect in the constitution and by-laws prior to the 1913 revision was the fact that clauses and regulations bearing upon the same fact or condition were scattered throughout the constitution and by-laws under different articles and sections. In the revised edition the material bearing upon one topic has been gathered together in one section, or, if this was impossible, cross references have been made. Headings, practically constituting an index, have been given to all the articles, and, in some instances, the more important phrases have been printed in heavy type. Although this task of revision may seem to be of less interest than some other phases of the year's work, it represents many weeks of long and arduous work and it will have an exceedingly important bearing upon the conduct of the Council and the observance of its laws in the future, a fact which is borne out by events which have transpired prior to the writing of this report. At the present time fraternities pledge high-school seniors in "full standing." In case this custom should be done away with, this by-law would necessarily be modified.

High school principals adopt uniform standards.—Up to the opening of last year there had been no definite standard established in the Twin Cities as to what constituted a high-school senior in full standing. As a result of agitation on the part of the Council, the high-school principals of both cities were led to adopt twenty-four credits as this standard.

Investigation of moral conditions.—As a result of public antifraternity criticism, the Council appointed a committee to investigate the moral conditions of the fraternities. The committee found that every academic fraternity has strict house rules against all forms of gambling and against drinking. It was the judgment of the committee that the moral tone of the fraternities, as well as that of the student body in general, has been on a far higher plane the last two or three years than ever before within their knowledge.

Annual expenditure and self-support among fraternity men.—The fol-

lowing are among the most important facts brought out by an investigation conducted with the aid of the fraternities to ascertain the average annual expenditure of fraternity men and the extent to which they are self-supporting. The investigation covered 365 young men scattered among nineteen fraternities. The average annual expenditure of fraternity men included in the report was \$528. Sixty-nine students out of the 365 cases were reported as spending more than \$600 per year. In only one fraternity was the *average* annual expenditure per man reported as exceeding \$600, it being in this case \$625. In five fraternities it was \$600; in others it was \$450 or less.

One hundred and seventy-three men, or nearly half the number, were earning their way through the University entirely or in part. Of this 173, 32 were earning their way entirely; 141 were earning their way in part. The average annual earnings of those earning their way entirely was \$675; of those earning their way in part was \$220. The men supporting themselves engage in a great variety of work. Some are night watchmen, chauffeurs, salesmen; others are employed in newspaper reporting, music, waiting on tables, farming, general stone-work, window decorating, real estate, lumbering, etc.

Scholarship.—Professor Nicholson, as chairman of the Committee on Students' Work, has for a number of years made studies of the relative standings of fraternity and non-fraternity students. His investigation for the year 1912-1913 showed that the average grade of the non-fraternity group of students lies somewhere between 80 and 83, whereas the average of the fraternity group varies approximately from 78 to 80. The method employed in determining these standings makes impracticable a closer average. The real question at issue is not whether the scholarship of the fraternity group is higher or lower than that of the non-fraternity group, but whether the men who are in the fraternities stand higher or lower in their studies than they would if they did not belong to fraternities. That the scholarship of the fraternities is improving seems to be well substantiated by the facts brought out in connection with the number of men eligible for initiation. No man can be initiated by any fraternity unless he is up in seventy-five per cent of his work at the time of his initiation. In November, 1912, out of a total of 147 candidates for initiation, 52 were not eligible, whereas in November, 1913, only 36 out of 145 were not eligible for initiation.

Systems for supervising studies.—Many of the fraternities have stringent rules applying to freshmen, framed for the specific purpose of compelling first-year men to give their first and most serious attention to their studies. There is not to my knowledge a single fraternity at our university which does not make some provision of this sort. In some fraternities the arrangements are of a general nature, including the selection of upperclassmen to tutor freshmen who are below in their studies. In other fraternities there are most stringent rules which forbid a freshman to be out more than two nights a week, and then only upon the approval of an upperclassman who acts as supervisor of the freshmen.

If a freshman is below grade in his studies he is denied the right to be out even these two nights. Systems for securing reports of grades are employed by most of the fraternities by which standings are secured from the different instructors each month and reported to the fraternities. In case a member of the fraternity is below in his work, the fraternity takes action and if necessary, very vigorous action, to compel him to attend to his studies.

Respectfully submitted,

F. H. SWIFT, *President*

THE GENERAL ALUMNI ASSOCIATION

To the President of the University:

SIR: I submit herewith the report of the General Alumni Association for the University year ending July 31, 1913.

Publications.—Since the last previous report the work of the Association has been going along in the usual manner, very few things calling for special mention. The *Minnesota Alumni Weekly*, our official publication, has been issued regularly, and, at the request of the University authorities, we issued early last January a special number devoted to setting forth the legislative needs of the University for the following biennium, together with a brief statement concerning the reasons for each specific request. A specially large edition of this number was issued and the material used was reprinted in pamphlet form for use with members of the legislature and others interested. An up-to-date Alumni Directory was also issued, and the major portion of the work of preparing material for a new edition of the *University Dictionary* was completed during the year.

Association of Alumni Secretaries.—At the call of the secretary of the Ohio State University Association, the secretary of our association assisted in organizing the national Association of Alumni Secretaries. The first meeting was held at Columbus, Ohio, at which some two dozen institutions were represented. Great enthusiasm was shown in this meeting and those who attended felt abundantly repaid for the expense and effort involved. The secretary of the Minnesota association was chosen president of the organization.

The following statistics bring the previous report up to date.

DEGREES GRANTED

Including those who received degrees on commencement day 1913, the University has conferred 10,379 degrees upon 9,389 persons—6,809 men and 2,580 women, as follows:

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS—

	Men	Women	Total
Bachelor of Arts	1,053	1,700	2,753
Master of Arts	176	136	312
Bachelor of Science	536	158	694
Master of Science	84	11	95
Bachelor of Literature	132	331	463
Master of Literature	10	11	21
Bachelor of Philosophy	4	6	10
Doctor of Philosophy	47	5	52
Doctor of Science	1	0	1

COLLEGE OF ENGINEERING AND THE MECHANIC ARTS—

Bachelor of Science	1	0	1
Bachelor of Civil Engineering	48	0	48
Civil Engineer	218	0	218
Bachelor of Mechanical Engineering	22	0	22
Mechanical Engineer	152	0	152
Bachelor of Electrical Engineering	23	0	23

Electrical Engineer	256	0	256
Bachelor of Architecture	5	0	5
Bachelor of Science (in Engineering)	100	0	100
COLLEGE OF AGRICULTURE—			
Bachelor of Agriculture	31	0	31
Bachelor of Science (in Agriculture)	87	0	87
Bachelor of Science (in Home Economics).....	0	62	62
Bachelor of Science (in Forestry)	59	0	59
Master of Forestry	2	0	2
Master of Industrial Pedagogics.....	1	0	1
Master of Agriculture	3	0	3
Master of Science in Agriculture	3	0	3
LAW SCHOOL—			
Bachelor of Laws	1,955	23	1,978
Master of Laws	202	8	210
Doctor of Civil Law	3	0	3
MEDICAL SCHOOL—			
Hamline—certificates	9	0	9
Bachelor of Medicine	8	1	9
Doctor of Medicine	1,002	58	1,060
Doctor of Medicine (Homeopathic)	78	15	93
Graduate in Nursing	0	12	12
COLLEGE OF DENTISTRY—			
Doctor of Dental Surgery	512	3	515
Doctor of Dental Medicine	206	4	210
COLLEGE OF PHARMACY—			
Bachelor of Pharmacy	106	13	119
Doctor of Pharmacy	69	6	75
Pharmaceutical Chemist	107	15	122
Master of Pharmacy	2	0	2
SCHOOL OF CHEMISTRY—			
Chemical Engineer	8	0	8
Bachelor of Science (in Chemistry).....	63	4	67
Bachelor of Science (in Chemical Engineering).....	10	0	10
Analytical Chemist	8	0	8
Bachelor of Science	8	0	8
SCHOOL OF MINES—			
Bachelor of Mining Engineering.....	6	0	6
Mining Engineer	10	0	10
Engineer of Mines	196	0	196
Metallurgical Engineer	4	0	4
COLLEGE OF EDUCATION—			
Bachelor of Arts (in Education)	39	131	170
Total degrees granted	7,666	2,713	10,379

Respectfully submitted,

E. B. JOHNSON, *Secretary*

REPORT OF THE REGISTRAR

To the President of the University:

SIR: I submit herewith a report on the work of the Registrar's office for the year ending July 31, 1913.

Entrance requirements.—While decided progress has been made toward securing uniformity in entrance requirements there are still three exceptions to the regulations recommended by the joint committee of high-school superintendents and the University authorities. (1) The College of Pharmacy does not require graduation from high school for admission; in fact, a student could enter that college with a preparation of not more than two years of high-school work. (2) The College of Dentistry, despite catalogue statements, has deemed it necessary to admit ninety candidates each year regardless of the *pass with credit* rule, basing the selection on mechanical ability, maturity, and general fitness. This standard is a flexible one and scholastically may be higher or lower than the eighty per cent standard depending upon the number of candidates and their average scholarship. High-school graduation is of course the minimum requirement for admission. (3) The School of Mines has no scholarship test for admission, nor does it recognize the major or minor requirements in the selection of entrance subjects. In view of the fact that the first year of the five-year course is similar to Academic work, it is quite likely that a number of students will enter upon this course with a view to transferring to some other department at the end of the year. The fact that the general question of entrance requirements with especial reference to the qualitative basis is still debated with vigor throughout the State seems to indicate that the present scheme will not be permanent. A historical sketch of the University entrance requirements as applied by the College of Science, Literature, and the Arts may be found in Volume 13, No. 6 of the *Alumni Weekly*; also in the proceedings of the M. E. A. for 1913.

Registration.—Table V (page 21) shows a comparison of the total registrations by colleges, schools, and departments for the years 1911-12 and 1912-13. The loss in the College of Science, Literature, and the Arts is undoubtedly due to the scholarship requirement for admission, as the greatest falling off is in the freshman class. While the Department of Agriculture shows an increase of 799, practically all of the gain is in the courses of sub-collegiate grade. The decrease in the Law School enrollment shows the effect of the requirement of two years of collegiate work for admission to regular courses; also the effect of discontinuing night classes. Many of the subjects heretofore offered in the evening school have been transferred to the Extension Division. The gain in the School of Chemistry is explained by the facts that the first year's work in the Arts and

Chemistry Course is quite similar to freshman Academic work, and that the *pass with credit* rule for admission was not in force in 1912-13. The increased interest in Evening Extension courses is shown by the gain of 492 in that department.

Table I (pages 17-19) shows the enrollment of students of collegiate grade. The totals for this group are the figures used in comparing Minnesota with other universities.

The diagram (page 16) shows the registration "curve" for a period of thirty years. This indicates clearly the differentiation between collegiate and non-collegiate enrollment, also the status of the Extension Division. Note that the maximum collegiate registration was reached in 1910-11.

Fees and deposits.—Every student is required to make a deposit of five dollars or more against which penalties for late registration, postoffice box rental, locker rental, excess breakage, etc., may be charged. During the past year it has been deemed necessary to have delinquent subscriptions to University publications charged to these accounts to insure payment. Upon the recommendation of the public examiner, a clerk has been put in charge of these deposit accounts, and also the book system of checking all fee payments with the accountant's office. It is hoped that the system will make it impossible for any student to leave the institution with unpaid subscriptions or petty charges behind him.

Editorial Department.—The efficiency of this department is seriously impaired by lack of proper organization due to insufficient appropriation. The work has grown so rapidly that it is impossible for one editor to handle it. A competent assistant should be secured at once at a salary not less than \$100.00 a month to act as executive head of the department in order that Miss Potter may devote her entire time to the research publications and book work for which she is especially fitted. The department has passed the experimental stage and should be strengthened at once to meet the ever-increasing demands made upon it.

Monthly report system.—The Colleges of Science, Literature, and the Arts, Engineering, Agriculture, Mines, Chemistry, and Education report all delinquent students to this office once in four weeks, the other colleges at stated intervals. Students are notified promptly of their standing and complete lists of those needing special attention are submitted to the Administrative Boards or Deans of the respective Colleges. This program not only makes it necessary for instructors to be in close touch with the work of their students, and keeps the delinquent warned against impending disaster, but makes it possible for the Registrar to answer definitely and promptly inquiries from parents and superintendents concerning the progress of those in whom they are interested.

Quarters.—Regardless of the fact that the office is considerably larger than it was two years ago, more room is needed for the Editorial Department, the mailing room, and for storage purposes. An office with separate divisions, or preferably separate offices, should be provided in the Editorial Department. Confusion is inevitable where editing, proofreading, telephoning, and conference are taking place simultaneously in one small office.

FINANCIAL REPORT

To the President of the University:

SIR: I submit herewith a report of the financial operations of the University of Minnesota covering the fiscal period ending July 31, 1913.

Some minor changes in the organization of the business office have been made since the last report, namely, the title of the position of Chief Clerk and Acting Purchasing Agent has been changed to Purchasing Officer. The classification and budget system have been combined under one head and the accounts kept in reconciliation.

The budget, including unexpended balances at the beginning of the year and also including special appropriations for buildings and equipment aggregated \$2,746,049. The receipts to be credited to the Support Fund were estimated at \$934,881; \$922,560 was appropriated to departments, leaving a reserve of \$12,321. The receipts developed that the estimates had been carefully made and the year closed with the reserve practically intact, and, together with a few minor savings by departments, \$13,399 was carried to the new budget.

On account of the large number of funds and the necessity of keeping the budget appropriations reconciled with the ledger balances, it has been found necessary to adopt a new form whereby we record in the budget, in addition to the requisitions, the order numbers and the invoices as received. This enables us at all times to determine the exact status of any account.

In the last report we gave the schedule of the time consumed in the payment of claims against the University, showing an average of fifty-eight days. With the coöperation of the State Auditor's office we have been able to reduce the time to approximately forty-five days but this is still unsatisfactory.

I desire to repeat the recommendation included in the last annual report, to apply for an amendment of the laws governing the payment of claims. I also desire to repeat my former recommendations with reference to amending the law relative to pay-rolls. It is a burden to the professors as well as to the business office to sign and secure approximately thirteen hundred signatures. It is a matter of form and of absolutely no value as a voucher.

In accordance with your instructions, the tables herewith given are but summaries of the year's business and additional tables and detailed statements will be given in the Biennial Report as required by law.

Respectfully submitted,

G. H. HAYES, *Comptroller*

TABLE I

RECAPITULATION OF ALL FUNDS

Balance August 1, 1912, Maintenance Funds...	\$237,892.70	
Receipts (not including transfers, etc.).....	1,568,473.44	
Balance August 1, 1912, Building and Equip- ment Funds	1,075,562.44	
Receipts, Building and Equipment Funds.....	611,051.77	
Balance and Sales, Agricultural Book Store...	18,713.05	
Dining Halls, etc.	130,822.01	
Total		\$3,642,515.41
Maintenance Expenditures	\$1,615,395.18	
Buildings and Equipment	900,922.48	
Expended for Books, etc., Agricultural Book Store	12,484.62	
Balance, Maintenance Funds	188,136.91	
Balance Building Funds	774,434.88	
Balance, Agricultural Book Store.....	6,228.43	
Dining Hall Receipts, etc., treated as Expendi- tures (the Dining Halls and Dormitories are not operated for profit. Charges for use of building, heat, light, etc., would more than ab- sorb balance)	130,822.01	
Adjustments. Deduction debits in excess of de- duction credits, to and from Maintenance Funds	2,834.05	
Building and Equipment Funds.....	11,256.85	
Total		\$3,642,515.41

TABLE II

CLASSIFICATION BY COMMODITY

	1911-12	1912-13	Increase	Decrease
Salaries	\$814,851.89	\$919,588.97	\$104,737.08	.....
Wages	142,329.88	147,202.93	4,873.05	.....
Miscellaneous Labor	36,070.39	85,531.00	49,460.61	.....
Fuel	72,728.55	78,886.37	6,157.82	.....
Electricity	7,609.03	7,495.72	.....	113.31
Gas	5,507.53	6,092.94	585.41	.....
Water	3,684.38	5,431.99	1,747.61	.....
Books	30,183.21	41,019.44	10,836.23	.....
Interest and Assessments	17,196.93	3,296.27	.....	13,900.66
Freight and Express	6,315.56	10,958.34	4,642.78	.....
Traveling Expenses	18,058.19	31,473.42	13,415.23	.....
Postage, Telegraph, and Telephone	11,200.55	14,926.48	3,725.93	.....
Publications and Bulletins	8,046.37	17,217.63	9,171.26	.....
Office Equipment, Stationery, and Printing	21,748.72	27,018.30	5,269.58	.....
Provisions	72,755.10	85,983.26	13,228.16	.....
Feed	18,626.56	19,351.29	724.73	.....
Household and Dormitories	16,529.66	5,318.55	.....	11,211.11
Supplies for Instruction	51,443.71	77,163.46	25,719.75	.....
Seeds and Plants	1,660.79	4,244.32	2,583.53	.....
Live Stock	11,871.08	12,239.40	368.32	.....

TABLE II—Continued

	1911-12	1912-13	Increase	Decrease
Scientific Instruments and Apparatus.....	20,952.82	67,980.62	47,027.80	.....
Furniture and Furnishings	9,456.33	90,086.59	80,630.26	.....
Tools, Implements, and Machinery	9,686.03	18,915.61	9,229.58	.....
Campus Extension and Tunnels.....	41,849.29	64,612.88	22,763.59	.....
Campus Maintenance	3,717.30	8,058.43	4,341.13	.....
Repairs	31,117.34	37,499.21	6,381.87	.....
New Buildings and Reconstruction	845,472.52	517,511.69	.....	327,960.83
Mechanical Equipment of Buildings.....	89,612.00	223,105.18	133,493.18	.....
Miscellaneous Supplies	20,973.93	21,502.23	528.30	.....
	<u>\$2,441,255.64</u>	<u>\$2,649,712.52</u>	<u>\$561,642.79</u>	<u>\$353,185.91</u>
Certificates of Indebtedness Redeemed	\$200,000.00			
Net Maintenance Expense	\$1,304,116.75	\$1,615,395.18		
Net Buildings and Equipment	1,001,522.25	900,922.48		
Dining Halls, etc.	135,616.64	133,394.86		
	<u>\$2,441,255.64</u>	<u>\$2,649,712.52</u>		

TABLE III

MAINTENANCE

FROM STATE: Balance August 1, 1912		\$237,892.70
<i>Standing Appropriations—</i>		
23-100 Mill Tax	\$281,514.65	
School of Mines Support.....	19,500.00	
Fruit Farm Investigation.....	4,500.00	
	<hr/>	\$305,514.65
<i>Annual Appropriations—</i>		
General Support	\$325,000.00	
Sundry Special Support.....	486,850.00	
	<hr/>	811,850.00
<i>Interest on Investments—</i>		
Swamp Land Interest.....	\$16,942.44	
Land Investments	12,338.20	
Interest on Bonds and Invest- ment	47,584.38	
	<hr/>	76,865.02
FROM FEDERAL GOVERNMENT:		
Nelson Fund	\$25,000.00	
Morrill Fund	25,000.00	
Hatch Fund	17,500.00	
Adams Fund	17,500.00	
	<hr/>	85,000.00
STUDENTS' FEES, SALES, ETC.:		
Tuition and Incidental Fees (net) .	\$189,778.93	
Sales from Farm Products	64,941.54	
Rents from Campus Houses	10,590.90	
Miscellaneous Income—Net	23,932.40	
	<hr/>	289,243.77
		<hr/>
Total available		\$1,806,366.14

TABLE III

MAINTENANCE

General University (administration, business management, care of buildings, heat and light)	\$209,350.76
Science, Literature, and the Arts.....	265,356.77
Engineering	87,256.46
Agriculture (including Substations)	469,198.76
Law	32,891.04
Medical { College \$133,690.23 {	212,140.70
{ Hospital, \$78,450.47 }	
Dentistry (\$14,147.19 Dental Infirmary).....	53,807.59
Pharmacy	13,829.47
Mines	40,198.65
Chemistry	43,176.10
Education	14,208.17
Extension	24,964.28
Summer Session	8,180.31
Graduate School	8,515.34
	<hr/>
Total Maintenance	\$1,483,074.40
Purchases from maintenance fund of items chargeable to inventory	132,320.78
	<hr/>
Maintenance as per summary.....	\$1,615,395.18
Difference between adjustments of debits and credits as shown in summary.....	2,834.05
 <i>Analysis of Balance:</i>	
Advance from 23-100 mill tax.....	\$100,000.00
Government funds received July 1, balance belonging to succeeding year.....	45,080.46
Bills payable, approximately.....	36,067.69
Unexpended balance	6,988.76
	<hr/>
	188,136.91
	<hr/>
	\$1,806,366.14

TABLE IV
SUMMARY OF MAINTENANCE FUNDS

	Balance August 1, 1912	Credits to Support Fund	Total	Debits to Support Fund	Balance July 31, 1913
1. Support Fund	\$136,500.22	\$1,337,418.69	\$1,473,918.91	\$1,390,560.24	\$83,358.67
2. Special University Support	48,380.06	245,886.76	294,266.82	253,541.32	40,725.50
3. Special University Repairs	14,834.19	44,398.26	59,232.45	56,596.78	2,635.67
4. Special Agriculture Support	30,985.74	111,382.26	142,368.00	121,796.46	20,571.54
5. Special Agriculture Repairs	3,822.11	13,812.28	17,634.39	16,126.21	1,508.18
6. Substation Support	3,370.38	204,238.31	207,608.69	168,271.34	39,337.35
Totals	\$237,892.70	\$1,957,136.56	\$2,195,029.26	\$2,006,892.35	\$188,136.91
Transfers and entries other than receipts credited to accounts .....	.....	\$388,663.12	.....	.....	.....
Transfers and entries other than expense charged to accounts .....	.....	.....	.....	\$391,497.17	.....
Net Receipts .....	.....	\$1,568,473.44	.....	.....	.....
Net Expenditures .....	.....	.....	.....	\$1,615,395.18	.....

TABLE V
SUMMARY OF BUILDING AND EQUIPMENT FUNDS

	Balance August 1, 1912	Credit to funds	Total	Debits to funds	Balance July 31, 1913
7. University Buildings	\$568,205.55	\$483,657.36	\$1,051,862.91	\$462,345.05	\$589,517.86
8. University Equipment	188,582.97	13,665.28	202,248.25	128,953.78	73,294.47
9. Agricultural Buildings	287,421.62	15,077.50	302,499.12	194,844.90	107,654.22
10. Agricultural Equipment	5,210.82	6,560.14	11,770.96	9,251.35	2,519.61
11. Crookston Buildings and Improvements....	423.54	42,000.00	42,423.54	41,713.83	709.71
12. Grand Rapids Buildings and Improvements..	3,345.37	.....	3,345.37	2,886.83	458.54
13. Morris Buildings and Improvements.....	22,372.57	50,091.49	72,464.06	72,183.59	280.47
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
Items other than expense charged to accounts....	\$1,075,562.44	\$611,051.77	\$1,686,614.21	\$912,179.33	\$774,434.88
	.....	.....	.....	11,256.85	.....
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	\$1,075,562.44	\$611,051.77	\$1,686,614.21	\$900,922.48	\$774,434.88
<i>Unclassified.</i>					
14. Educational Buildings .....	.....	\$14,500.00	\$14,500.00	.....	\$14,500.00
15. Agriculture Book Store	\$4,593.01	14,120.04	18,713.05	\$12,484.62	6,228.43
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
	\$4,593.01	\$28,620.04	\$33,213.05	\$12,484.62	\$20,728.43

Educational Building Funds were not carried into the above summary as the appropriations were not available until the succeeding year. The above amount was included in order for ledger reconciliation.

TABLE VI

DISTRIBUTION OF NET FEES, UNIVERSITY ONLY

	1911-12	1912-13
College of Science, Literature, and the Arts.....	\$43,762.40	\$47,716.82
College of Engineering	15,959.90	18,200.58
Medical School	22,338.00	22,682.32
School of Chemistry	3,638.25	4,899.30
School of Mines	4,676.75	4,861.96
College of Dentistry	35,053.17	35,952.16
Law School	17,207.84	12,529.19
College of Pharmacy	4,306.30	5,078.35
College of Education	1,836.50	2,306.32
Graduate School	1,080.85	1,592.87
General Deposits	6,569.54	7,508.14
Extension Division	300.00	7,314.53
Summer Session	7,017.40	7,466.22
P. O. Boxes, Summer School		51.40
Lockers, Summer School		10.15
Medicine, Summer School		352.50
Dentistry, Summer School		40.00
	<hr/>	<hr/>
	\$163,746.90	\$178,562.81

1911-12

The above includes fees credited to University Support Fund only. Collections of Economics Extension Fees credited to special funds amounting to \$2,626.10 were treated as miscellaneous receipts.

PUBLICATIONS OF THE FACULTIES, 1912-13

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

ANIMAL BIOLOGY

HAL DOWNEY, Ph.D., Assistant Professor of Comparative Histology

The Origin of Blood Platelets. *Folia Haematologica*, XV (1913), 25-58, 2 plates.

The Development of Histogenous Mast Cells of Adult Guinea Pig and Cat, and the Structure of the Histogenous Mast Cells of Man. *Folia Haematologica*, XVI (1913), 49-74, 1 plate.

The Granules of the Polymorphonuclear Leucocytes of *Amblystoma*, with a few Notes on the Spindle Cells and Erythrocytes of this Animal. *Anatomischer Anzeiger*, XLIV (1913), 309-22.

Reviews of all American haematological literature for *Folia Haematologica*. In connection with this work 110 papers were reviewed in 1912-13.

ASTRONOMY

FRANCIS P. LEAVENWORTH, M.A., Professor, Head of the Department of Astronomy

The Position of Nova Geminarum No. 2. *Astronomische Nachrichten*, CLXV (1913), 223-24.

BOTANY

FREDERIC EDWARD CLEMENTS, Ph.D., Professor, Head of the Department of Botany

Rocky Mountain Flowers (with E. S. Clements), illustrated with colored plates.

Guide to the Spring Flowers of Minnesota, Field and Garden (with C. O. Rosendahl and F. K. Butters), 3d edition, revised and illustrated, 70 pages. Minneapolis, The University of Minnesota, May, 1913.

Guide to the Autumn Flowers of Minnesota, Field and Garden (with C. O. Rosendahl and F. K. Butters), illustrated, 96 pages. Minneapolis, The University of Minnesota, June, 1913.

CARL OTTO ROSENDAHL, Ph.D., Professor of Botany

A Guide to the Spring Flowers of Minnesota, Field and Garden (with F. E. Clements and F. K. Butters), 3d edition, revised and illustrated, 70 pages. Minneapolis, The University of Minnesota, May, 1913.

A Guide to the Autumn Flowers of Minnesota, Field and Garden (with F. E. Clements and F. K. Butters), illustrated, 96 pages. Minneapolis, The University of Minnesota, June, 1913.

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HERBERT F. BERGMAN, B.S., Assistant Professor of Botany

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FREDERIC KING BUTTERS, B.S., B.A., Assistant Professor of Botany

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The Vegetation of the Selkirk Mountains. Appendix to book by Howard Palmer, "Mountaineering and Exploration in the Selkirks," about 12 pages. In press. G. P. Putnam's Sons.

EDITH SCHWARTZ CLEMENTS, Ph.D., Instructor in Botany

Rocky Mountain Flowers (with F. E. Clements), illustrated with colored plates.

COMPARATIVE PHILOLOGY

FREDERICK KLAEBER, Ph.D., Professor, Head of Department of Comparative Philology

The Later Genesis and other Old English and Old Saxon Texts relating to the Fall of Man, 69 pages. Heidelberg, Carl Winter's Universitaetsbuchhandlung, 1913.

Die christlichen Elemente im Beowulf, Part IV. *Anglia*, XXXVI (1912), 169-99.

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Reviews of

O. Behaghel, Heliand und Genesis, *Veiblatt zur Anglia*, XXIII (1912), 305-7; S. v. Gajsek, Milton und Caedmon, *Englische Studien*, XLV (1912), 314-16; Hubert Pierquin, Le Poème Anglo-Saxon de Beowulf, *Beiblatt zur Anglia*, XXIV (1913), 138-39; F. J. Snell, The Age of Alfred, *Englische Studien*, XLVI (1913), 287-90; Levin L. Schuecking, Beowulf, 10th edition, *Beiblatt zur Anglia*, XXIV (1913), 289-91; Selma Colliander, Der Parallelismus im Heliand, *Journal of English and Germanic Philology*, XII (1913), 471-75.

ECONOMICS AND POLITICAL SCIENCE

JOHN HENRY GRAY, Ph.D., Professor, Head of the Department of Economics and Political Science.

Suggestions to the Department on Regulation of Interstate and Municipal Utilities of the National Civic Federation, on Local Franchises in Relation to State Authority, 12 pages, pamphlet form, November, 1912.

Economic Knowledge and International Peace. *Proceedings Lake Mohonk Conference on International Arbitration, Eighteenth Annual Meeting*. Pamphlet form, May, 1912.

"Explanation" of Sections for a Model Utility Bill (1st revised draft), Department on Regulation of Interstate and Municipal Utilities of the National Civic Federation, 35 pages, pamphlet form, December, 1912.

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- Civic Federation Investigation. *Economic Review*, March, 1912.
- Local Franchises and State Authority. *Gas Record* (Chicago), II (1913).
- Governmental Price Regulation. *American Economic Review*, III (1913), Sup. No. 1.

EDWARD VAN DYKE ROBINSON, Ph.D., Professor of Economics

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- Schumacher, Weltwirtschaftliche Studien, *American Economic Review*, II (1912), 886-87; Brunhes, La Géographie Humaine, *American Economic Review*, III (1913), 364-65; Bogart, Financial History of Ohio, *Weltwirtschaftliches Archiv*, II (1913), 225-27; E. R. A. Seligman, Essays in Taxation, revised (8th edition), *National Municipal Review*, II (1913), 772; P. Clerget, Géographie Economique, *American Economic Review*, III (1913), 109-10; abstracts of articles on Economic Geography, *American Economic Review*, II (1912), 739-41, 981; III (1913), 217-18, 487-88, 750-51.

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CEPHAS DANIEL ALLIN, M.A., LL.B., Assistant Professor of Political Science

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J. FRANKLIN EBERSOLE, M.A., Assistant Professor of Economics and Political Science

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JEREMIAH S. YOUNG, Ph.D., Assistant Professor of Political Science

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RAYMOND V. PHELAN, Ph.D., Instructor, Extension Work in Economics Woman Labor and Moral Strength. *Westminster Review*, February, 1913, 215-18.

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CHARLES HERBERT PRESTON, B.A., Instructor, Extension Work in Economics, Extension Division.

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RICHARD BURTON, Ph.D., Professor, Head of the Department of English
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HARDIN CRAIG, Ph.D., Professor of English

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JOSEPH WARREN BEACH, Ph.D., Assistant Professor of English

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OSCAR W. FIRKINS, M.A., Assistant Professor of English

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WILLIAM HARVEY EMMONS, Ph.D., Professor, Head of the Department of Geology and Mineralogy

The Enrichment of Sulphide Ores (Bulletin 529, United States Geological Survey), 260 pages. Washington, United States Geological Survey, June, 1913.

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FRANK FITCH GROUT, M.S., Assistant Professor of Geology and Mineralogy

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EDWARD M. LEHNERTS, M.A., Assistant Professor of Geography
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HISTORY

FRANK MALOY ANDERSON, M.A., Professor, Chairman of the Department of
 History, 1912-13

A Forgotten Phase of the New England Opposition to the War of 1812. *Proceedings
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Lincoln, *ibid.*, XIX (1913), 176-77; Weill, France Sous la Monarchie Constitu-
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WILLIAM STEARNS DAVIS, Ph.D., Professor of History

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ALBERT BEEBE WHITE, Ph.D., Professor of History

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LATIN

JOHN EVENSON GRANRUD, Ph.D., Professor of Latin

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 Characteristics of Roman Art (with 10 illustrations). *Records of the Past*, XII (1913),
 7-13.

Roman Historical Reliefs (with 12 illustrations). *Records of the Past*, XII (1913),
 74-84.

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MATHEMATICS

GEORGE N. BAUER, Ph.D., Professor of Mathematics

Some Transcendental Curves and Numbers (co-author with H. L. Slobin). *Rendiconti
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WILLIAM HENRY BUSSEY, Ph.D., Assistant Professor of Mathematics

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ROYAL RUSS SHUMWAY, B.A., Assistant Professor of Mathematics

Reviews of

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HERMON LESTER SLOBIN, Ph.D., Instructor in Mathematics

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FREDERICK KUHLMANN, Ph.D., Professorial Lecturer in Philosophy and Psychology

A Revision of the Binet-Simon System for Measuring the Intelligence of Children. *Journal of Psycho-Asthenics*, XVI (1912), 1-41.

The Present Status of the Binet and Simon Tests of the Intelligence of Children. *Ibid.*, XVI (1912), 113-39.

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PHYSICS

HENRY A. ERIKSON, Ph.D., Assistant Professor of Physics

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ALOIS FRANCIS KOVARIK, Ph.D., Assistant Professor of Physics

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PAUL E. KLOPSTEG, B.S., Assistant in Physics

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RHETORIC

CHARLES WASHBURN NICHOLS, M.A., Assistant Professor of Rhetoric

Teaching Shakespeare to Engineers. *English Journal*, II (1913), 366-69.

FRANK M. RARIG, M.A., Assistant Professor of Rhetoric

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HALDOR B. GISLASON, B.A., LL.B., Instructor in Rhetoric

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RUTH SHEPARD PHELPS, M.A., Instructor in Italian

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SAMUEL GEORGE SMITH, Ph.D., LL.D., Professor, Head of the Department of Sociology and Anthropology

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ALBERT ERNEST JENKS, Ph.D., Professor of Anthropology

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Duckworth, Primitive Man, *ibid.*, 829-30; Sir Robert Stout and J. Logan Stout, New Zealand, *ibid.*, 830-31.

SAMUEL N. REEP, Ph.D., Assistant Professor of Sociology

Review of

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COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

FRANCIS CLINTON SHENEHON, C.E., Dean, and Professor of Civil Engineering

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**JOHN J. FLATHER, Ph.B., M.M.E., Professor of Mechanical Engineering,
Head of the Department of Mechanical Engineering**

- Mississippi River. *Minnesota Engineer*, XXI (1912), 1-21.
- High Dam Project. *Ibid.*, 52-62.
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FREDERIC HERBERT BASS, B.S., Professor of Municipal and Sanitary Engineering

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FRANKLIN WESLEY SPRINGER, E.E., Professor of Electrical Engineering

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WILLIAM THOMAS RYAN, E.E., Assistant Professor of Electrical Engineering

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OTTO S. ZELNER, B.S., Assistant Professor of Surveying

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JOHN V. MARTENIS, M.E., Assistant Professor of Mechanical Engineering

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CHARLES F. SHOOP, B.S., Assistant Professor of Experimental Engineering

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ADOLPH FREDERICK MEYER, C.E., Professorial Lecturer in Hydraulic Engineering

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DEPARTMENT OF AGRICULTURE

ALBERT FREDERICK WOODS, M.A., Dean and Director of the Department of Agriculture

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CONRAD G. SELVIG, M.A., Superintendent, Northwest School and Experiment Station, Crookston, Minnesota

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DEXTER D. MAYNE, Principal, School of Agriculture

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ANDREW BOSS, Professor of Agriculture, Chief of the Division of Agronomy and Farm Management

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ASHLEY V. STORM, M.A., Professor of Agricultural Education, Chief of the Division of Agricultural Education

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COATES PRESTON BULL, B.Agr., Associate Professor of Agronomy

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FRANCIS W. PECK, B.S. in Agr., Instructor in Farm Management

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AGRICULTURAL CHEMISTRY AND SOILS

ROSCOE WILFRED THATCHER, M.A., Professor of Agricultural Chemistry, Chief of the Division of Agricultural Chemistry

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