

Bulletin of The University of Minnesota

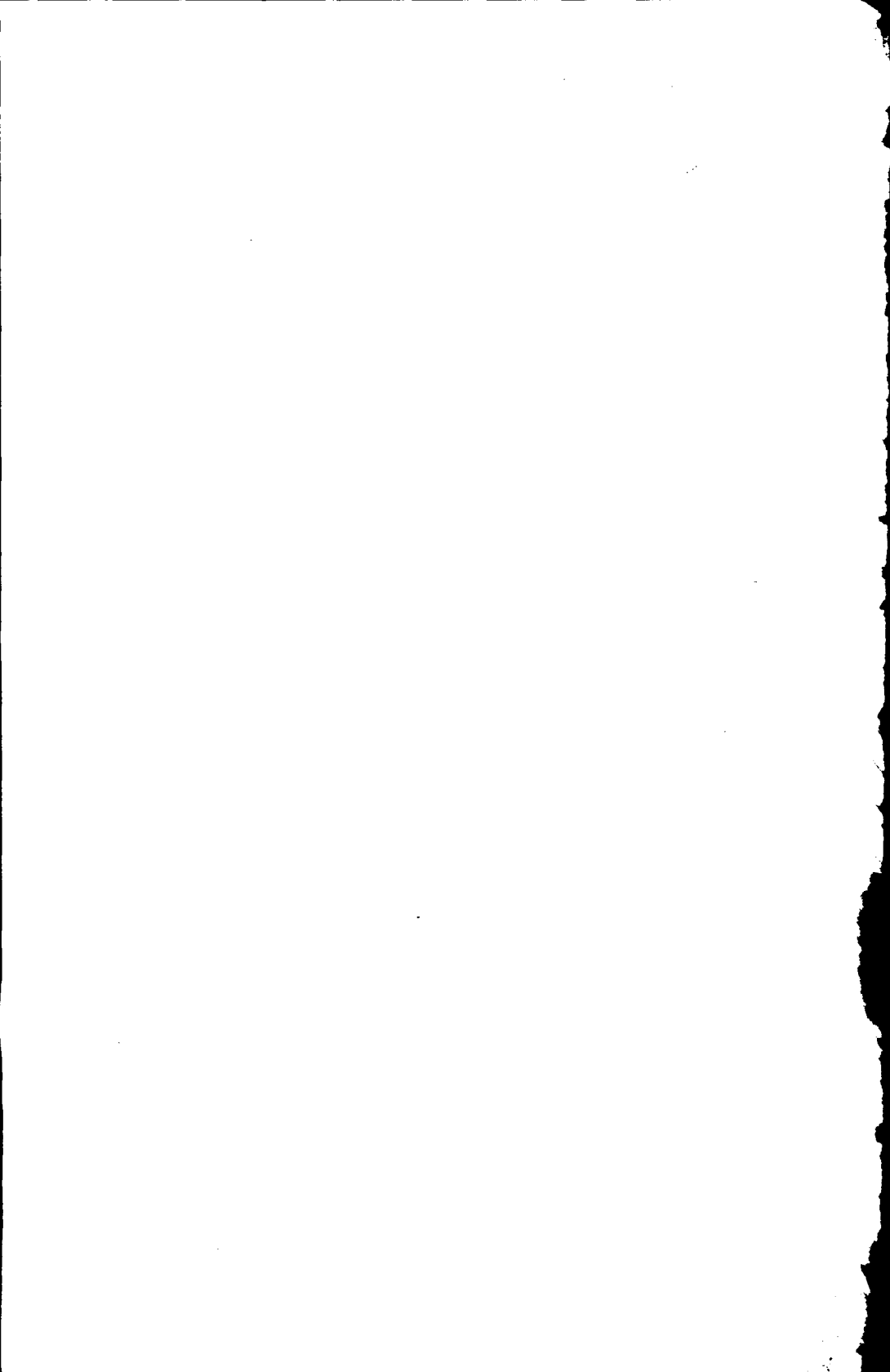
THE PRESIDENT'S REPORT

1913-1914



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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, 1914. In reporting changes in the personnel of the teaching staff, I include only men and women of professorial rank.

Resignations.—During the year the following men of professorial rank resigned from the faculty: Eldon R. James, Professor of Law in the Law School; Frank Malloy Anderson, Professor of History in the College of Science, Literature, and the Arts; Charles M. Andrist, Professor of French in the College of Science, Literature, and the Arts; E. A. Cook, Assistant Professor of Rhetoric in the College of Science, Literature, and the Arts; Samuel N. Reep, Assistant Professor of Sociology; C. C. Lipp, Assistant Professor in the Veterinary Division; John I. Parcel, Assistant Professor of Structural Engineering.

Retirements.—John F. Downey, having reached the age of sixty-eight years, was retired as Dean, Head of Department of Mathematics and Professor Emeritus in the College of Science, Literature, and the Arts. John G. Moore, having reached the age of sixty-five, and having signified his desire to be relieved of work, was retired as Professor and Head of the Department of German in the College of Science, Literature, and the Arts. Lettie M. Crafts, Assistant Librarian with the rank of Assistant Professor, was retired on the Carnegie Foundation, January 1, 1911. Through an oversight the retirement was not recorded in the annual report for that year.

Deaths.—John S. Clark, Professor of Latin, died September 6, 1913; Charles W. Benton, Professor of Romance Languages, November 11, 1913, and Dr. J. Clark Stewart, Associate Professor of Surgery, June 24, 1914.

Leaves of absence granted during the year.—Joseph M. Thomas and Charles W. Nichols of the Rhetoric Department, one year beginning August 1, 1914, on half pay. Ruth S. Phelps of the Department of Romance Languages, one year beginning August 1, 1914, without salary. Professor Norman Wilde for one year

beginning August 1, 1914, on half salary. Professor E. V. Robinson for one year beginning August 1, 1914, on half salary. Richard Burton for one year beginning August 1, 1914, on half pay. John J. Flather for one year beginning August 1, 1914, on half pay. Dr. H. E. Robertson for one year beginning August 1, 1914, on half pay. Charles F. Sidener from November 1, 1913, to September 1, 1914, on half pay. John Zeleny for the academic year 1914-15 on half pay. F. H. Scott for the first semester of the academic year 1914-15 on half pay. Mrs. Margaret J. Blair, sabbatical leave on half pay for the year beginning August 1, 1914. A. W. Johnston, Instructor in Geology, for the first semester of the academic year 1914-15 without salary.

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

John Black Johnston, Professor in the Department of Animal Biology in the College of Science, Literature, and the Arts, and Dean of that College.

Ph.B., 1893, Ph.D., 1899, University of Michigan; Assistant in Zoology and Instructor, University of Michigan, 1893-99; Professor of Zoology, West Virginia University, 1899-1907; Assistant Professor of Neurology, University of Minnesota, 1907.

Everett Ward Olmsted, Professor of Romance Languages and Head of the Department of Romance Languages.

Ph.B., 1891, Ph.D., 1897, Cornell University; Master of French, Cascadilla School, Ithaca, New York, 1891-93; Instructor in French, Cornell University, 1893-98; Assistant Professor of Romance Languages, Professor of Romance Languages, Cornell University, 1898-1914.

Ernest Gustav Lorenzen, Professor of Law in the Law School.

Ph.B., 1898, LL.B., 1899, Cornell University, J.U.D., Goettingen, 1901; Professor of Law, University of Maine, 1903-4; Professor of Law and Dean of the Law School, George Washington University, 1904-11; Professor of Law, University of Wisconsin, 1911-14.

Francis Jager, Professor of Apiculture and Apiculturist of the Experiment Station.

Colbert Searles, Professor of Romance Languages in the College of Science, Literature, and the Arts.

B.A., Wesleyan University, 1895, Ph.D., University of Leipzig, 1899; Instructor in Romance Languages, University of Indiana, 1899-1900; Associate Professor of English and Modern Languages, University of Arkansas, 1900-01; Assistant Professor and Associate Professor of Romance Languages, Leland Stanford Junior University, 1901-14.

Elmer Edgar Stoll, Professorial Lecturer in English in the College of Science, Literature, and the Arts.

B.A., Wooster University, 1893; B.A., 1895, M.A., 1896, Harvard; Ph.D., Munich, 1904; Instructor in English, Adelphi College, 1900-2; Instructor in English, Harvard, 1905-6; Assistant Professor of English, Western Reserve University, 1906-12.

Clinton Raymond Stauffer, Associate Professor of Geology.

B.Sc., 1903, M.A., 1906, Ohio State University; Ph.D., University of Chicago, 1909; Principal of High School, Cuyahoga Falls, Ohio, 1903-5; Instructor in Geology, Ohio State University, 1906-7; Fellow in Geology, University of Chicago, 1907-9; Instructor in Geology, Western Reserve University, 1909-10; Assistant Professor of Geology, Queens University (Canada), 1910-11; Associate Professor of Geology, Western Reserve University, 1911-14.

Thomas Barksdale Hutcheson, Associate Professor of Agronomy and Associate Agronomist of the Experiment Station.

B.S., 1906, M.C., 1908, Virginia Polytechnic Institute; M.S.A., Cornell University, 1913; Instructor, Assistant Agronomist and Associate Agronomist, Virginia Polytechnic Institute, 1906-13.

Wilbur H. Bender, Associate Professor of Agricultural Education.

B.Di., 1886, M.Di., 1890, Iowa State Normal School; Ph.B., State University of Iowa, 1895; B.S. in Agricultural Education, Iowa State College of Agriculture and Mechanic Arts, 1914; Teacher in rural schools, principal, and superintendent in graded and city schools, eight years; Director Department of Training in Teaching, Iowa State Teachers' College, sixteen and two-thirds years; Assistant Professor of Agricultural Education, Iowa State College of Agriculture and Mechanic Arts, one and one-third years.

Ross Aiken Gortner, Associate Professor of Soil Chemistry.

B.Sc., Nebraska Wesleyan University, 1907; M.A., University of Toronto, 1908; Ph.D., Columbia University, 1909; Research Assistant in Agricultural Chemistry, University of Nebraska, 1906-7; Assistant in Chemistry, Faculty of Arts, University of Toronto, 1907-8; University Fellow, Columbia University, 1908-9; Resident Investigator in Biological Chemistry at the Station for Experimental Evolution of The Carnegie Institution of Washington, September 1, 1909, to August 1, 1914.

Paul Henry Neystrom, Associate Professor of Economics in the General Extension Division.

Ph.B., 1909, Ph.M., 1910, Ph.D., 1914, University of Wisconsin; Public School work in Wisconsin, 1897-1908; District Representative and Instructor, University of Wisconsin Extension Division, 1909-10; District Representative and Assistant Professor of Political Economy, University of Wisconsin, 1910-14; on leave of absence from University of Wisconsin, 1913-14.

William Paul Kirkwood, Editor of Bulletins in the Department of Agriculture.

B.A., Macalaster College, 1890; Instructor in Mathematics, Macalester College, 1891-92; in charge of Special Course in Journalism, Macalester College, 1908-10.

Sidney F. Pattison, Assistant Professor in the Department of Rhetoric and Public Speaking.

B.A., University of Rochester, 1898; B.A., Williams College, 1899; M.A., Harvard, 1908; Instructor, Assistant Professor, and Professor of English, Colorado College, 1899-1909; Professor of English, Acadia College, 1909-12; Instructor in English, University of Utah, 1912-14.

Walter Raleigh Myers, Assistant Professor in the Department of German.

Ph.B., Northwestern University, 1903; Ph.D., University of Chicago, 1909; studied two years at the University of Berlin; Instructor in German, Elgin Academy of Northwestern University, 1904-5; Instructor in German, Oberlin College, Oberlin, Ohio, 1905-7; Assistant Professor and Associate Professor of German, Miami University, Oxford, Ohio, 1909-14.

J. Paul J. Williams, Assistant Professor of Structural Engineering in the College of Engineering.

B.S., 1898, M.S., 1899, C.E., 1908, University of Pennsylvania; Instructor in Structural Engineering, University of Pennsylvania, 1899-1901; Instructor in Structural Engineering, Swarthmore College, 1901-2; Instructor in Structural Engineering, University of California, 1904-6; Assistant Professor of Structural Engineering, Columbia University, 1910-13.

Peter John Olson, Assistant Professor of Agriculture.

B.S., North Dakota Agricultural College, 1910; M.S., University of Illinois, 1913; Instructor in Agricultural and Biological Science, "Putnam" High School, Alexandria, Minnesota, 1910-12.

William Foster Lusk, Assistant Professor of Agricultural Education.

Ph.B., University of Wisconsin, 1903; Superintendent City Schools, 1903-5 and 1911-13; Principal Teachers' Training School, St. Croix Falls, Wisconsin, 1905-7; Instructor in Physics and Agriculture, State Normal School, Stevens Point, Wisconsin, 1907-11.

Roger Sherman Mackintosh, Extension Horticulturist in the Division of Agricultural Extension.

B.Agr., University of Minnesota, 1902; M.S., Iowa Agricultural College, 1910; Assistant in Horticulture, Minnesota Experiment Station, 1896-1903; Professor of Horticulture and State Horticulturist, Alabama Polytechnic Institute, 1903-10; Instructor in Horticulture, Iowa

State College, 1909-10; Instructor in Horticulture, Pennsylvania State College, 1910-11; Instructor in Horticulture, Caledonia High School, Minnesota, 1911-14.

Robert Anderson Hall, Assistant Professor of Pharmacology.

B.A., 1905, Ph.D., 1907, University of Chicago; Assistant Professor of Chemistry, Armour Institute of Technology, 1907-8; Assistant Professor of Chemistry, South Carolina State Agricultural College, 1908-10; Associate Professor of Chemistry, University of North Carolina, 1910-12; Associate Professor of Chemistry, Washington University, 1912-13.

Soren P. Rees, Assistant Professor of Medicine.

B.S., 1895, M.D., 1897, University of Minnesota; Certificates University of Vienna (Medical), 1909; Instructor and Clinical Professor, University of Minnesota, 1895-1912.

Gerhard Adam Gesell, Assistant Professor in the General Extension Division.

B.A., University of Wisconsin, 1908; Debating Coach, University of Wisconsin, 1910; Municipal Reference Librarian and Assistant Professor of Public Speaking, University of Kansas, 1911-13.

Promotions.—H. E. Robertson from Associate Professor to Professor; R. E. Scammon from Associate Professor to Professor; W. H. Bussey from Assistant Professor to Associate Professor; G. M. Damon from Assistant Professor to Associate Professor; H. A. Erikson from Assistant Professor to Associate Professor; Edwin L. Newcomb from Assistant Professor to Associate Professor; Wallace Notestein from Assistant Professor to Associate Professor; A. G. Ruggles from Assistant Professor to Associate Professor; Clyde H. Bailey from Instructor to Assistant Professor; Emil S. Geist from Instructor to Assistant Professor; W. F. Holman from Instructor to Assistant Professor; G. N. Northrop from Instructor to Assistant Professor; F. B. Rowley from Instructor to Assistant Professor; Frederick W. Schlutz from Instructor to Assistant Professor; H. L. Slobin from Instructor to Assistant Professor; Anna H. Phelan from Instructor to Assistant Professor; A. A. Zierold from Instructor to Assistant Professor.

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 coöperation 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 coöperate 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 regulations have been adopted: "Self-supporting students over twenty-one years of age who declare an intention to reside in Minnesota shall be classified as resident members," and "all students under the age of twenty-one shall be considered as domiciled where their parents or guardians are domiciled. All students who are and for six months prior to the date of registration have been domiciled in Minnesota shall pay resident fees."

Codification of Regents' rules, etc.—Work upon a codification of the regulations adopted by the Board of Regents is progressing. It is proposed to print in connection with this code the laws of the United States and of the State of Minnesota which bear upon the status of the University.

New by-law concerning committee meetings.—The following has been adopted by the Board: "Whenever a meeting of any committee of the Board is duly called and one or more members of the committee, less than a quorum, meet, any member of the Board, not a regular member of the committee, may sit with the committee, and for the purpose of creating a quorum and transacting business, be deemed to be a member with all the powers of a regular member."

Coöperation with State Efficiency Commission.—At the request of this body the Board relieved Dr. E. Dana Durand, Director of the University Bureau of Statistics, from a part of

his teaching duties in order that his services might be put at the disposal of the Commission. The Regents regarded such coöperation as an appropriate service to the State and as falling within the scope of Dr. Durand's special competence and interest.

Natural History Advisory Committee.—A plan for organizing a committee to coöperate in the building up of the Natural History Collection of the University has been approved. It is hoped that a group of naturalists and hunters will be formed to aid in a general plan of making the University Museum completely representative of all sections of the State. It is also expected that many other regions will be drawn upon.

Offer of a hospital site.—The Regents offered to the commission in charge of the Hennepin County Tuberculosis Sanitarium, a site on the University Campus near the Elliot Hospital. After due consideration the commissioners decided that another location was more desirable.

Relation of moral character to admission and graduation.—The following regulations have been adopted by the Regents:

1. In admitting students from secondary schools the University assumes that certified graduates are of good moral character. Applicants from colleges and universities are required to present certificates of "honorable dismissal" or diplomas of graduation. The University will, however, when circumstances seem to warrant it, make special inquiries regarding a given applicant, and, if evidence of good moral character is insufficient, reserve the right to refuse him admission.

2. Convincing evidence that a student in the University has been guilty of serious misconduct involving moral turpitude, shall be sufficient reason for requiring him to withdraw from the University. Before such withdrawal is enforced, however, a student charged with such delinquency shall be first given a reasonable hearing before the faculty of the college or department in which he is registered.

3. The degrees of this University shall be conferred only upon students of good moral character; but no student shall be denied the privilege of graduation because of a lack of good moral character unless he shall first have been given a hearing before the faculty of the college or department from which he is seeking his graduation.

Regulations concerning private practice, etc.—After careful consideration by a joint committee of Regents and faculty members, the following regulations were recommended to the Board and duly adopted:

1. No full-time member of the faculty shall engage in any outside activity which substantially interferes with his regular university duties.

Such employment should contribute to his growth and efficiency in his special field of work.

2. No full-time member of the faculty shall receive from any outside source either an annual retaining fee or a regular salary unless the arrangement shall have been concurred in by the Board of Regents.

3. Any understandings now (June, 1914) existing between the University and members of the staff with reference to private practice shall be made a matter of record. This shall apply also to new members of the faculty when they join the University staff.

4. No member of the faculty who engages in consultation or other private practice shall use the official stationery of the University or give as a business address any building or department of the institution.

5. No member of the staff shall use University technical equipment for purposes of private practice without notice to the Comptroller and the payment of a reasonable fee for the privilege enjoyed. (See 9 and 10 below.)

6. While it is not possible to draw the line definitely between professional service of an expert or consultative character and routine professional work, the University is opposed to the entrance of University men into ordinary competition in the various professional fields.

7. No member of the faculty shall accept employment which shall bring him as an expert or in any other capacity into antagonism to the interests of the State of Minnesota.

8. Every member of the teaching staff who gives professional opinions must protect the University against the use of such opinions for advertising purposes. That is, when a member of the staff does work in a private capacity he must make it clear to those who employ him that his work is unofficial and that the name of the University is not in any way to be connected with the transaction.

9. No member of the faculty shall undertake for private persons or corporations tests, assays, chemical analyses, bacteriological examinations, et cetera, of a routine character and which involve the use of the University property, without notifying the Comptroller, by whom permits for the work will be issued. The faculty member to whom the permit is issued shall collect fees from those who receive the services, and account to the University, monthly, for its percentage of the fees as fixed in the list of prices mentioned in item 10 or in the permit.

10. It shall be the duty of the Comptroller to prepare in conference with the various departments concerned a list of prices for the different types of work which the University can undertake for private individuals or corporations, and the percentages which shall be paid to the University for the use of its equipment. In special cases not covered by the Comptroller's list, the price for the work to be done and the University's percentage shall be fixed in the permit authorizing the service.

Departmental organization.—On the recommendation of the College of Science, Literature, and the Arts, the Board approved regulations governing the administration of departments

organized on the so-called chairmanship plan. The rules require the members of a department to act as a group, holding regularly called meetings, keeping records of actions, etc., etc.

Graduate scholarships.—On the recommendation of the Dean of the Graduate School the Regents voted to establish graduate scholarships with free tuition for graduates of the following institutions of the State: Carleton College, Gustavus Adolphus College, Hamline University, Macalester College, St. Olaf College; and to the following colleges of the University: the College of Science, Literature, and the Arts, the College of Engineering and the Mechanic Arts, the College of Agriculture, the Medical School, the School of Mines, the School of Chemistry, the College of Education, the regulations governing the selection of scholars to be determined by the Executive Committee of the Graduate School.

EDUCATIONAL POLICIES

Medical School curriculum.—During the year 1913-14 important changes have been made in the Medical School course of study. Beginning with the second year a medical student will be permitted to make about one fifth of his work elective. He may either distribute these elective courses among departments or to some degree he may specialize in one field. A faculty committee on individual student programs will be a source of advice and guidance to students in making their plans for distribution of their work. It is believed that by making its curriculum more flexible the Medical School will be able to stimulate both students and faculty and better adapt its teaching to individual aptitudes and needs.

Teaching fellowships in the Medical School.—With the purpose of providing in the clinical departments well-trained, full-time assistants and research workers, and at the same time affording a basis for graduate teaching in the various specialties, the Medical School, with the approval of the Regents, has established a system of teaching fellowships. Each fellowship normally will be held for three years at a stipend of \$500 for the first year, \$750 for the second, and \$1,000 for the third. To be eligible for a first-year fellowship a candidate must, as a

general rule, have received his M.D. degree from an acceptable medical school and have served one year as an interne in a good hospital.

School of Public Health.—A plan, drawn up by a committee representing the Medical School, the College of Engineering, and the State Board of Public Health, was submitted to the Board and given general approval. While ultimately a special organization will be provided for this work, for the present, pending adequate budget provisions, it will be administered through the Medical School. The first aims of this organization are to correlate the health agencies of the University and to provide a curriculum for students who desire to fit themselves for Public Health Work. The coöperation of the State Board of Health will afford the best possible opportunities for practical field work.

Extension of the Dental Course to four years.—The Dental Faculty, having presented a general recommendation that under certain conditions a fourth year be added to the Dental Course, the Regents expressed themselves favorably disposed toward such a plan, provided a majority of the colleges in the Association of University Dental Colleges should decide to adopt a four-year course. It seems probable that this policy will be adopted in the early future. The additional expense will be almost, if not wholly, met by the increased revenue from tuition fees.

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 authorized the leasing of two farms to be put in charge of two students of the senior class in the College of Agriculture. These students were made wholly responsible for the management of these farms for the year. The granting of degrees was conditioned upon the successful completion of this work. 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 results for the first year were satisfactory and fully justified the experiment.

Entrance requirements.—By action of the University Senate, ratified by the various colleges, the entrance requirements have been so modified that any graduate of an accredited high school in Minnesota may be admitted, provided he offers certain specific entrance units which are prerequisite for continued work in some college of the University. This means that the requirement of better than an average passing grade has been abolished. From the point of view of the University alone the former standard seemed to have much in its favor. Records of the College of Science, Literature, and the Arts show that students who enter from the lower half of a high-school class have distinctly less chance of success in college than those who belong to the upper half of the secondary school group. In spite of the temptation to limit admission to a somewhat selected group, a majority of the Senate voted for the change, on the ground that the University could not honorably isolate itself from the high schools and the state system as a whole. If a gap exists it is the duty of the University to bear its share of responsibility by maintaining close relations with the high schools and by helping to increase the efficiency of the state educational system. The regulations now in force will continue to lay emphasis upon the importance of good work in high school. The schools are to be judged by the stronger rather than by the weaker students whom they send to the University. High-school graduates whose records raise serious questions as to success in college will be warned and their parents notified that they must not be confident of graduation for their sons or daughters.* Such applicants, however, will not be refused admission, nor if they insist upon coming, will they be in anyway discriminated against. Neither instructors nor fellow students will know that warnings have been given.

* Of the 707 new students who enrolled in the College of Science, Literature, and the Arts in September, 1914, 264 would have been refused admission under the old regulations. These 264 received the prescribed warning. In December, 1914, 38 freshmen were dismissed for poor scholarship. Of these 28 belonged to the "warned" group. In other words, 10.6% of the freshmen who had a high-school record below 80 were dropped; of the freshmen with a record above 80 only 1.35% were dropped. Thus it is obvious that freshmen with poor high-school records suffer by far more severely than they who have done well in the secondary school. It is also true, however, that many students who would have been, under former conditions, refused admission have shown their ability to carry University courses successfully.

THE TEACHING STAFF

Numbers of the teaching staff.—The table below shows the numbers of the faculty of each grade as of August 1, 1912, and August 1, 1914. The distribution into full-time and part-time groups is also indicated. It should be noted that this table includes all of the instructional force of the schools of agriculture. The increase in full-time teachers is 18 per cent. The decrease of 11.3 per cent in part-time teachers is due chiefly to the reorganization of the Medical School Faculty (see page 97). If extension instructors be excluded, the increase of teaching staff available for residence work is 15.4 per cent. This must further be reduced by the reduction in part-time teachers already mentioned. The decrease in the number of professors is due to the fact that on August 1, 1914, eight professors were on leave of absence, their places being taken by instructors on one-year appointments.

NUMBERS OF THE FACULTY OF EACH GRADE AS OF AUGUST 1, 1912, AND AUGUST 1, 1914

RANK	August 1, 1912			August 1, 1914		
	Full time	Part time	Total	Full time	Part time	Total
Deans and administrative officers	21	0	21	24	0	24
Professors	72	43	115	67	11	78
Associate professors	9	8	17	29	12	41
Assistant professors	76	18	94	79	28	107
Instructors	154	58	212	178	51	229
Assistants	4	44	68	34	35	69
Lecturers	20	23	23	0	22	22
Extension staff	14	0	14	26	12	38
Total	370	194	564	437	171	608

Ratio of teachers to students.—In the last biennial report it was shown that this ratio for Minnesota was approximately 1 to 16. Recent reports from other universities give the following figures: Wisconsin, 10.6; Illinois, 10.9; Michigan, 13.6; Missouri, 13.9. During the biennium Minnesota has made progress but the recent increase in the number of students threatens to restore the former ratio. For example, the College of Science, Literature, and the Arts had November 1, 1914, the equivalent of 2,200 students under instruction, 1,721 registered in the college and registrations from other colleges of the University

aggregating the equivalent of 479 full-time students. The teaching staff was 127. Even this number included 16 teaching assistants, all of whom did not have full responsibility for classes. Thus it is clear that in this, the largest college of the University, the ratio is, if anything, a little more than 16 students to 1 teacher. In the Department of Agriculture there has been an increase since 1912 of 27.7 per cent in the teaching corps, but up to November 1, 1914, there was for the same period a gain of 50 per cent in the number of students. It is to be remembered, however, that a good deal of the work for agricultural freshmen is provided by the College of Science, Literature, and the Arts.

Relation between buildings and teaching staff.—There is direct connection between full use of buildings and the size of the instructional force. By the subdivision of large classes and laboratory sections both recitation rooms and laboratories may be more completely utilized. Such subdivision demands an additional number of teachers. For example, large laboratories are very little used in the morning and often overcrowded in the afternoon. Just the reverse is true of recitation buildings. A larger teaching force would make it possible to use both types of buildings all day. This would reduce the demand for new buildings and would increase educational efficiency.

Private practice and outside incomes of teachers.—For the year 1912-1913 an inquiry was made concerning the earnings of University teachers from outside sources. Only full-time teachers were included in the inquiry. Sixty per cent of these persons earned incomes in addition to their University salaries. The average earnings from professional practice—legal, engineering, medical, surgical—were \$471.72 per man; from expert services in cases at law, \$311.96; from routine professional work—drafting, computing, blood-testing, etc.—\$74.58; from laboratory tests, analyses, etc., \$95.90; from literary work and lectures, \$254.66. Of the total earnings reported, namely, \$52,607.11, 38.6 per cent, or \$20,313.58, was received for work done during the vacation. Rules governing private practice by members of the Faculty were adopted by the Regents and are reported elsewhere (see page 9).

Average salaries for each grade.—The average salary for deans is \$4,954.17. The average salary for professors is \$3,-

089.24. This represents a gain of nearly two hundred dollars over the average of two years ago. The average for the associate professorship, a rank recently reestablished and carefully recruited, is \$2,672.22. The figures for the assistant professorship and the instructorship are respectively \$2,265 and \$1,318.17. The average for assistants is \$689.

THE STUDENTS

Distractions of social life.—Students of Minnesota are peculiarly subject to social distractions. The city environment contributes to this. Hundreds of students live at home, and continue neighborhood and family social life in addition to the new relations which they establish in the University. Many forms of public entertainment make constant appeal. In the autumn of 1913 the Committee on Student Affairs reported that there were 150 organizations of different kinds among the students. During October, 60 social functions were given; of these 35 were dancing parties. For November the figures were 70 affairs, of which 46 were dances. Of the 60 October entertainments 35 were under fraternity or sorority auspices; of the 70 November events 42 were conducted by these groups. These figures need interpretation because they may well be misleading. Among nearly 4,000 students there are obviously a great many distinct groups. Therefore, there might easily be several affairs every evening appealing to wholly different constituencies, and in a given month not overtaxing the time or energy of any one individual. As a matter of fact, however, it is probably true that a small number of students have more social life than is good for them, while the majority would profit by more frequent contact. The regulation of social life in a large university must be brought about through student public opinion rather than by faculty rules. The administration can at best control only such affairs as are given on university grounds or are of a public character. With hundreds of private houses open to informal student parties of many kinds, any attempt at university control could easily be evaded. There are signs that students themselves are coming to recognize the need of regulation. A Senate committee on which students are in a majority voted in May, 1914, that all strictly university functions, that is, those

which appeal to the whole community, may be held only on Friday or Saturday nights or on the eve of a holiday. It is to be hoped that this will be only the beginning of a policy of rational self-restraint. After all, negative regulation is largely ineffective. A university becomes truly a university only in the proportion that a positive interest in intellectual things relegates to their proper places the social and recreative features of college life.

The housing problem.—Nearly 150 women students (for the year 1914-15 this number will be increased to at least 225) are compelled to live in boarding-houses in the southeast district. These houses are inspected, agree to conform to certain regulations, and are for the most part well-conducted. But at best these quarters do not afford the most desirable environment for women students. As soon as it can be done additional dormitory space should be provided. In the meantime, a plan of cooperative housekeeping is being tried. At the suggestion of the Faculty Women's Club and with the efficient aid of that organization, a house at 113 Church Street has been opened, and is known as the *Elizabeth Northrop House*. Eleven students live in this house, which is owned by the University. Preference is given to women who are partially or wholly self-supporting or who are forced to economize carefully. At a cost of \$16 a month to each occupant room and board are provided. The University is partly paid for heat and receives besides a small monthly rent which rather more than covers the cost of repairs, etc. The plan has been so successful that it is proposed to extend it to include three other houses which will accommodate from 36 to 40 more students. It should be noted, however, that these houses are not strictly self-supporting. If a full charge were made for rent and heat, the cost would be considerably increased. The plan should be regarded as an extension of the dormitory system, not as an experiment in the actual cost of living.

The scholarship standard.—Reports show that the use of the University Library steadily increases; the fraternities within four years have brought their average standing almost up to the average for the non-fraternity group. The fact that so far as figures go the general average has slightly declined is to be regarded as evidence that the standard of requirements has been somewhat stiffened, not that it has been relaxed. It is the gen-

eral impression that there has been a gain in earnestness and in the spirit of work. The number of dismissals for poor scholarship is usually regarded as an evidence of a high standard of scholastic attainment. This test should be carefully examined. Dismissals may be merely mechanical and automatic. There is a difference between making work hard for students and making students work hard. Now and then there are teachers whose idea of raising the standard consists in assigning an excessive amount of reading, setting long papers, and giving examinations with catch questions. The number of such instructors is never large and they are soon eliminated from academic life. The teachers who get the most work out of their students are they who know how to kindle a genuine enthusiasm, how to arouse a zeal for study, how to challenge abilities, and to open up vistas of rewarding knowledge and ideals. More and more attention is being given to individual students. In the professional schools the faculties are in close contact with the relatively small student groups. In the College of Science, Literature, and the Arts a special committee is giving much time to administration. Members of this committee are relieved from a part of their teaching in order that they may devote a good deal of attention to individual students. The dismissal of students, therefore, is not a merely mechanical process, but rather a selective work, done intelligently and with patience and consideration.

Student self-government.—The development of student self-government during the biennium has been marked. The All-University Student Council, the Minnesota Union, the Woman's Self-Government Association, and several other groups have been active and successful. An agitation in behalf of the Honor System in examinations has already made progress and has been partially adopted. A Minnesota code has been published by the All-University Council. Training in community responsibility and loyalty, in the orderly conduct of public affairs, in leadership and the formation of public opinion should be afforded by our great universities. The old régime of faculty domination by threat and punishment must yield to a coöperation between teachers and students in creating a genuine self-directing community with a regularly constituted representative organization. The Senate committees, made up of both faculty and student members, give promise of success.

Health supervision.—Once more attention is called to the need of a thorough health organization for the University community. At present all entering students are subjected to physical examination and are required to attend lectures on personal and public hygiene. Departments of Physical Education for both men and women are maintained. Boarding-houses are subject to a measure of sanitary inspection by the University. A trained nurse is at the service of the women students. The State Board of Health coöperates promptly and effectively in cases of contagious disease. All these agencies should be unified and coördinated in a single effective health system for the institution as a whole. It is hoped that first steps, at least, in this movement may be taken during the coming biennium.

The Minnesota Union.—The last legislature made available as a Men's Building the old Chemistry Laboratory. This was vacated by the Chemistry Department early in July, 1914. Work was at once begun on the remodeling and equipping of the building as a Men's Club. This building, administered by the Minnesota Union, an organization of men students in the University, was turned over to that society in September. In addition to the restaurant, reading, study, committee, and game rooms have been provided. More than four hundred men are patronizing the restaurant daily. A student may board at the Minnesota Union at from \$3.50 to \$4.00 per week. This student club promises to meet a pressing need of the men of the University.

STATISTICS OF REGISTRATION

Registration—Table I shows the comparative enrollments of collegiate grade students for the years 1912-13 and 1913-14. This group includes only those departments in which the requirements for entrance include graduation from a four-year high-school course. While the College of Pharmacy is the exception to this rule its students are counted because practically all hold high-school diplomas. It is this group which should be kept most in mind in comparing Minnesota's enrollment with that of other universities.

The loss of twenty students in Science, Literature, and the Arts is insignificant. The gain in the College of Engineering is undoubtedly due to the increasing interest in Architecture. The

gain in Agriculture is consistent with the increase of previous years as all classes from freshman to senior show an advance. The decrease in Law still shows the cumulative effect of the increased entrance requirements coupled with the discontinuance of night classes. After 1915 the enrollment should show a steady increase. The Medical School's gain in freshman registration tallies exactly with its total loss of thirteen and is prophetic of a healthy growth from now on. The College of Dentistry has been filled to its capacity for some time and is compelled to limit its freshman registration to ninety. For the past three years qualified applicants have been refused admission for lack of room. The Pharmacy increase of twelve is entirely in the first-year group. The increase of thirty-six in the School of Mines may doubtless be explained in part by the absence of a scholarship requirement for entrance and the fact that the first-year course in Mines is not wholly different from other freshman courses where such a requirement is applied. The loss of twenty-six in the School of Chemistry may be explained by the application of the "pass with credit" rule in that department beginning September, 1913.

TABLE I. COLLEGIATE STUDENTS BY COLLEGES AND SCHOOLS, 1912-14

COLLEGE OR SCHOOL	1912-13			1913-14			GAIN	LCSS
	Men	Women	Total	Men	Women	Total		
SCIENCE, LITERATURE, AND THE ARTS:								
Seniors.....	90	186	276	65	189	254		
Juniors.....	82	216	298	111	189	300		
Sophomores.....	217	229	446	225	208	433		
Freshmen.....	284	260	544	254	251	505		
Unclassed.....	14	34	48	28	72	100		
Total.....	687	925	1,612	683	909	1,592		20
ENGINEERING AND THE MECHANIC ARTS:								
Post-Seniors.....	41		41	26		26		
Seniors.....	44		44	60		60		
Juniors.....	73		73	66		66		
Sophomores.....	77		77	114		114		
Freshmen.....	133		133	156		156		
Irregular.....	25		25	16		16		
Total.....	393		393	438		438	45	
AGRICULTURE:								
Graduates.....	11		11	29	1	30		
Seniors.....	36	18	54	49	27	76		
Juniors.....	46	23	69	51	42	93		
Sophomores.....	56	51	107	80	62	142		
Freshmen.....	83	86	169	121	68	189		
Special Students.....	10	7	17	16	10	26		
Total.....	242	185	427	346	210	556	129	

TABLE I—Continued

COLLEGE OR SCHOOL	1912-13			1913-14			Gain	Loss
	Men	Women	Total	Men	Women	Total		
LAW:								
Third-Year Day.....	56	2	58	26	1	27		
Second-Year Day.....	29	1	30	49		49		
First-Year Day.....	27		27	36		36		
First-Year Day (Academic Seniors).....	27	1	28	8		8		
Fourth-Year Night.....	8		8	11	1	12		
Third-Year Night.....	13	2	15					
Special Students.....	48		48	43		43		
Post-Graduates.....				1		1		
Total.....	208	6	214	174	2	176		38
MEDICAL:								
Graduate Students.....	11	1	12	6		6		
Sixth-Year.....	42	4	46	28	2	30		
Fifth-Year.....	32	2	34	38	1	39		
Fourth-Year.....	50	2	52	37	1	38		
Third-Year.....	50	2	52	62	3	65		
Unclassed Students.....				4	1	5		
Total.....	185	11	196	175	8	183		13
SCHOOL FOR NURSES.....		30	30		36	36	6	
DENTISTRY:								
Graduate Students.....				1	2	3		
Third-Year.....	62		62	78	3	81		
Second-Year.....	86	3	89	80		80		
First-Year.....	92		92	97	2	99		
Unclassed.....	11		11	12		12		
Total.....	251	3	254	268	7	275	21	
PHARMACY:								
Graduates.....	3		3	2		2		
Seniors.....	32	1	33	30	2	32		
Juniors.....	45	4	49	56	8	64		
Unclassed.....	1		1					
Total.....	81	5	86	88	10	98	12	
MINES:								
Seniors.....	11		11	9		9		
Juniors.....	7		7	19		19		
Sophomores.....	19		19	13		13		
Freshmen.....	20		20	27		27		
First-Year.....	37		37	62		62		
Total.....	94		94	130		130	36	
ANALYTICAL AND APPLIED CHEMISTRY:								
Post-Seniors.....	2		2	5		5		
Seniors.....	16	1	17	8	1	9		
Juniors.....	7		7	5		5		
Sophomores.....	11		11	20	3	23		
Freshmen.....	57	9	66	35		35		
Irregular Students.....	4	1	5	5		5		
Total.....	97	11	108	78	4	82		26
EDUCATION:								
Graduate Students.....	8		8					
Seniors.....	9	35	44	20	33	53		
Juniors.....	8	32	40	13	19	32		
Unclassed.....	4	8	12	4	23	27		
Total.....	29	75	104	37	75	112	8	
GRADUATE.....	114	69	183	117	49	166		17

TABLE I—Continued

COLLEGE OR SCHOOL	1912-1913			1913-1914			GAIN	LOS
	Men	Women	Total	Men	Women	Total		
SUMMER SESSION:								
College Section.....	204	290	494	260	278	538		
Agricultural.....	28	64	92	82	51	133		
Total.....	232	354	586	342	329	671	85	.....
General Totals.....	2,613	1,674	4,287	2,876	1,639	4,515	228	.....
Less duplicates.....	170	109	279	247	113	360	.....	81
Grand Total, less duplicates.....	2,443	1,565	4,008	2,629	1,526	4,155	147	.....

Table II shows comparative enrollment of sub-collegiate students for the years 1912-13 and 1913-14. The loss is one in figures only and not in fact. The Morris short-course enrollment was merged with the convention held at that time and no count was made.

TABLE II. SUB-COLLEGIATE STUDENTS, 1912-1914

SCHOOL	1912-13			1913-14			GAIN	LOSS
	Men	Women	Total	Men	Women	Total		
CENTRAL SCHOOL OF AGRICULTURE:								
Intermediate.....	13	4	17	14	8	22		
Seniors.....	140	69	209	105	58	163		
Juniors.....	164	83	247	178	100	278		
Freshmen.....	294	131	425	303	123	426		
Special Students.....				2	3	5		
Total.....	611	287	898	602	292	894		4
NORTHWEST SCHOOL OF AGRICULTURE.....	274	262	536	215	222	437		99
WEST CENTRAL SCHOOL OF AGRICULTURE.....	244	241	485	116	162	278		207
Total.....	518	503	1,021	331	384	715		306
Total, Schools.....	1129	790	1919	933	676	1609		310
SHORT COURSES:								
Traction Engineering..	37		37	37		37		
Teachers' Training School.....	69	784	853	64	795	859		
Dairy School.....	103		103	117		117		
Farmers' Short Course..	129	5	134	167	27	194		
Junior Short Course....	244	84	328	282	76	358		
Total.....	582	873	1,455	667	898	1,565	110	.....
SHORT COURSE FOR EMBALMERS.....				35		35	35	.....
Total, sub-collegiate students.....	1,711	1,663	3,374	1,635	1,574	3,209		165

Table III shows the remarkable gain of 806 in the Extension Division.

TABLE III. EXTENSION STUDENTS, 1912-1914

COURSES	1912-13			1913-14			GAIN	Loss
	Men	Women	Total	Men	Women	Total		
General.....	509	259	768	1,158	394	1,552		
Correspondence.....	34	20	54	37	39	76		
Total.....	543	279	822	1,195	433	1,628	806	.....

Table IV gives the summary for the entire institution. In giving the total enrollment care should be taken to differentiate the three groups, collegiate, sub-collegiate and extension. The third group is composed of both collegiate and sub-collegiate students but as the entrance requirements of this division are not stated in terms of scholastic preparation all of its students are listed under one caption.

TABLE IV. SUMMARY, 1912-1914

DIVISION	1912-13			1913-14			GAIN	Loss
	Men	Women	Total	Men	Women	Total		
Collegiate Students.....	2,443	1,563	4,008	2,633	1,522	4,155	147	.....
Sub-collegiate Students.....	1,711	1,663	3,374	1,635	1,574	3,209	.....	165
Extension Students.....	543	279	822	1,195	433	1,628	806	.....
Grand Total.....	4,697	3,505	8,204	5,463	3,529	8,992	788	.....

Table V is a recapitulation of Tables I, II, III and IV.

TABLE V. COMPARATIVE REGISTRATION FIGURES, 1912-14

COLLEGE	1912-13			1913-14			GAIN		Loss	
	Men	Women	Total	Men	Women	Total	Men	Women	Men	Women
Science, Literature, and the Arts.....	687	925	1,612	683	909	1,592	.....	.....	4	16
Engineering and the Mechanic Arts.....	393	.....	393	438	.....	438	45	.....	.....	.....
Agriculture.....	1,976	1,900	3,876	2,011	1,826	3,837	35	.....	.....	74
Law.....	208	6	214	174	2	176	.....	.....	34	4
Medical, (incl. Nurses and Embalmers).....	185	41	226	210	44	254	25	3	.....	.....
Dentistry.....	251	3	254	268	7	275	17	4	.....	.....
Pharmacy.....	81	5	86	88	10	98	7	5	.....	.....
Mines.....	94	.....	94	130	.....	130	36	.....	.....	.....
Chemistry.....	97	11	108	78	4	82	.....	.....	19	7
Education.....	29	75	104	37	75	112	8	.....	.....	.....

TABLE IV—Continued

COLLEGE	1912-13			1913-14			GAIN		Loss	
	Men	Women	Total	Men	Women	Total	Men	Women	Men	Women
Graduate.....	114	69	183	117	49	166	3			20
Summer Session	95	195	290	141	190	331	46			5
Total.....	4,210	3,230	7,440	4,375	3,116	7,491	222		12	57
Less duplicates.	56	2	58	111	16	127				126
Net Total...	4,154	3,228	7,382	4,264	3,100	7,364				18
EXTENSION:										
Evening Courses	509	259	768	1,158	394	1,552	649		135	
Correspondence Courses.....	34	20	54	37	39	76	3		19	
Total.....	543	279	822	1,195	433	1,628	652		154	
SUMMARY:										
Total, Resident Students.....	4,154	3,228	7,382	4,264	3,100	7,364	110			18
Total, Extension Students.....	543	279	822	1,195	433	1,628	652		154	
GRAND TOTALS	4,697	3,507	8,204	5,459	3,533	8,992	762		136	

Table VI shows the schools from which entering students were received during the year 1913-14.

Of the 231 high schools of this state 173 sent students, while 58 were not represented. The largest number from any school outside of the Twin Cities and Duluth is 8, four sent 7, three sent 6, nine 5, twelve 4, twenty-seven 3, thirty-seven 2 and seventy-two 1.

Of the twenty private schools on the list, 17 sent students; two of these sent 7, two 6, two 5, one 3, five 2, and seven 1.

Wisconsin (36), Iowa (27), North (12) and South Dakota (18) easily lead in our non-resident representation. Undoubtedly alumni influence is shown in the representation from Montana (8), Idaho (1) and Washington (5).

Of the foreign countries sending students Norway and Canada each sent four, Africa sent two, and Austria and Cuba each sent one.

TABLE VI. SCHOOLS FROM WHICH ENTRANTS WERE RECEIVED

	1913-14									
	Science, Literature, and the Arts	Engineering	Chemistry	Mines	Dentistry	Pharmacy	Nurses	Special Law	Agriculture	Total
MINNESOTA										
Ada										
Adrian										
Aitkin									1	1
Akeley										
Albert Lea	1						1			2
Alden		1								1
Alexandria			1						1	2
Amboy										
Annandale									1	1
Anoka	1					2			1	4
Appleton				1		1				2
Argyle										
Arlington										
Atwater		1							1	2
Aurora										
Austin	2				1	2	1		1	7
Bagley										
Barnesville										
Belle Plaine										
Bemidji									1	1
Benson					1				1	2
Bird Island	1									1
Biwabik									1	1
Black Duck										
Blooming Prairie										
Blue Earth	1									1
Brainerd	2			1						3
Breckenridge	1									1
Browns Valley										
Buffalo	1									1
Buhl				1						1
Caledonia	1				1					2
Cambridge										
Canby						1			1	2
Cannon Falls	1									1
Cass Lake									1	1
Chaska	1									2
Chatfield					1	2				2
Chisholm								1		1
Clarkfield					1	1				1
Cloquet	1					1			2	4
Cokato						1				1
Coleraine	2								1	3
Cottonwood		1								1
Crookston		1			1		1			3
Dassel					1					1
Dawson					1					2
Deer River	1								1	1
Detroit	3					2			1	6
Dodge Center										
Duluth										
Central	6	5		2					3	16
Industrial									1	1
Eagle Bend						1			3	4
East Grand Forks	1				2					3
Elbow Lake	1									1
Elk River		1								1
Elmore										
Ely			1						1	2
Eveleth	4					1				5
Excelsior		1								1
Fairfax		1								1
Fairmont	1	2			1				1	5

TABLE VI—Continued

	1913-14									
	Science, Literature, and the Arts	Engineering	Chemistry	Mines	Dentistry	Pharmacy	Nurses	Special Law	Agriculture	Total
Faribault.....	1	1				1				3
Farmington.....	1									1
Fergus Falls.....	1	1		1					1	4
Fertile.....										
Posston.....	1									1
Frazer.....		1								1
Fulda.....								1		1
Gaylord.....										
Gilbert.....										
Glencoe.....	1				1					2
Glenwood.....	1									1
Graceville.....	2									2
Grand Meadow.....										
Grand Rapids.....	1	1						1		3
Granite Falls.....										
Hallock.....		2			2			1		5
Halstad.....		1				1				2
Harmony.....										
Hastings.....	4									4
Hawley.....										
Hayfield.....	1									1
Hector.....	1									1
Henderson.....										
Herman.....										
Heron Lake.....	1				1					2
Hibbing.....	1							2		3
Hinckley.....	1									1
Hopkins.....	2	1						1		4
Houston.....	1									1
Howard Lake.....	1	1			1					3
Hutchinson.....	3				2	1		2		8
International Falls.....										
Ivanhoe.....					1	1				2
Jackson.....								1		1
Jacksonville.....	1							1		2
Jordan.....								1		1
Kasota.....										
Kasson.....					2					2
Kenyon.....	2							1		3
Kerkhoven.....										
Lake Benton.....						1				1
Lake City.....				2						2
Lake Crystal.....	1									1
Lakefield.....								1		1
Lake Park.....										
Lamberton.....	1					1				2
Lanesboro.....	1	1		1						3
Le Roy.....										
Le Sueur.....	1									1
Le Sueur Center.....	2					1		1		4
Lewiston.....						1				1
Litchfield.....	2		1	1				1		5
Little Falls.....										
Long Prairie.....	1	2								3
Luverne.....	5									5
Lyle.....										
McIntosh.....										
Mabel.....										
Madelia.....								3		3
Madison.....		1						1		2
Mankato.....	2		2	1				2		7
Mantorville.....								1		1
Maple Lake.....										
Mapleton.....								1		1

TABLE VI—Continued

	1913-14									Total
	Science, Literature, and the Arts	Engineering	Chemistry	Mines	Dentistry	Pharmacy	Nurses	Special Law	Agriculture	
Madison				1	1					2
Milbank	1									1
Pierre	1									1
Selby	1									1
Sioux Falls	1				1					2
Webster		1								1
Wilmot		1								1
Woonsocket	1									1
NORTH DAKOTA										
Churchs Ferry		1								1
Dickinson	1									1
Fargo College Academy	1									1
Hettinger		1								1
Hunter	1									1
Jamestown	1									1
Kenmare		1								1
Mayville Normal	1									1
Minnewaukon	1									1
Oakes				1						1
Portland, Bruffat Academy	1									1
Wahpeton School of Science	1									1
MONTANA										
Billings		1								1
Broadwater County	1									1
Forsyth	1									1
Great Falls	1	1								2
Havre	2									2
Kalispell								1		1
ILLINOIS										
Dickson	2									2
Evanston Academy	2									2
Ottawa	1									1
Watseka		1								1
WASHINGTON										
Colville, Ells Academy								1		1
Everett							1		1	2
Spokane										
Lewis & Clark	1									1
Brunot Hall	1									1
INDIANA										
Elkhart	1									1
Garrett	1									1
Indianapolis Manual Training				1						1
FLORIDA										
Tampa		1		1						2
NEW HAMPSHIRE										
Phillips Exeter	1			1						2
IDAHO										
Boise								1		1
CALIFORNIA										
Pasadena		1								1
NEW MEXICO										
Military Institute				1						1

TABLE VI—Continued

	1913-14									Total
	Science, Literature, and the Arts	Engineering	Chemistry	Mines	Dentistry	Pharmacy	Nurses	Special Law	Agriculture	
NEW YORK Brooklyn, Girls' Home....	1									1
OHIO Marysville.....	1									1
OKLAHOMA Tonkawa, U Preparatory..	1									1
OREGON Portland, Washington H. S.	1									1
MICHIGAN Menomonie.....	1									1
WASHINGTON, D. C. McKinley Man'l Training.		1								1
TENNESSEE Jackson, Union Academy..	1									1
VIRGINIA Waynesboro, Fishburne Military Academy ..			1							1
NEBRASKA Orleans.....						1				1
CANADA Ontario, Ottawa Institute..									1	1
Saskatchewan, Weyburn...	2	1								3
AUSTRIA Szuparka, Prep. School....	1									1
CUBA Havana, School of Arts....			1							1
NORWAY Bergen, Cathedral School..						1				1
Kristiania.....						2				2
Nissen School.....	1									1
SOUTH AFRICA Johannesburg, King Edward VII.....									2	2

SUMMARY FOR TABLE VI

Wisconsin.....	36	Indiana.....	3	New Mexico.....	1
Iowa.....	27	Florida.....	2	New York.....	1
South Dakota.....	18	New Hampshire.....	2	Ohio.....	1
North Dakota.....	12	California.....	1	Oklahoma.....	1
Montana.....	8	Idaho.....	1	Oregon.....	1
Illinois.....	6	Michigan.....	1	Tennessee.....	1
Washington.....	5	Nebraska.....	1	Virginia.....	1
				Washington D. C.....	1
Total number of entrants for Minnesota.....	833				
Total number for United States, outside of Minnesota.....	131				
Total for Foreign Countries.....	12				
Grand total.....	976				

A SURVEY OF THE COLLEGES, ETC.

The following paragraphs summarize the chief features of the annual reports of the Deans and other administrative officers for the year 1913-14.

College of Science, Literature, and the Arts.—(1) Departments of Human Anatomy and Human Physiology in the Medical School recognized as departments in the college; (2) the election to the deanship of John B. Johnston, formerly Professor of Comparative Neurology in the Medical School, and the appointment of a number of new professors and instructors in various departments.

College of Engineering and the Mechanic Arts.—(1) The addition of considerable modern equipment and machinery in the Departments of Mechanical and Electrical Engineering; (2) the establishment in the Main Engineering Building of a Central Engineering and Architectural Library; (3) research work in the Experimental Engineering Laboratory on the strength of materials, and publication of the results; (4) revision of the curriculum with the object of bringing the student in contact with engineering problems earlier in his course, the required cultural courses coming later.

The Department of Agriculture.—(1) Progress in adjusting the work of the various divisions to the plan of organization, and in the segregation of the work of College, Experiment Station, and School of Agriculture; (2) the centralization of work in Domestic Science, Domestic Art, Domestic Economy, Drawing and Designing, Textiles and Clothing, Foods and Cookery, Nutrition and Home Management in a Division of Home Economics; (3) reorganization of the work in Bee Culture (4) extension of the work, and increase in the number, of Demonstration Farms; (5) plans drawn and work begun or completed on a number of new buildings; (6) a study made of the use of room in buildings at the University Farm; (7) preparation and distribution of a large number of scientific and popular publications.

The Agricultural Substations.—Particular attention is called to the valuable work done by the substations. Of special note is the work being carried on at the Fruit-Breeding Farm at Zumbra Heights. Many valuable hybrids have been produced and distributed. The work is conducted in coöperation with the State

Horticultural Society. Their various testing stations are used in the testing work and the advice of the various members of the society has been valuable in many ways. Notable progress has been made at the Forest Experiment Station at Cloquet, the Northwest Experiment Station at Crookston, the West Central Experiment Station at Morris, the North Central Experiment Station at Grand Rapids, the Northeast Experiment Station and Demonstration Farm at Duluth, and the Southeast Experiment Station and Demonstration Farm at Waseca.

The Law School.—(1) Course of lectures by Honorable William H. Taft, and Judge Homer B. Dibell; (2) development of an efficient course in practice; (3) establishment, in coöperation with the Associated Charities, of a Legal Aid Bureau in the work of which seniors get experience in the actual practice of law; (4) additions to the library; (5) adoption of the honor system in examinations.

The Medical School.—(1) Revision of the curriculum involving greater flexibility and freedom for the development of individuality; (2) plan of clinic clerkships for sixth-year students; (3) requirement of a fifth or clinical year spent as interne in an approved hospital; (4) offering of specialized graduate work; (5) establishment of teaching fellowships and graduate scholarships in clinical departments; (6) closer relations with other colleges of the University effected; (7) six weeks' course in Embalming conducted; (8) plan worked out for a School of Public Health.

The College of Dentistry.—(1) New building and equipment made available; (2) understanding reached that under certain conditions the course will be extended to four years; (3) thirty students given instruction in the summer school.

The College of Pharmacy.—(1) New quarters in old Millard Hall, which has been reconstructed and fire-proofed; (2) certain changes in the curriculum made; (3) adoption of the requirement, effective with the year 1915-16, of high-school graduation or its equivalent for entrance to the college.

The School of Mines.—(1) Service rendered to the Tax Commission by making ore estimates; (2) new courses in metallography introduced; (3) plans drawn and ground broken for the new School of Mines building.

The School of Chemistry.—(1) Occupation of the new Chem-

istry Laboratory; (2) research carried on in a number of chemical problems; (3) a survey of the whole field of industrial chemistry with a view to pointing out to business men the necessity of rapid development of the various chemical industries owing to conditions brought about by the European war.

The College of Education.—(1) Secondary schools inspected and teaching of Minnesota graduates supervised through the work of the Extension Department; (2) the Appointment Bureau has rendered valuable service in placing graduates in teaching and supervisory positions; (3) the college furnished professional instruction and training to an increasing number of students registered in other colleges in the University and in the Extension Division; (4) students given opportunities for practice teaching in the University High School; (5) short course for superintendents and principals.

The Graduate School.—(1) The reorganization of the school with an executive committee composed of the Dean and seven members appointed by the President; (2) \$20,000 expended in research in a wide field of practical problems; results published or in press.

Report of the Dean of Women.—(1) A House Council, representing Sanford Hall, sorority houses, and lodging houses has formulated rules; (2) wholesome entertainment and opportunities for social life for women students; (3) conferences with chaperones of sorority houses in regard to common problems; (4) the Elizabeth Northrop Cottage provides homes for eleven women students; (5) all lodging houses listed for University women inspected by Resident Nurse; (6) coöperation with Director of Physical Education for Women concerning health of women students; (7) loan fund of \$3,373, the proceeds of a play given under the auspices of the Faculty Women's Club, and a fund of \$250 raised by the Home Economics Association provided.

The Library.—(1) The number of books issued in the reading room continues to increase; (2) all accessions of the year completely catalogued; progress made in the recataloguing of the older portion of the Library; cataloguing of professional libraries almost completed; (3) 21,264 volumes added to the Library during 1913-14; (4) 1,074 periodicals regularly received by Library; (5) large number of valuable publications

received through exchange for University publications; (6) several institutions have loaned to the University books needed for research; (7) Medical School adopts principle of central, as opposed to departmental, libraries.

Agricultural Extension.—(1) Farmers' Institutes; (2) demonstration trains were operated; (3) two men have devoted most of their time to rural school work; (4) judges furnished for county and street fairs and festivals; (5) bulletins sent to a mailing list of 45,000 names; (6) 25 county agents put in field to give first-hand scientific instruction and counsel; (7) special instructors in Agriculture and Home Economics furnished to County Teachers' Training Schools; (8) short courses held; (9) 28 Demonstration Farms under the direction of Division; (10) during 1913-14, with the coöperation of the agricultural papers and town and county officers, nearly 700 Farmers' Clubs organized, making a total August 1, 1914, of 830 clubs listed.

General Extension Division.—(1) Evening classes in business, engineering and academic subjects conducted in St. Paul; (2) "University Weeks" (24 sessions) held in towns and villages throughout the State; (3) correspondence courses in wide range of subjects offered to general public; (4) Merchants' Short Course in methods of merchandising held at University; registration of 138; (5) six debating squads of students sent out; (6) lectures given in several towns in coöperation with National Institution of Moral Instruction; (7) sets of lantern slides furnished to schools; (8) over 125 localities supplied with lyceum courses of lectures and entertainments; (8) Municipal Reference Bureau established under auspices of Minnesota League of Municipalities and General Extension Division; nearly 100 cities, towns, and villages have joined the League.

Physical Education for Men.—(1) Physical examinations made and recorded; (2) special lecture on sex hygiene given to men; (3) disease census taken of freshmen; (4) gymnasium instruction given to 649 students; (5) efficiency tests in various athletic events applied to all students; (6) contests in "soccer" football, baseball, basket-ball, and swimming organized and conducted; (7) an athletic fraternity to encourage all-round physical development organized; (8) annual sophomore-freshman class contests conducted.

Physical Education for Women.—(1) Physical examinations

made and recorded for all women students entering the University; (2) large number of interviews and consultations held; (3) visits made to schools at Crookston and Morris; (4) course of twelve lectures in Personal Hygiene given to freshman women; (5) special physical exercises prescribed for weak students; (6) contests in basket-ball, swimming, skating, and tennis organized; (7) plans for systematic sanitary inspection of boarding houses made; (8) a number of new courses offered; (9) significant gains in lung capacity shown by women who had physical training during winter; (10) plans for new gymnasium directed and completed.

Military Department.—(1) Students registered for drill, 1,072; (2) military camps conducted; (3) special attention given to target practice; (4) National Guard Battery organized in coöperation with State military authorities; (5) battalion ranked by War Department as one of the ten distinguished university battalions of the country.

The Geological Survey.—(1) Many inquiries answered and numerous materials examined; (2) agreement entered into with the United States Bureau of Mines for the investigation of peats in Minnesota; (3) investigation of the geology of the area in the vicinity of Duluth and portions of the area between Duluth and Pigeon Point, particularly those portions that contain magnetic iron ores, made; (4) report on soils and weather conditions of Minnesota prepared; (5) a relief model of an area including the Twin Cities arranged for.

The Botanical Survey.—(1) Origin and formation of different kinds of peat investigated; (2) maps prepared, a basis for reclamation projects.

Committee on Physical Education and Intramural Sports.—(1) Interclass, intercollege, interfraternity, and all-University contests held in basket-ball, swimming, handball, baseball, tennis, and soccer football; (2) under the management of the Women's Athletic Association contests in tennis, basket-ball, swimming, and gymnastics organized; (3) through the efforts of the committee two baseball fields with permanent back stops provided, baseballs, etc., furnished, additional tennis courts provided.

SCHOLARSHIP OF FRATERNITY AND NON-FRATERNITY GROUPS *

	1911-1912	1912-1913	1913-1914
Total average.....	1.399	1.41	1.38
Non-fraternity average.....	1.502	1.43	1.38
Fraternity average.....	1.096	1.34	1.37

The Academic Fraternities.—(1) Card index system adopted for reporting high-school pledge men, university undergraduate pledge men, students' grades, etc.; (2) revision of the constitution and by-laws to restrict and safeguard pledging and initiation; (3) high-school principals of the Twin Cities induced to adopt twenty-four hour credits as the standard for seniors in full standing; (4) moral conditions among the fraternities believed to be on a higher plane than ever before; (5) average annual expenditure for 365 fraternity men \$528; 32 men earning their way entirely, 141 in part; (6) steady improvement in fraternity scholarship reported; (7) Acacia, a national academic fraternity, admitted to the Council; (8) system to provide for the proper chaperonage of all fraternity parties worked out.

General Alumni Association.—(1) *Alumni Weekly* published regularly; (2) new *Alumni Directory* and new *Dictionary of Minnesota* issued; (3) Secretary chosen president of the newly organized Association of Alumni Secretaries; (4) records show University has conferred 10,379 degrees upon 9,389 persons; (5) campaign to secure substantial increase in the permanent endowment fund amounting to \$15,000 begun; success assured.

UNIVERSITY FUNCTIONS, CONVOCATIONS, ETC.

Commencement exercises.—The Commencement address was delivered by Harry Burns Hutchins, LL.D., President of the University of Michigan. His subject was, "Thinking Ahead, Some of the Results and Problems that Come of It." The Baccalaureate address, "Life: Its Aims and Inspirations," was given by the Reverend Marion Daniel Shutter, D.D., Pastor of the Church of the Redeemer, Minneapolis.

* Based upon a grade of excellent as three points, good as two points, pass as one point, a condition as zero, and a failure as minus one.

University convocations.—In accordance with custom a general assembly of faculty and students was held in the University Armory on the opening day of the first semester. On March 19 a convocation was held in honor of former President William Howard Taft.

Chapel assemblies.—Throughout the year chapel assemblies were held at 12:00 o'clock on Tuesdays and Thursdays. Brief addresses were delivered by members of the University community, ministers and social workers of the Twin Cities, and by a number of distinguished visitors to the Twin Cities. Among these should be mentioned President Ozora S. Davis of Chicago Theological Seminary; Mr. Meyer Bloomfield, Director of the Boston Vocation Bureau; the Reverend Charles W. Gordon (Ralph Connor); Senator William S. Kenyon of Iowa; George Arliss, the distinguished actor; Dr. James A. Francis, Pastor of the Clarendon Street Baptist Church, Boston; Mr. J. J. O'Connor, General Secretary of the Associated Charities in Minneapolis; Miss Inez Abbott, Principal of the American School, Samakov, Bulgaria; the Reverend Samuel M. Crothers, Pastor of the First Unitarian Church, Cambridge, Massachusetts; President Albert Parker Fitch, of Andover Theological Seminary; Dr. Lightner Witmer, Professor of Psychology in the University of Pennsylvania; Dr. Lotus D. Coffman, Professor of Education in the University of Illinois; Sidney L. Gulick, author and lecturer on the Far East; Mr. D. Leigh Colvin, President of the Intercollegiate Prohibition Association; Dr. Charles R. Brown, Dean of the Divinity School of Yale University; the Reverend J. D. Jones, President of the Free Church Council of Great Britain; and Dr. Shosuke Sato, Japanese Exchange Lecturer on the Carnegie Endowment for International Peace.

University public lectures.—In accordance with a plan inaugurated in the fall of 1911, a course of public lectures by members of the University staff was offered upon the general subject, "Social and Intellectual Leaders of Modern Life." Honorable William H. Taft, Professor of Law at Yale University, delivered four lectures on "Anti-Trust Legislation." This course was open to law students, and to members of the State Bar Association by ticket. The place of religion in life was presented to the students by Dr. Shailer Mathews, Dean of the Divinity School of the University of Chicago; Dr. Cyrus Northrop; Pres-

ident Albert Parker Fitch of Andover Theological Seminary, who delivered four addresses under the auspices of the Y. M. C. A. and Y. W. C. A.; Dr. Charles R. Brown, Dean of the Divinity School of Yale University; and a number of the pastors of Minneapolis and St. Paul churches. Two valuable lectures were delivered before the members of the German department by Professor Alexander R. Hohlfeld of the University of Wisconsin, and Dr. Ludwig Fulda of Berlin. Important lectures of a literary nature were given by Mr. Langdon-Davies of the Garton Foundation, England; Mr. Sidney A. Teller, Chicago; J. J. O'Connor, General Secretary of the Associated Charities in Minneapolis; Mr. L. N. Nielson, Lecturer and Author of Copenhagen, Denmark; Dr. H. M. Kallen, Professor of Psychology in the University of Wisconsin; Dr. Georg Brandes, Professor of Esthetics in the University of Copenhagen; Dr. David Snedden, Commissioner of Education of the State of Massachusetts. Dr. Shosuke Sato, Rector of the College of Agriculture of the North-eastern Imperial University of Japan, delivered, under the auspices of the Carnegie Endowment for International Peace, a series of four addresses on the subject, "Fifty Years of Progress in Japan." Valuable lectures of a technical nature were delivered by Lieut. Colonel Elliott, Surgeon in the Indian Medical Service of Great Britain; Mr. George Chandler Whipple, Professor of Sanitary Engineering, Harvard University; Mr. V. S. Beck, and Mr. R. F. Pack of Minneapolis; Mr. Winthrop G. Noyes of St. Paul; Mr. O. S. Davis, Secretary of the Housing Committee of the Civic and Commerce Association, and Dr. H. Gideon Wells of the University of Chicago. The annual Phi Beta Kappa address was delivered by Professor George Edward Woodberry, Author and Scholar, on the subject, "The Artist Life." The Sigma Xi address was given by Dr. Winford P. Larson of the University of Minnesota. His subject was, "Some Problems in Immunity."

University representation.—During the year the University of Minnesota has been represented at the following meetings, conferences, University functions, et cetera: American Association for the Advancement of Agricultural Teaching, American Public Health Association, American Bar Association, Association of Official Seed Analysts, Association of Farmers' Institute Workers, American Society of Agronomy, American Political Science

Association, Association of State Universities, Association of Land Grant Engineering Colleges, International Live Stock Show, Association of American Universities, United States Live Stock Sanitary Association, Meeting of Supervisors of County Agent Work, Meeting of College Teachers of Education, Biennial Conference of Deans of Women, Society of Directors of Physical Education in Colleges, Council of the American Home Association, Council on Education of the American Medical Association, Association of American Medical Colleges, Conference of University Medical Schools, National Conference on Marketing and Farm Credits, Meeting of Deans of Women's Colleges in connection with the meeting of the Association of Collegiate Alumnae, Association of Academic Deans of State Universities, National Drainage Congress, American Economic Association, University Business Men, American Guernsey Cattle Club, Missouri Valley Veterinary Association, National Nurses' Association, Forest Products Exposition.

PHYSICAL PLANT AND EQUIPMENT

The inter-campus trolley.—The Comptroller's report contains a full statement with reference to this connection between the two campuses. The enterprise has already proved itself to be self-sustaining. More important still is the influence of this rapid means of communication upon the unification of the institution as a whole and upon the avoidance of duplication in plant and equipment. Perhaps no other one recent step in the development of the University of Minnesota has been more important than this linking of the two campus centers. Incidentally, the new line brings St. Paul students to the center of the Main Campus for a seven-cent fare.

Efficient use of buildings.—A careful study is being made of the present use of university buildings. The preliminary reports show that a considerable amount of space in various buildings is available for use. It is clear that class schedules can be more closely adjusted to the available building space. This will effect economies and bring about a more complete utilization of existing rooms. The problem, however, is much more complicated than it appears at first sight. For example, the complete utilization of a building would call for class exercises from eight o'clock

in the morning up to six o'clock in the evening. As a matter of fact so many students live at a distance from the University that, especially in the winter, the eight o'clock hour can not be completely utilized. The same conditions make it all but impossible to schedule classes between five and six o'clock in the late afternoon. The Regents are determined to study the situation with the utmost care and in every possible and reasonable way to utilize existing buildings to the utmost. The Board will insist that there can be no departmental or college proprietorship in the buildings, and that space anywhere that is not absolutely needed for college or departmental purposes shall be available for general university use.

Northern Pacific Railway tracks.—The Northern Pacific Railway Company was by Chapter 302, Laws of Minnesota 1909, required to cover its tracks through the campus of the University. The Act also authorized the Board of Regents to enter into a contract with the railway company for the accomplishment of the object if in the judgment of the Board it could be accomplished to the advantage of the University by such agreement. It seemed advisable to the Board to negotiate with the railway company to have the covering done by agreement in order that the walls of the tunnel might be built strong enough to carry not only the earth above but also any buildings which might in the future be erected over the tunnel. As the strengthening of the walls of the tunnel for this purpose would necessitate the expenditure of additional money it seemed clear that any contract made with the railroad should fix a stipulated sum to be paid by the University. With that end in view negotiations have been pending with the railroad since 1909. In the spring of 1914 an agreement was reached. By the terms of this agreement the tracks were to be covered at once with a head-room in the tunnel of nineteen feet at the Harvard Street bridge and the surface above the tunnel at that point to be not more than one foot above the roadway of the bridge. This agreement was conditioned upon the payment of \$50,000 by the University and the granting of permission by the City Council of Minneapolis to permit an overhead crossing at University and Oak Street six feet above the present level of University Avenue. To carry out this agreement it was necessary to obtain from the Board of Railroad and Warehouse Commissioners a modification of the law which requires

a head-room in tunnels of twenty-three feet. Upon application this modification was allowed by the Railroad and Warehouse Commission, but when the agreement was presented to the City Council that body refused to sanction it and passed a resolution requiring the Northern Pacific Railroad to depress its tracks at University Avenue and Oak Street twenty-one feet below the present grade of those streets. As a result of this action the subject is now at a standstill. The railroad company has refused to obey the order of the City Council and has announced its intention to contest the power of the City Council to pass the resolution, in the State and Federal Courts. Nothing can therefore be done until the resolution is either rescinded or annulled, or its validity settled by an action brought either by the City of Minneapolis or by the University of Minnesota. The subject is having the careful and constant attention of the Board of Regents.

FINANCES

The budget interpreted.—The Regents of the University have intrusted to their care and administration: (1) an Arts College and a group of professional schools (including an Agricultural College); (2) Experiment Stations for investigation in Agriculture, Mines, and Engineering, and research laboratories, etc., closely related to the educational system mentioned under (1); (3) a complete University Extension Service doing work in all parts of the State; (4) public services, e.g., a 180-bed hospital for the indigent poor, ore estimating for the Tax Commission, making of hog-cholera serum, the administration of a pure seed law, etc.; (5) a system of secondary agricultural schools with more than 1,000 pupils; (6) a system of dormitories, dining-halls, and restaurants for over 2,000 students. The annual budget is large, but it should be judged in the light of these various responsibilities with which the Regents are intrusted. It is not easy to analyze the annual expenditures into the six classes suggested above. Tables IV and VI in the Comptroller's Report* follow, of course, the usual business classification. Teaching and research are for the most part done by the same men. The same plant with common overhead charges is used to a considerable degree

* Pages 101 and 103, Eighteenth Biennial Report of the Board of Regents.

for both the College of Agriculture and for the School of Agriculture. The dormitories and dining-halls meet actual running expenses but are not charged to the full with overhead expenses, interest, depreciation, etc. Approximate estimates put the annual cost of the secondary agricultural schools and stations at \$250,000. The University Hospital ought not to be charged wholly to medical education. A fair estimate would assign 80 per cent of the maintenance, or \$64,000, to the public service of the sick poor for whom various communities in the State would otherwise have to provide. So much is briefly indicated in order to show that the term "University" covers a very wide range of complex and varied activities which touch the whole life of the State.

One problem of the budget.—It is essential to good budget making to be able to estimate with close approximation the income likely to be available for the year. In making such a forecast the University is embarrassed at one point. The proceeds of the 23/100 mill tax vary in the time of payment. In one year, for example, the counties will make payments in June and the University will be credited with a large amount in July before the fiscal year closes; in another year payments from the counties may be delayed and a large installment of the taxes may be credited after August 1. If the University were conducted as an ordinary business enterprise there would be no difficulty. The institution would be credited with taxes assessed but not paid, and this amount could be carried in the University statement, with the usual deduction, as "accounts receivable." As things now stand August 1 is a fixed limit. Every dollar received after that date, even though the sum properly belong to the preceding year's income, must be reckoned as income of the following year. The Comptroller in his report points out this difficulty and shows that the advance from the general funds or the borrowing temporarily by the Regents at the close of the year are subject to misinterpretation. Attention is called to the situation in order that it may be clearly understood.

Publicity of University finances.—At the beginning of each fiscal year the University files with the Governor, the State Auditor, the State Treasurer, the Public Examiner, and the Secretary of State a complete budget which shows the estimated revenues of the University, and the apportionment of these revenues to each department of the institution for the year. This budget

goes into details of pay roll, supplies, and other expenditures. The volume contains over one hundred pages. The State officials recognize changes in this budget only as these may be formally authorized by the Board of Regents and printed in the published proceedings of that body. All University revenues of every kind are turned into the treasury of the State. No disbursements may be made save with the authority and approval of the State Auditor through whose office all requisitions must pass. Copies of these requisitions are filed in the State Auditor's office and become public records covering every item of expenditure of the University. An annual report is published in which the Comptroller gives statements of receipts and expenditures, together with a classification of the latter. All special funds of every kind are reported upon. Every year the Public Examiner's office after a complete examination makes a report upon the finances of the University. It is possible, therefore, for any citizen of the State to have access to all the records which reveal completely the financial operations of the University.

Central storehouse.—The Comptroller reports upon the establishment of a central storehouse by means of which it will be possible to purchase University supplies in larger quantities at better prices, and to avoid the duplication inevitable when supplies are stored in a number of separate storerooms. It will take some little time to develop a completely satisfactory central storehouse system, but the work is being advanced steadily and the results in the form of economy and efficiency are confidently counted on.

Dormitories and dining-halls.—Attention is called to the fact that while dormitories, restaurants, and cafés conducted by the Board of Regents do, in almost all cases, meet current expenses, they are not, from the standpoint of accurate accounting, strictly self-supporting: that is, if all overhead charges, heat, light, interest on investment, depreciation and repairs were charged to these units they would show deficits. It is peculiarly difficult to conduct dining-halls at Morris and Crookston in such a way as to meet even current expenses. The overhead costs are relatively heavy and the short (six months') session offers an additional problem. It is important to keep the charges to students at the lowest possible point in order to make education available to the largest number. The competition of private boarding houses is

also a factor in determining the price of board. The situation with respect to the dormitories raises the question as to how far the University is justified in providing at less than cost, quarters for a small fraction of the students while the rest are compelled to find outside accommodations at commercial rates. The whole subject, complicated as it is, demands and is receiving, careful study. Recommendations as to policy will be formulated and presented to the Regents for consideration.

Incidental and tuition fees.—From time to time the question is raised as to whether university instruction should not be wholly free. Incidental rather than tuition fees of \$30 a year are now charged in the Colleges of Science, Literature, and the Arts, of Education, and of Agriculture. More than one half of the collegiate students pay these incidental fees. In Engineering and Law the fees are a little higher. In other professional schools the fees range from \$75 to \$150 annually. It is to be noted that loan funds are available for a considerable number of students who need financial assistance. Opportunities in the two cities for self-support are normally good. It may be that students of ability and promise are deterred by the incidental and tuition fees from entering the University. The number of really able and ambitious students, however, who are prevented from undertaking a university course must be small. Plans to provide free scholarships have been undertaken in a number of states. New York, for example, appropriates a considerable sum to cover scholarships in leading institutions of the state. Illinois provides scholarships of a similar character. The aggregate sum now received by the University from incidental and tuition fees is so considerable an item in the annual budget that any sweeping reduction of fees without a corresponding addition to appropriations would seriously embarrass the institution.

Legislation suggested.—The recommendations of the Comptroller with reference to changes in the law need emphasis. In spite of the best efforts of the University Business Office and the hearty coöperation of the State Auditor's Office, the payment of bills is by no means so prompt as it should be. It is impossible to obtain the best prices unless early payment can be guaranteed. The compelling of all instructors and others who receive salaries or wages from the University to sign a monthly pay roll is an antiquated and useless practice. The voucher check system has

been adopted by all efficient business concerns. The law should establish this procedure. The University Inventory should be put upon a modern basis by recognizing a permanent inventory, to be modified each year by a depreciation charge and a checking of the annual additional purchases. It would be well, also, to have the Regents explicitly authorized to borrow money for a short time toward the end of the year, in anticipation of taxes due but not yet paid. It has been the custom for years for the Regents to borrow in this way. It is probable that the powers granted to the Regents are sufficient to include this, but since the Public Examiner has raised the question of legality, it would be well to have the power recognized and confirmed by legislative action.

SUMMARY

Teaching.—An institution of higher education can do its duty by students only when well-trained, high-minded teachers are working under favorable conditions. An adequate staff and a reasonable ratio of teachers to students are primary necessities. The University of Minnesota for many years has needed more teachers. In spite of recent additions to the faculty the increase of students has prevented any real improvement in the larger colleges. There must be constant vigilance to prevent the material side of the institution from growing at the expense of true educational development.

Standards.—A standard of scholarship is not only a stimulus to individuals but a protection to the community. It is especially true that in professional schools the maintenance of a good standard is a public duty. The social aspects of education are more and more recognized. The various careers for which the state university prepares its graduates are not to be thought of first of all as means of individual success but rather as forms of service to the State. The aim is not to give professional education to the largest possible number, but to graduate enough competent and conscientious persons to meet the needs of the community. The public support of higher education is primarily justified by its contribution to social welfare.

Research.—Every institution of higher education needs the invigorating influence of original investigation. A group of

scholars must kindle enthusiasm by pushing forward the frontiers of knowledge. The results of investigation may not always have an immediate practical utility, but the history of the growth of human thought shows that investigation is fundamental to all kinds of progress. The University of Minnesota devotes itself primarily to teaching, but it can not do this teaching effectively unless it also fosters, under reasonable conditions, original research.

Extension.—The modern university is recognizing its obligations to the whole community. It is devising new ways of reaching individuals and communities. The new idea of university extension goes far beyond the original plan to carry university education of the conventional sort to the public at large. University extension now stands for a wide variety of activities adapted to the needs of many different social groups. Minnesota has made rapid progress in this field and plans to develop those agencies which give promise of greatest usefulness and success.

The state system.—The University feels the obligations to cooperate in every way with the educational system of the State as a whole. There can be no thought of domination. The high-school course must be adapted to the needs of the great majority who can not pursue higher education. College and University must therefore adapt themselves to the high school as a people's college. There should, however, be the closest coöperation between the University and the high schools in the development of courses of instruction, teaching methods, etc. The University has an important duty in the training of teachers for the secondary schools. The diversification of these schools calls for new types of teachers especially in the vocational subjects. The University must, therefore, give conscious attention to providing the professional training which high-school teachers need for their work.

New plans postponed.—Minnesota may seem to be developing its work with great rapidity. Much progress has been made, but many important demands can not be met. The introduction of many things must be postponed; for example, full development of courses in commerce providing training for business comparable to professional training for law or medicine; courses in history and appreciation of art; training for many specialized vocations such as librarianship, social service (charity organiza-

tion secretaryships, playground directorships, Boy Scout leaderships), the offering of a normal course for the training of directors of physical education; the preparation of teachers of manual training; the introduction of courses in vocational guidance with a view to preparing people for this important service; a technical course for bakers, an experiment peculiarly appropriate for Minnesota; "short courses" for newspaper men and professional and occupational groups of many kinds. The times make insistent demands for these new forms of activity. The University must guard against extending its work over too wide an area until adequate resources are available, but it must constantly look forward and be alert and responsive to the real and persistent needs of the society which it seeks to serve.

Respectfully submitted,

GEORGE E. VINCENT, *President*

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

To the President of the University:

SIR: I submit herewith the report of the College of Science, Literature, and the Arts for the year ending July 31, 1914.

Enrollment.—The enrollment in the College of Science, Literature, and the Arts for the year 1913-14 was as follows:

	Men	Women	Total
Seniors.....	64	190	254
Juniors.....	111	189	300
Sophomores.....	222	213	435
Freshmen.....	259	255	514
Unclassed.....	27	62	89
Graduate students.....	118	57	175

Faculty.—The faculty consisted of 38 professors, 4 associate professors, 27 assistant professors and 45 instructors. Compared with the year 1912-13 the faculty showed an increase of 2 professors, 4 associate professors and 8 instructors, and a decrease of 7 assistant professors. In the number of assistants and scholars there was a decrease from 53 to 38.

Deaths.—During the year two of the older members of the faculty died, Professor Charles W. Benton, Head of the Department of Romance Languages, and Professor John S. Clark of the Department of Latin.

Retirements.—The Dean of the College, Professor John F. Downey, who has held office since 1903, retired from the college at the end of this year. The office was filled by the appointment in April of John B. Johnston, heretofore Professor of Comparative Neurology in the Medical School. Professor John G. Moore, Head of the German Department, also retired from the college at the end of this year.

Leaves of absence.—Two professors and two assistant professors were absent on leave for the year, and two professors were on leave during the second semester.

Appointments.—To fill vacancies and make additions to the faculty for the year 1914-15, eight new appointments were made in the professorial ranks and eighteen in the rank of instructor.

Curriculum changes.—By vote of the faculty the Departments of Human Anatomy and Human Physiology were recognized as departments in this college.

Respectfully submitted,

J. B. JOHNSTON, *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 1913-14.

The growth of the College.—In my report of 1911-12 a brief historical sketch of the beginnings of the College prefaced the more recent record, and the growth and development of the College was traced to the end of July, 1912. My report of last year, 1912-13, briefly noted the full occupation of our ampler, more wholesome quarters in the Main Engineering Building; it showed something of the nearing adequacy of the instructional staff to meet the needs of a larger student body, and to give more intensive work and work of increasing scope to that student body; and it mentioned the prospective betterment of our equipment in laboratories and shops due to legislative appreciation of our needs. The year 1913-14 has been one of continued growth in student numbers, some increase in staff, and better equipment to serve more effectively the students and the state. It is purposed in this report to review the progress of the year somewhat in detail, discussing the College, and the several departments which aggregated make up the College.

The College organization.—In the evolution of the University from a simple single Academic unit with only general fundamental courses, to the present complex aggregation of colleges of high specialization, the College of Engineering was the first differentiated. This early beginning places the College second in academic sequence based on order of founding, the parent College of Science, Literature, and the Arts being chronologically first. In student numbers, Engineering ranks third among the ten colleges of the University; in the number of its graduates in full four-year courses it ranks second. It had 438 students registered in 1913-14, and its instructional staff in the same year was made up of 36 men. In its shops, power house, laboratories, and offices, 17 more persons have been employed. The organization of the College shows seven departments: Architecture, Civil Engineering, Drawing, Electrical Engineering, Experimental Engineering, Mathematics, and Mechanical Engineering. The Power House exists as an inter-departmental laboratory of applied mechanical and electrical work. The Administration as a central office serves to articulate and unify the several departments. The Faculty is the legislative body.

The legislative body.—The Faculty of the College is made up of all members of the instructional staff of the seven departments of the College and a representative from each department in other colleges giving work to students in Engineering and Architecture. The President of the University is ex-officio a member of the Faculty, and its presiding officer when present. The President in the past five years has not as-

sumed his prerogative in this matter, and the Dean of the College presides. A few years ago a professor's vote was given a higher numerical value than the vote of an instructor. The present rule is one of entire equality without regard to rank. All large matters of college policy, the curriculum, the granting of degrees, and important discipline are acted upon by the Faculty. Promotions in rank or salary, detailed budget items, or matters administrative rather than legislative, are not ordinarily passed on by the Faculty. Meetings of the Faculty are held perhaps six or eight times a year, and are well attended.

Committees of the College.—In addition to the standing committees on Degrees, Curriculum, Enrollment, Library and Students' Work, a number of special committees have served effectively. The Advisory Committee acts as a counseling body to the Dean. In this committee most of the affairs and policies of the College are discussed. It serves excellently its purpose. During the year a new series of committees to be developed in 1914-15 was conceived. These are the "Correlating Committees" to secure an inter-departmental contact in subjects allied in their nature, but existing in various departments. As an instance, Hydraulics and its allies are in the department teaching the Mechanics of Fluids; Hydrology, Water Power, Water Supply and Sewage, Rivers, Harbors and Canals are taught in the Civil Engineering Department, and Drainage in the Agricultural College. The men of varied affiliations giving the work in these subjects are to work for a closer articulation of the various courses and an avoidance of duplication. Much work devolves on the men of the College in committee work. In the past much work of an administrative nature was imposed. The arrangement now is to have routine matters handled as far as possible by the administration. At times of peak loads, as at enrollment time in September, it is necessary to call upon the instructional staff for help. Much work is doubtless done in committee in order to maintain the democratic tradition of the Campus.

Administration.—The Dean is Administrative officer. The Secretary to the Dean is also the Secretary of the Faculty and of the Advisory Committee. A stenographer in the Administrative Office assists in college affairs, and serves also the clerical needs of the Departments of Civil Engineering and of Mathematics and Mechanics. The Dean of the College is charged with various representative duties in the contact of the College with other colleges, and in dealings with the Administrative Officers of the University, primarily the President. He is in intimate contact with the student body, and gives some instruction to the post-senior Civil Engineers. The offices of the Administration are in the Main Engineering Building.

Civil Engineering.—The Department of Civil Engineering has an instructional staff of three professors (one being the Dean of the College as Head of the Department), three assistant professors, and one professorial lecturer. This department is one of the four departments quartered in the Main Engineering Building. It has some equipment in the form of surveyors' and engineers' instruments and a camp outfit. About a third of the student body is working towards degrees in Civil Engineer-

ing. Work in this Department is given to all Engineers and Architects.

Mechanical Engineering.—This Department has a staff of one professor, two assistant professors, five instructors, a machinist, an assistant machinist, a toolroom boy, and a stenographer. The extensive shops of the College—machine, pattern-making, wood-working, forge and foundry—which are incorporated in this Department, add considerably to the staff. The Department is housed in a separate building of temporary construction, which at the present time serves its purposes. Its shop equipment is relatively large. This has been improved and modernized by the installation during the year of the following pieces: eight lathes, a turret lathe, an automatic screw machine, a radio drill, a horizontal milling and drilling machine, a universal milling machine, a pattern-makers' universal circular saw, and a combination gas furnace. The shops are now in shape to add to the fundamental instruction in machine shop practice, new work in management, cost accounting, and manufacturing processes. About one sixth of the student body is working towards the degree of Mechanical Engineer. This, however, does not measure the work of the Department because every engineering student takes shop work throughout his freshman year, and the Electrical Engineers continue shop work through the sophomore year. Moreover shop work is given to students of the Schools of Mines and Chemistry.

Electrical Engineering.—This Department has an instructional staff of two professors, two assistant professors (one of these on part time only), one instructor, and one student assistant. A mechanician and a stenographer are also employed. The Department shares a building of temporary construction with the Power House. The portion of this building assigned to Electrical Engineering proper, has during the past year been somewhat enlarged by making usable the basement and the attic. While the conditions are not the best for effective, wholesome, safe work, the building must care for the needs of this important Department for the two or three years needed to design and build a modern electrical laboratory. The equipment of the Department is necessarily extensive and intricate. Much of it had grown obsolete with the rapid advance of the art, but during the past year about \$15,000 has been expended in new equipment, and a balance of about \$3,000 is still available further to equip the laboratory. This balance will be exhausted during the calendar year 1914. About one-third of the student body is working towards the degree of Electrical Engineer. Courses are given to the Civil, Mechanical, Mining and Chemical Engineers and Dentists.

Architecture and Architectural Engineering.—This Department has had a staff of one professor, two instructors, and a part-time stenographer. Work in the freshman and sophomore years only have been in force, with forty-eight students registered. In my report of last year the coming to Minnesota of Professor Frederick M. Mann, as Head of this Department, was noted; this year Mr. Roy C. Jones has been added as Instructor in Design; and some stenographic help has been provided. This Department is one of four having quarters in the Main Engineering Building, occupying most of the third floor. The Department has made an excellent start

in equipment in the way of drawing tables, office furniture, casts, lantern slides and lantern slide cases.

Drawing and Descriptive Geometry.—This Department has a staff of one professor, three instructors and a stenographer. It occupies exclusively the three floors of the south wing of the Main Engineering Building, and some considerable office and recitation room space in addition. Its equipment consists for the most part of drawing tables and office furniture. It gives work not only to all engineering and architectural students of the College but to students in the Schools of Chemistry, Mines, Medicine, and the College of Science, Literature, and the Arts.

Experimental Engineering.—This Department has a staff of one professor, one assistant professor, one instructor, one laboratory assistant, one machinist, one engineman, and a stenographer. It is housed in the Experimental Laboratory, new in 1911, which is ample, wholesome and effective. Its equipment is comparatively extensive in order to carry on the wide variety of tests of boilers, steam and gas engines, pumps, air compressors, water meters, wooden, steel and concrete beams and columns, floor slabs, road materials and many other things needed in engineering practice; and to experiment on the flow and measurement of water and gases, on the stability of retaining walls and other things. The laboratory is well adapted to research investigations along engineering lines. All students in engineering and architecture take work in this Department. It gives work also to students in the Schools of Mines and Forestry.

Mathematics and Mechanics.—This Department has an instructional staff of one professor, two assistant professors, and three instructors. It is one of the four departments which occupy the Main Engineering Building. It has little equipment. It gives work to all engineering and architectural students of the College.

The power house employs three men, an engineer, and two assistant engineers. Instruction is given in plant operation, and tests of boilers, steam and gas engines. The plant furnishes a large portion of the direct current used on the Campus for light and power. It has a considerable equipment.

The library of the College.—By action of the Faculty, April 10, 1913, a Central Engineering and Architectural Library was created. Prior to this establishment the books of the College were scattered in the various departments, and served mainly the purposes of a department rather than the needs of all the students, all the members of the Faculty, and all the practicing engineers of the Twin Cities and the State. The north wing of the Main Engineering Building was completed in January, 1913. This was designed to accommodate a collection of perhaps 40,000 volumes, and shelf room has been provided for half that number. The reading and stack room is on the first floor, and is seventy feet long and thirty-eight feet wide. It has a ceiling height of twenty-six and a half feet, and is lighted laterally and by sky light. Some ornamentation has been employed, and the Library has been called the most beautiful room on the Campus. It is provided with ample desk and table room and is

much used. The Library is open from eight in the morning until ten at night. A trained librarian of the University Library staff is in charge. While the General Engineering and Architectural Library serves in a large way a large group of people, the utility of a compact, efficient collection of books in the departmental headquarters has not been lost sight of. Departmental Libraries still exist in Mechanical Engineering, Electrical Engineering, and in Architecture. Other departments have pooled substantially all of their books in the General Library, while the departments of Mechanical Engineering and Electrical Engineering have contributed some books to the College Library. The problem, not yet entirely solved, is to preserve that nice balance between the central collection of books, and the minor departmental collections whose efficiency lies largely in their immediate proximity to the drafting room, the lecture room or the laboratory. As the Central Library is but three minutes' walk from the furthest departmental library, and as this time will be reduced when all departments are in the new Engineering Group of buildings, wise policy points to the largest development of the centralized accessible collection, but it points also to some duplication of much-used books, with generous loaning privileges to all departments. The College collection of books, general and departmental, is small. The Central Library showed 5,687 bound volumes and 4,600 (estimated) unbound pamphlets and volumes at the end of the fiscal year 1913-14. In the departmental libraries, Electrical Engineering shows 1,636, Mechanical Engineering 1,923, Architecture (loaned) 193 bound volumes. While the accessions to the Library for the year have been small, 1,382 bound volumes, the books have been important. The Library fund is administered by the Library Committee of the College, with a representative of each department in its personnel.

The College as an engineering center.—In the development of the College during the past few years the thought has been constantly in mind that it is something more than an undergraduate institution. While its simple primary function is to train young men for the vocations of Engineer and Architect, it conceives that to train men successfully to serve in these professions it must needs train them as men of wide horizons and of good citizenship. Hence five-year courses with maturer training, but at the end of five years the College must still be a center of Engineering interests and advance to which its own graduates and those of other institutions may turn for graduate or special work; and its Faculty, its laboratories and its library must be of kinds and capacities substantially to help the profession towards the best solution of its technical problems. It must be a meeting place also for technical societies, where effective presentations of advanced engineering methods and experience may be made. The Engineering Auditorium has served effectively as an assembling center for engineers and architects. It is in the Main Engineering Building, has a seating capacity of four hundred, and is equipped with the best projection apparatus obtainable. It has an opaque projection lantern that will take an ordinary plan or blue print twenty inches square, and throw an enlarged image of it on a screen to illustrate

a lecture. Another lantern of the same kind will take a drawing, photograph or printed page eight inches square, and project it with high magnification and definition. Lantern slides and microscopic slides are utilized effectively. A motion picture machine has also been in use, and many educational films of high technical value to engineers and architects have been displayed. The capacity of the Auditorium and its means for the facile illustrating of lectures, has induced many technical societies to meet in the Engineering Building. Among others during the year are: the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, the American Institute of Architects, the Engineers' Club of Minneapolis, and the Engineers' Society of the College.

Special lectures.—Addresses to the students by Engineers of distinction have been of value during the past year. The following is a partial list of the speakers outside of the Faculty: Frederick P. Stearns, Past-President of the American Society of Civil Engineers of Boston; Rudolph Hering, Consulting Sanitary Engineer of New York; James H. Fuertes, Consulting Engineer of New York; Louis C. Sabin, Civil Engineer of Sault Ste. Marie, Michigan; J. F. Druar, Consulting Engineer of St. Paul; R. F. Pack, General Manager of the Minneapolis General Electric Company; and George C. Whipple, Professor of Sanitary Engineering. Harvard University. In addition certain manufacturers have been permitted to address the students in regard to the engineering features of their products. These addresses were illustrated by lantern slides, or by motion pictures. When practicable, the special lectures are under the auspices of the student organization, the Engineer's Society.

Architectural exhibits.—During the year the third floor corridor walls were prepared for continuous exhibits of student drawings and competitive designs. The exhibits of other architectural schools of the country and of the Beaux Arts architects were displayed in the Main Engineering Building and many architects of the State were in attendance. In the Beaux Arts competition the work of some of our own students was entered, and two "honorable mentions" were awarded.

Summer camp.—In the vacation period following the junior year all students in Civil Engineering are required to go into camp for a period of about five weeks. The camp during the past year was established at Lake Koronis just outside of Paynesville, Minnesota. The engineers began work there on June 5, and conducted various surveys for the location of railways, the triangulation and topography and hydrography in the vicinity of Lake Koronis, and in addition made a survey and map of the town of Paynesville. To these surveys the measurement of stream flow was added, using a current meter. The party was under the direction of Assistant Professors A. S. Cutler and O. S. Zelner, aided by a student assistant. The work is conducted in all respects as an engineering party would be handled in a survey of this kind for state or governmental purposes. The entire camp equipment is the property of the University.

The Experiment Station.—Research work in the Experimental Laboratory has been in progress along two distinct lines. Assistant Professor Shoop has conducted an extensive series of wearing tests, accompanied

by strength tests, on concrete as a road material made up of many different aggregates of Minnesota stones and gravels. The method used of continuous traction abrasion on the internal circumference of concrete rings twenty-eight inches in diameter was novel and effective. The State Highway Commission collaborated in this work. Instructor McMillan has carried on an elaborate series of deflection and extensometer measurements on flat reinforced-concrete floor slabs. These tests involve in addition to the immediate distortions due to loading, the cumulative effects of long-time loading. These two series of researches will be presented to the profession as Bulletins or Research Publications in Engineering. Professor Kavanaugh has carried on in connection with the Geological Survey of the State tests of various Minnesota stones. The survey will prepare a Bulletin on this subject. Some routine tests have been made for which a small charge was made. Under the new regulations in effect in 1914-15, routine testing is to be undertaken by the laboratory as a regular function. A special assistant will be provided, whose salary will be paid from the receipts from these tests.

Men of the Faculty as experts.—While the Faculty of a great technical school must be thought of primarily as a body of teachers, whose large service is fully concerned in giving to the student body the most effective instruction, it is in the nature of things that the intensive and extensive study of specialized engineering subjects which serves to make a man an authoritative teacher will make him, if he is big enough, also an authority on the larger Campus of the State, the nation or the world even. It is well to have at least a few men of this type to serve the community, the state or the nation in expert things. During the past year service of this kind has been rendered in the State of Minnesota, in other states, and to the nation by a number of the men of the Faculty of the College of Engineering.

Men of the Faculty as consulting engineers.—Some service has been rendered during the past year by men of the Faculty as Consulting Engineers for clients not governmental. Assuming the magnanimity of the practicing engineer, this is also a service to society, just as is the work of a surgeon. Under the regulations of the Board of Regents, the University is safeguarded in its prior claim to the time and energy of each professor in his collegiate work proper.

Men of the Faculty as teachers.—The conception of a University as largely extra-mural in its activities and influence is perturbing to the large majority of men of the Faculty whose whole intent is to put into the minds of the students the things which the curriculum prescribes, and whose whole energy and time are devoted to this end. These are the expert college teachers, as distinguished from the researchers, the writers, the lecturers, the counsellors, the administrators and the extension men. It is very certain that the influence for professional excellence which the graduating body of young engineers and architects take out into the world as the result of expert teaching, is great. It is doubtful if any other influence, which has its origin on the Campus, is greater. Of course the man who writes a really authoritative book has an influence that is

far-flung, and the man in the research laboratory may revolutionize engineering practice—but these men are few, and the teachers are many. It does appear to be a fact that plain successful teaching does not bring a pay-roll return quite as ample as that of the man who has written the book, or has been successful in research. Perhaps the unusualness of the authoritative book and the successful research may explain that. During the past year the men with a talent and passion for thoro penetrating teaching have served the College and the State abundantly.

Revision of the curriculum.—During the year the curriculum of the College has been vitally changed for the freshman and sophomore years, and the upper years have been slightly modified, pending more sweeping changes, to be perfected during the coming year. The object is to give students an immediate contact with engineering matters in the freshman year, to intensify the mathematical teaching and make it more concrete. Incidental foreign language of the freshman and sophomore years is eliminated. All freshmen take a year of Chemistry for Engineers. A special one-hour credit course in Technology has been introduced, which in lectures will give the freshman among other things a survey and understanding of the various engineering fields. Once a month each freshman is to visit some engineering work in progress or plant in operation under the guidance of an instructor, and is to present a theme concerning it which is technically criticised and then goes to the Rhetoric Department as an exercise in English Composition. It is purposed to retain the full cultural value of the present curriculum, but place it in part higher up.

Night classes.—During both semesters of the year work in Engineering and Architecture was offered under the direction of the Extension Division of the University. These classes were in part subcollegiate; but in some classes practicing engineers and architects were among those in attendance. The subjects were as follows: Shop Mathematics, Applied Mechanics, Strength of Materials, Structural Design, Reinforced Concrete, Materials Testing, General Electricity, Elements of Alternating Currents, Telephony, Plane Surveying, Heating and Ventilating, Power Stations, Elementary and Advanced Architectural Design, and Architectural History. Shop Mathematics was given in St. Paul and in Duluth as well as in Minneapolis.

Promotions and changes in Faculty.—Mr. Edward P. Burch was made an Assistant Professor after serving as Professorial Lecturer. Mr. F. B. Rowley and Dr. W. F. Holman were promoted from the rank of Instructor to that of Assistant Professor. Mr. John I. Parcel, Assistant Professor of Structural Engineering, resigned to accept a similar position with higher salary at the University of Illinois. Instructor R. W. Brink of the Department of Mathematics and Mechanics resigned. The following appointments have been made: Mr. Frederick M. Mann as Professor of Architecture, and head of the Department of Architecture and Architectural Engineering; Mr. R. C. Jones as Instructor in Architectural Design; Mr. J. P. J. Williams as Assistant Professor of Structural Engineering; Dr. W. L. Miser as Instructor in the Department of Mathematics and Mechanics.

Betterment of non-instructional organization.—A few years ago full professors in this College were their own typewriters and servicemen. The fixed continuous policy since has been to relieve the unbusinesslike lack of subordinate assistants. During the past year part-time stenographers were assigned to the Departments of Architecture and Drawing, and a larger allotment for stenographer was made to the Department of Electrical Engineering. An engineman was added in the Experimental Laboratory.

Public health.—The College of Engineering has collaborated during the year in the preliminary steps towards a School of Public Health. It is understood that this School is to be located in neither the School of Medicine nor the College of Engineering, but is to occupy a neutral zone, and be administered by a board much the same as that of the School for Health Officers of Harvard University and the Massachusetts Institute of Technology. In this school the director is a Doctor of Medicine, the chairman of the Administrative Board is a Doctor of Science, and the third member of the Board is a Sanitary Engineer.

Property inventories.—During the year the property inventories of the various departments have been put in better shape. The card-index inventory scheme of the Department of Experimental Engineering has been worked out with nice detail, and other departments are adopting the same system.

School of Mines.—The instructional and administrative staff of the School of Mines has been housed in the Main Engineering Building since the burning of the Mines Building in February, 1913.

Statistics.—In Tables I, II, and III appended to this report, statistics are presented of the registration in the College for the years 1873-1914, of scholarship, and of the geographical distribution for the past year. The registration numbers show a distinct upward trend in the past two years, the gain being nearly sixteen per cent. The geographical distribution shows a greater gain in students from outside the State than in those within the State. This is evidence of the widening influence of the College.

Scholarship.—Under the rigid scholarship rules adopted by the Faculty during the year, 80 students out of a student body of 438, over eighteen per cent, were dropped. This drastic elimination of men not doing good work, while it may appear cruel, is in the end kind. It is a wholesome awakening for those mistaking the College course for a primrose path, an orienting experience for those who have not yet found themselves, and a dispensation for those not equal to the rigorous technical courses. For those remaining it means progress with less impediment, and with fuller instructional service. Men of the right stuff will return and fight their way to successful scholarship; temporary elimination will but test their ultimate fitness.

Recommendations.—The most urgent recommendation is for funds for a modern, ample, efficient Electrical Laboratory. With an appropriation by the legislature of 1915 it will be September, 1916, before a new building may be designed, erected, and occupied. This means two college

years more of our present inadequate laboratory. My report of two years ago urged an appropriation for this building. Some relief, as noted earlier in this report, was given by an allowance for temporary remodeling and repairs. This was however in the nature of a makeshift. A permanent structure should not be delayed. The Engineering and Architectural Library should be specially provided for. Some additional equipment should be added in the Experiment Station and in Electrical Engineering. Some increases of salary are recommended as recognition of service. Some betterments in the instructional staff are noted in discussing the various departments. The important subjects of Hydraulics, Highways, Shop Management, and Architecture must be advanced.

TABLE I. REGISTRATION IN THE COLLEGE, 1873-1914

Year	No.	Year	No.	Year	No.
1873-74	4	1887-88	28	1901-02	312
1874-75	7	1888-89	25	1902-03	371
1875-76	4	1889-90	33	1903-04	395
1876-77	3	1890-91	74	1904-05	399
1877-78	5	1891-92	78	1905-06	412
1878-79	3	1892-93	154	1906-07	458
1879-80	2	1893-94	147	1907-08	473
1880-81	2	1894-95	149	1908-09	467
1881-82	9	1895-96	201	1909-10	407
1882-83	15	1896-97	186	1910-11	420
1883-84	8	1897-98*	129	1911-12	378
1884-85	7	1898-99	143	1912-13	393
1885-86	none	1899-1900	195	1913-14	438
1886-87	15	1900-01	246		

Total.....7,195

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

TABLE II. SCHOLARSHIP STATISTICS, 1913-14

1. Total number of students.....	438
2. Number of conditions.....	416
3. Number of failures.....	407
4. Number of students dropped.....	80*
5. Number of students left.....	45

*In addition to this number one student was suspended for a portion of the first semester. One student out of the eighty was expelled for forgery. Twenty-three of this number were notified that they could not return until the second semester of 1914-15 on account of being below passing grade in fifty per cent or more of their work.

TABLE III. GEOGRAPHICAL DISTRIBUTION OF STUDENTS
DISTRIBUTION BY COUNTIES IN MINNESOTA

County	No.	County	No.	County	No.
Anoka.....	3	Isanti.....	2	Redwood.....	1
Becker.....	5	Kanabec.....	2	Renville.....	2
Bigstone.....	2	Kandiyohi.....	4	Rice.....	4
Blue Earth.....	2	Kittson.....	2	Rock.....	1
Carlton.....	1	Lac qui Parle.....	2	St. Louis.....	20
Carver.....	1	Lake.....	1	Sherburne.....	2
Chippewa.....	3	Lesueur.....	1	Sibley.....	2
Chisago.....	2	Lyon.....	1	Stearns.....	2
Cottonwood.....	1	McLeod.....	2	Steel.....	2
Crow Wing.....	2	Marshall.....	1	Stevens.....	1
Dakota.....	3	Martin.....	5	Swift.....	1
Dodge.....	2	Meeker.....	3	Todd.....	5
Douglas.....	1	Murray.....	2	Wadena.....	1

THE PRESIDENT'S REPORT

TABLE III—Continued

County	No.	County	No.	County	No.
Faribault.....	3	Nobles.....	1	Wabasha.....	4
Fillmore.....	8	Norman.....	1	Waseca.....	4
Freeborn.....	4	Olmsted.....	1	Washington.....	4
Goodhue.....	8	Ottertail.....	4	Watsonwan.....	3
Grant.....	1	Pine.....	1	Winona.....	1
Hennepin.....	170	Polk.....	2	Wright.....	7
Houston.....	1	Ramsey.....	52	Yellow Medicine.....	2

Total.....382 Gain over last year 22

DISTRIBUTION IN OTHER STATES

State	No.	State	No.	State	No.
Colorado.....	2	Kentucky.....	1	North Dakota.....	5
Dist. of Columbia...	1	Massachusetts.....	2	Ohio.....	3
Florida.....	1	Michigan.....	2	South Dakota.....	6
Illinois.....	2	Missouri.....	1	Virginia.....	1
Iowa.....	5	Montana.....	4	Washington.....	2
				Wisconsin.....	8

Total.....46 Gain over last year 18

DISTRIBUTION OUTSIDE OF UNITED STATES

Country	No.	Country	No.	Country	No.
Canada.....	3	Norway.....	1	Syria.....	1
Cuba.....	1	Russia.....	1	South America.....	1
Japan.....	1	Siberia.....	1		

Total.....10 Gain over last year.. 5

Gain in state.....22

Gain from outside state.....23

Total gain.....45

Note: This distribution shows the student body is made up of 87 per cent of Minnesota men, but an increasing number from outside the State is indicated.

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, 1914.

ORGANIZATION

Considerable progress was made during the year in adjusting the work of the divisions to the plan of organization described in the last and previous reports. It has not yet been possible fully to segregate the work of the College, Experiment Station, and School of Agriculture, on account of the necessity of the joint use of buildings and equipment, and of carrying on the work with as small a force as possible. As the department grows and funds become available, it will be possible to assign workers more definitely to a special branch. Experience however indicates the economy and efficiency of a divisional grouping on the basis of subject matter. Such a grouping secures the combined judgment of all of the specialists in any one line on related problems in all branches of the department, and permits individuals to give most of their time to a single branch.

Closer relations are each year being secured between the various branches of the Department of Agriculture and the other colleges. The aim is to avoid duplication of teaching staff, equipment, and buildings. All military drill has been transferred to the Main Campus and Armory. All general courses in chemistry, botany, zoology, physiology, bacteriology, economics, sociology, psychology, and academic subjects in general, are provided for agricultural students by the other colleges. The special application of these subjects to agriculture, home economics, and forestry is provided for on the agricultural campus. Many of the courses on this campus are open to students in other colleges who are prepared to take the work. There is thus a rapidly growing cooperation between the departments on the two campuses which will increase when the street railway connecting the two campuses is completed.

Mention should also be made of the increasing cooperation between the Agricultural Extension service and the General University Extension service. The one covers the rural field especially, and the other the urban, and they unite in many projects.

REPORT BY DIVISIONS

CHANGES IN COURSES OF STUDY

The changes in courses as outlined in the last report were put into operation during the year and have proved highly satisfactory both to students and faculty. The purpose of the changes was to give a more scientific foundation for the applied courses and to provide opportunity for some specialization in the junior and senior years. The value of these changes is already evident, from the clearer grasp of the subject matter and increased interest on the part of the students. This is especially apparent in the Home Economics courses.

Division of Home Economics.—In the reorganization of 1913, the former sections of Domestic Science, Domestic Art, and Domestic Economy were combined with the sections of Drawing and Design, Textiles and Clothing, Foods and Cookery, Nutrition and Management, in the Division of Home Economics. During 1913 this was a department of undergraduate college instruction, continuing the work of the former sections, with the addition of courses in Drawing and Design, Food Economics, Nutrition, Dietetics, Textiles. All the courses offered were required of candidates for the degree of Bachelor of Science in Home Economics.

Beginning with 1914-15, this division will comprise the section of college instruction, including graduate work toward the Master's degree, and two sections of secondary instruction in the School of Agriculture. New courses will be added in the sections of Drawing and Design, and Textiles and Clothing. Two courses in Home Management, (1) Building and Equipment, (2) Operation and Maintenance, will be added to the requirements for the degree and as preparation for the teaching of Home Economics.

Home Management—Operation and Maintenance—deserves special mention since it is a University of Minnesota experiment—perhaps the first of its kind. Its unique feature is laboratory work, managed on a commercial basis, for which college credit is given. The course includes two lectures or class exercises a week and practice in management as its laboratory work. The laboratory is a fifteen-room house, on the corner of Knapp Street and Raymond Avenue, which is rented furnished. The course is financed by the income of the house, except for the salary of the instructor. The group consists of twenty persons, an instructor, nine senior students and ten freshmen. The nine seniors care for the house-keeping during the nine weeks period. Each of these in turn acts as home manager for one week, assigning the work, planning the meals, ordering supplies, keeping the budget, etc., etc. Eight prepare the meals and perform all other services of the housekeeper. After nine weeks the group of seniors changes, thirty-six students securing credit for the course during the school year.

Division of Bee Culture.—Special mention should be made of the reorganization as a distinct division of the work in bee culture. Courses have been offered in the various phases of this subject and thirty-one stu-

dents in the School elected the work during the year. Plans have been made for greatly enlarging the work the second year of the biennium. Special work on bee culture has also been included in several of the short courses and is arousing a great deal of interest.

Division of Agricultural Education.—The College has as yet been able to supply but few of the teachers of agriculture needed in the high schools and in the extension service. The extent to which we have to draw upon other states is indicated by the fact that Minnesota has supplied only seventeen out of one hundred and thirty-six teachers of agriculture, and thirty-seven out of one hundred and thirty-three teachers of home economics in Minnesota high schools receiving state aid for industrial work. The number of students in the College of Agriculture has been quite small until recently, but in the past five years the growth has been rapid. An increasing number of men are taking the general courses in agriculture with special work in farm crops, farm management, dairy and animal husbandry, or other technical branches. The women take Home Economics courses almost exclusively, and all who are preparing for teaching are required to elect certain work in technical education with practice teaching. From now on, therefore, an increasing number of competent teachers will be available from among our graduates.

The Division of Agricultural Education has grown rapidly. Thoroughly experienced teachers offer a four-year college course for the training of teachers of Agriculture and Home Economics. Each course includes sufficient professional educational work adapted to these industrial subjects to fulfill the requirements of the statutes and the rules of the State Department of Education. Special emphasis is laid upon proper methods of teaching, correct organization and management and teaching practice under expert supervision.

The Division offers help to the one hundred thirty-six high schools of the State that receive special aid for maintaining these departments and to other Minnesota public schools through the medium of the Visitor, through addresses at teachers' associations and local gatherings, through visits to schools and communities, and through correspondence.

A larger number of students each semester choose agricultural education for their major work. Plans for the future contemplate the organization of a normal class to whom will be taught the special courses in Agriculture and Home Economics arranged for country schools, the coordination of the work of the division with some of the country schools nearby, the teaching of agriculture in the University High School, and further assistance to the high schools of the State by the publication of pamphlets and the utilization of seniors as assistants for short periods.

College of Forestry.—There has been no material change in the courses of the College of Forestry. The practical field work has been emphasized and more attention has been given to the problems of practical forest management. No attempt has been made to attract large numbers of students to the Forestry courses. Scientific forestry has not yet developed in this country to a point where many men of college training

are required. The country is awakening however to the importance of scientific forest management, and it is evident from the data presented in the table on page 85, that the graduates are making good use of the training they have received.

THE SCHOOLS OF AGRICULTURE

The Central School of Agriculture has registered approximately 900 students each year for the last four years. This number is more than we can properly accommodate with the equipment and force available. About two-thirds of these are men and one-third women. During the school year 1913-14 there was a total attendance of 292 girls, 98 of whom had homes in the Twin Cities. The capacity of the girls' dormitories is 160, leaving thirty-four country girls who were obliged to find room outside the dormitories. Some changes can be made, increasing the capacity to 173. At the same time 602 boys were in attendance, of whom 113 were from the Twin Cities. This leaves 489 country boys to be cared for. As the dormitories for boys would accommodate but 335, 154 country boys were left to find rooms elsewhere.

At Crookston the number has ranged between 136 and 161, and at Morris from 91 to 129. This has been about the limit that could be cared for in the dormitories and classrooms. At Crookston, the dormitory space for boys has been inadequate. It has been necessary to crowd three in a room, barely large enough for two. A new dormitory completed during the year will provide twenty-six rooms for fifty-two boys. This will give us space for 144 boys, two in each room. There were 116 boys registered during 1913-14. We have room for 64 girls, two in a room, and 47 were registered.

At Morris the new dormitory for girls and one for the boys have met the requirements satisfactorily. The greatest need at both of these schools is for better dining hall facilities and also for suitable hospital quarters. Further reference will be made to this under special needs for the next biennium.

Short courses.—The attendance at the Farmers' Short Course has increased from 127 three years ago, to 194 in 1913-14, but this is somewhat lower than in 1910 and 1911. This is due to the large number of short courses held over the State in agricultural high schools and consolidated schools with the help of our Extension Service. Details regarding these will be found in the Extension Service Report. It is expected that the introduction of agriculture in the consolidated and high schools, under competent teachers, will reduce the necessity of too greatly extending that work at University Farm, Crookston and Morris.

Farmers' Week.—With the distribution of the short courses over the State, it is less expensive and more convenient for the farmers to attend, and the work can be more closely related to the locality. For this reason we have decided to change the Farmers' Short Course to a Farmers' Week. This will come between Christmas and New Year. It is expected that the students in the school will go home for that week and send their parents here. The dormitory rooms will be available and

special work will be offered in farm crops, marketing, farm management, dairy and animal husbandry, home economics, etc., etc., with special evening entertainment features like "Back to the Farm" and "The Boosters" plays, etc. It is expected that a very large number will attend and enjoy the week.

The Dairy School.—The Dairy School had the largest attendance in its history—117. This is fourteen more than the preceding year. A large number of the famous Minnesota buttermakers have been trained in this school. It is open only to those who have had previous experience.

The Junior Short Course.—The Junior Short Course started with 310 in 1911-12 and registered 358 in 1913-14. This is a course for young people, corresponding to the Farmers' Week.

The Traction Engineering Short Course.—The Traction Engineering Short Course has remained about stationary. It is open only to those who have had previous experience in this work.

The Teachers' Summer Training School.—The Teachers' Summer Training School started with 90 in 1908-09 and increased to 859 in 1913-14. These are largely rural teachers and those planning to teach in rural schools. It is conducted under the supervision of the State Superintendent of Education.

The College Summer School.—The College Summer School is essentially a summer session of the College, with special reference to the needs of teachers. It has been steadily growing each year.

Course for Rural Church Workers.—During the last week of the summer session, a short course for rural church workers and country life leaders was held. There were twenty-nine registered, mostly rural preachers. The course aroused great interest among those present and it is planned to hold it again this year.

THE EXPERIMENT STATION

Agronomy and Farm Management.—The principal lines of work in the Division of Agronomy and Farm Management have been coöperative seed production and distribution, farm crops studies, cereal breeding, and cost accounting investigations.

Owing to the fact that Mr. Bull was on leave of absence to conduct the National Corn Show at Dallas, Texas, but little work was done in coöperative seed production during the year. The pure seeds grown at University Farm were sold in small quantities to farmers in Minnesota and a seed-exchange bureau was maintained. In this way material aid was given to those in search of improved strains of small grain and corn.

The community corn breeding stations have been maintained throughout the year and variety tests and ear-to-row breeding plots conducted.

For the past two years investigations in the production of sugar-beet seed have been conducted in coöperation with the Minnesota Sugar Company of Chaska. A little over an acre of beets of different varieties was raised at that point during the year and a large number of "stecklings" was grown, from which seed production has been attempted this year.

The experimental results at Chaska and at University Farm indicate that sugar-beet seed of high quality can be produced in Minnesota. It is proposed to enlarge this work sufficiently to determine whether or not the growth of sugar-beet seed in a commercial way would be profitable.

Investigations in tobacco-growing were also continued through the year. A good crop was secured and considerable advance made in methods of harvesting and marketing the product. No attempts have been made at tobacco-breeding, the effort being concentrated on methods of growing, cultivating, harvesting, and curing the crop.

The investigations with small grains include a number of experiments, all related to the strength of growth and the culture of the crop. They cover trials of acclimated versus imported seed oats; a comparison of the value of the different grades of seed oats for seed purposes; a comparison of the value of primary and secondary oat kernels for seed purposes; a comparison of small, medium, and large grains of wheat for seed purposes; a grain-mixture test, and the relation of methods of preparation of the seed bed to the yield and quality of spring wheat. Data are being secured also on the time to sow rye and winter wheat and variety tests of grain are being conducted.

Several experiments are under way in connection with our forage crop investigations, including (1) a comparison of distance apart to plant corn to secure maximum yield, and stage of maturity at which to cut for silage purposes. This project is being conducted in coöperation with the Dairy Division, which will make the digestion experiments and chemical analyses. (2) Time, rate, and method of seeding alfalfa. This is a continuation of work started two years ago. While the tests are not yet complete, they indicate that inoculation is highly important in securing a stand of alfalfa in Minnesota; also that summer seeding of alfalfa on clean land is desirable, especially where there is difficulty in getting a stand. Different methods of inoculation are being tested and lime has been used on some plots with very beneficial results. (3) Investigations of Sudan grass, recently introduced by the United States Department of Agriculture, have been conducted for the past two years. This grass grows very luxuriantly and seems to be suited to our climatic conditions and soil. The feed value is yet to be determined. (4) Miscellaneous experiments in the production of millet, mixtures of Canada field peas and oats for silage, and hay production, the production of roots for live stock, and investigations of the time, rate, and method of seeding sweet clover, have also been carried on.

The cereal breeding as conducted in the past has been continued. The hybrids of 1907 coming from winter and spring wheat crosses, are developing several good strains that give promise of being superior varieties. Selections of winter wheat for hardiness and yield have been continued and especial attention also has been given to securing heavy yielding strains of spring wheats. Selections of oats have been continued for hardiness and yield. The work in barley breeding has been carried on in coöperation with the Bureau of Plant Industry, United States Department of Agriculture.

Four new projects were started in plant breeding during the year: (1) Importance of show points and their relation to yield in corn; (2) earliness in corn as affected by cross breeding; by the temperature at which germination is made; by the use of commercial fertilizers, and by cultural methods. The behavior of early maturing selections under changed environment is also being studied. (3) The improvement of small grains through hybridization and by selection is a supplementary study. Special attention will be given to isolating plant characters and to studying their behavior. (4) The inter-relation between nitrogen-fixing bacteria of alsike, medium red, white, crimson, and sweet clover and alfalfa is under investigation. These projects were started under the leadership of Mr. T. B. Hutcheson and Mr. P. J. Olson. Mr. H. K. Hays will assume charge of the projects upon his arrival in Minnesota. They will be carried on in the meantime by Mr. Olson, who will continue to assist in the work.

In connection with investigations of the cost of producing farm products, two statistical routes, one at Cokato and one at Halstad, have been maintained throughout the year. In addition we have secured, in coöperation with the Office of Farm Management, United States Department of Agriculture, data from nine additional farms. During the winter feeding season, data were secured from eleven farms on which cattle and hogs were fed also with a view to determining the cost of meat production. Data were also secured from six market gardeners in the vicinity of Minneapolis which will be combined with the data secured during the past two summers and published as a bulletin on the cost of producing garden products. The data on the cost of producing Minnesota farm crops for the period of 1908 to 1912 have been compiled.

Crop-rotation experiments have been continued. The fourth cycle of the standard rotations and the twentieth year of the investigation as a whole has been completed on Field C. Upon the completion of the chemical analyses, the results for the entire period will be reviewed and published. While these experiments are expected to run only for the twenty-year period, the results obtained in the past and the conditions of the plots at the present time seem to warrant further continuation of the work. Before the plots were given up, studies of the bacteria of the soil and further studies of the chemical condition should be made. The Field T plots, started in 1909, are giving valuable results. We now have the data from five years of cropping and the data on certain features of the experiments are ready for publication. The data for the four previous crops have been compiled and as soon as the results from the 1914 crop can be combined with them, a bulletin will be presented for publication on this experiment.

This year we are closing our investigation of methods of eradicating quack grass, conducted on the forty-acre tract at Monticello. The effort has been to eradicate the quack grass without losing a crop from the land. This has been accomplished through the use of short rotations and by giving thoro tillage at every opportunity when crops are not growing. The results have been highly satisfactory, and will be ready for

publication in a very short time. Some-work has been done in the eradication of sow thistles and Canada thistles. The plan is to close up the work on quack grass eradication and devote the next series of experiments to the control of these noxious weeds.

We have at hand data on farm equipment representing a survey of one hundred and twenty farms in Minnesota conducted in coöperation with the United States Department of Agriculture. This material is about ready for publication.

In 1913, data were secured from 650 farms in Rice County in connection with our farm management surveys. The data secured in 1913 have been compiled and will be ready for publication soon. In order to secure the information needed, we should have four men in the field each summer from May 1 to August 1. The data secured in such work are very valuable in analyzing the farm conditions in the State and in furnishing working plans to farmers.

Division of Research in Agricultural Economics.—The work of the Division of Research in Agricultural Economics has been devoted largely to problems of marketing and coöperation, and several important investigations have been completed.

In compliance with a state law requiring the University to collect statistics of coöperative organizations in Minnesota, lists of all such organizations were first compiled and forms for reports were drawn up for each kind of organization. Reports were secured by mail, and altho some organizations did not report, the returns are sufficiently complete to make possible a more thoro statistical analysis of coöperation in this State than has hitherto been attempted. The results have been formulated in bulletin form under the title "Statistics of Coöperation in Minnesota."

During the summer of 1913 surveys of two rural communities were made, consisting of exhaustive statistical and descriptive analyses of economic, marketing, and social conditions, and the two reports are practically ready for publication.

A study of the marketing of grain at Minneapolis, with special reference to the Minneapolis Chamber of Commerce, was undertaken in coöperation with the Office of Markets, United States Department of Agriculture.

In the studies of marketing of Minnesota farm products, reports on the marketing of meat, the coöperative marketing of potatoes, and the marketing of poultry have been practically completed and will be presented for publication.

An investigation of the marketing of Minnesota butter was begun in July, 1914, in coöperation with the Office of Markets, United States Department of Agriculture, and with the Minnesota Dairy and Food Department. The investigation has divided itself into five chief divisions, viz., the marketing of dairy butter, the marketing of country creamery butter; the marketing of butter through "centralizers"; transportation problems; and the organization of methods of marketing butter in eastern cities to which Minnesota butter is shipped. Half of the time of the Divi-

sion is being devoted to this study, which will require several months for completion.

A study of rural credits in Minnesota was undertaken in coöperation with the Rural Organization Service, United States Department of Agriculture. This investigation has been completed.

Division of Agricultural Engineering.—In the Division of Agricultural Engineering, it has been necessary to give a great deal of attention to equipping the new Agricultural Engineering Building during the year. For this reason, no progress has been made on the projects to determine the strength of drain tile or the method and cost of drainage construction. The irrigation experiment in coöperation with the Division of Irrigation Investigations, United States Department of Agriculture, and our Division of Plant Pathology and Botany, is being continued. One assistant spent the entire summer of 1913 collecting information regarding the values and methods of improving peat and muck lands, but these data have not yet been compiled.

During the year an Experiment Station Bulletin on the Selection and Preparation of Land for Cranberry Culture was published.

Division of Bee Culture.—The Division of Bee Culture was established during the year in accordance with the legislative provision. Mr. Francis Jager was appointed Professor of Bee Culture and Chief of Division.

A great deal of interest in the work has been manifested by the students of the School and the College, and especially by the Short Course students. Sixty-four hives and selected strains of bees and considerable necessary equipment were secured. Space for the department was set aside in the old Agronomy wing of the Farm House, and the cellar of the Farm House will be used for winter quarters for the bees. Progress has been made in experimental work, especially in the production of queens; progress has also been made in pure line breeding, artificial fertilization having been accomplished in several cases. A great deal of Extension work has been done in developing bee culture and close coöperation has been arranged between the Bee Inspection Service of the State and the University.

The Division of Botany and Plant Pathology.—Laboratory and greenhouse studies on rust resistance in cereals have been continued. The results indicate that resistance may sometimes be only apparent. The fact has been confirmed that biologic forms adapt themselves to new hosts, although the adaptation is very slow; also that the barberry plant, while it may serve as a bridging species between rusts on grasses, does not usually act as such between the cereal rusts. It has been shown that grass rusts may possibly play a considerable part in the infection of cereals. The possibilities of obtaining rust-resistant varieties by bulk and individual selections are being tested, but the work has not been continued long enough to give results.

The work on hybridizing spring and durum wheats has been continued on an extensive scale, with the coöperation of the United States Department of Agriculture, and hybrids with considerable resistance have

been developed. These are being tested for behavior in other localities and under varying conditions as well as for milling qualities and yield. The work on rusts will be continued during the coming year along the same lines, except that work in biochemical studies will be added, aiming toward the isolation of the physiological factors involved in disease resistance.

A study of corn smut has been inaugurated and a few definite results obtained. The infections seem to be more or less local and fresh spores germinate very readily, making a rapid spread of the disease in favorable weather. A beginning has been made in the isolation of fungi from the soil, but their power of parasitism has not yet been demonstrated. This work bears on the important question of soil sanitation and rotation of crops.

In garden truck diseases observations have been made on the so-called Cucumber Nubbin, indicating that it is a physiological disorder which may be induced secondarily by facultative parasites. The chief bean disease of Minnesota, Bean Bacteriosis, is especially virulent on "Refugee 1000 to 1," which is the chief canning bean. Seed plot methods must be used to control the disease.

The work on potato diseases indicates that bichloride of mercury is more effective in the treatment of *Rhizoctonia* on potatoes than any of the other standard mixtures.

On the diseases of fruit trees, it has been shown that a very decided difference exists in the susceptibility of various Minnesota plums to the Brown Rot, and the indications are that this resistance is due to physiological characteristics. The apple and plum spraying experiments indicate a decided financial gain as a result of spraying. It has not been found that there is any great difference in the efficiency of the various spray mixtures for the diseases which occur in Minnesota. The spraying for Brown Rot of plums must be made so as to make the last spray very shortly before the ripening time of the plums, since they are most susceptible to the Brown Rot at this particular period. In the coming year plum pocket and apple canker and the Wealthy fruit spot will be given particular attention. The work on plums in regard to the Brown Rot and the apple and plum spraying will be continued.

Some work has been done on oak canker and on *Armillaria* root rot. It is planned to collect material from cross inoculations made at Itasca Park in 1911 and to examine material during the coming year.

In the work on the study of bacteria in the peat lands, samples were collected from peat soils which had been cultivated for varying lengths of time and in different ways and the bacteria were isolated and compared with those from virgin peat soils. No cellulose splitting forms were found in virgin peat soils nor in those which had been cropped for only one or two years. In some fields which had been cropped for as long as four years these bacteria were also missing.

The Seed Laboratory.—During the past year the Seed Laboratory has made analyses of 5,534 samples sent in by farmers and others and of an additional 386 samples collected by the inspector. The results of

these tests will be published in bulletin form. The number of farmers who are availing themselves of the opportunity of having their seeds tested is steadily increasing and the educational results have been good. The seed herbarium has been increased by 200 samples, collected by members of the division and by 1,200 samples transferred from the Horticultural Division, collected by the late Otto Luggler.

In the seed studies of the year, very important results have been obtained in a perfection of methods for the diagnosis between the different species of *Agropyron* seeds found in the common trade. It is now possible with certainty to identify quack grass in a seed mixture, even if only the individual florets are present.

The production of weed seed cases has been continued and the demand for them has steadily increased. During the year 553 cases have been distributed.

In the weed studies, an increasingly large number of weeds has been identified for the farmers of the state. A bulletin describing twenty-four weeds common in this state was completed.

The beginning of a weed survey has been made and records are being kept of the appearance and distribution of the common bad weeds in different parts of the state.

Division of Agricultural Chemistry.—Cereal and Flour Investigations, Strength of Wheat Flour, Sorghum Syrup Industry in Minnesota, Sodium Silicate as an Egg Preservative, Wild Rice Investigations, Grains Grown in Mixture, have been the principal projects under investigation.

In connection with Cereal and Flour Investigations, 117 samples of wheat were secured from localities representing all the typical wheat-growing districts of the state and submitted to analyses, milling and baking tests. The results of these tests have been included with those of similar tests on samples of the crops of 1912 and 1913 and prepared as a bulletin which is now in process of publication. Thirty-two of the above-mentioned samples were of fall-sown wheat. The average quality of the winter wheats of the crop of 1913 was found to be superior to that of similar wheats of the crop of 1912, but inferior to that of the spring-sown varieties grown in the same locality. Our wheat storage investigations were carried out on a large scale during the present year. Seventeen different carload lots of wheat, having moisture contents varying from 12.75 per cent to 17.45 per cent, were under investigation at the elevator during the fall months. Several bins of very damp wheat were carried through the entire winter and the conditions under which such wheat could be stored investigated. The laboratory work included two series of determinations of the comparative rates of respiration of wheats of varying moisture content. A method for the removal and quantitative determination of the evolved carbon dioxide and water has been worked out. The laboratory results are opening up a very promising field of study of the changes involved in the "sweating" and "heating" of stored grain.

We have continued the studies of the influence of environment upon the composition and milling quality of wheat and the progressive develop-

ment of the wheat kernel. Climatological data and the crop history of the plots were recorded. The samples were submitted to careful analyses and milling tests. The data are on file for comparison with similar data of preceding and subsequent seasons. Several hundred individual heads of each of two varieties of wheat—Turkey Red and Blue-stem—were tagged when first coming into bloom and samples collected at regular intervals until the grain was ripe. These samples were immediately dried, threshed out by hand, the kernels weighed, and then submitted to complete analyses. By this means the successive changes in both the percentage composition and the actual quantities of materials in the kernels were followed. The data thus secured show some unexpected and rather surprising facts concerning the composition of the daily gain in materials per kernel for successive periods of development. These investigations will be continued and extended.

Work on strength of wheat flour this year was confined to enzymes and proteins. The work on the enzymes has dealt, thus far, only with the diastases and invertases. Quantitative methods for the extraction and estimation of the comparative strength of these enzymes have been perfected. A determination of the diastase content of a large number of flours of varying "strength" showed that there is no definite relation between the amount of diastases present in the different flours and their relative baking strength, but indicate that there may be other factors which influence the diastatic activity of each individual flour. This is to be given further study. A determination of the invertase content of each flour showed that the amount present in flour is relatively so much less than that in yeast that the invertase content of flour is probably not a factor in its "strength." The work on the proteins has developed proper methods for the extraction and purification of individual wheat proteins and a study of the cleavage products of the proteins is now under way.

Investigations on the sorghum syrup industry in Minnesota have been actively prosecuted during the past year. The statistical data which have been obtained show that in most instances the manufacture of sorghum syrup is in a very primitive state of development. In the few cases where records of cost are available, it appears to be an exceedingly profitable business with an assured market for a largely increased output. Analytical data concerning the composition and changes in composition of the juice of the sorghum plant during its development have been accumulated during two growing seasons. These, with similar data for the third season which are now being secured, will permit general conclusions concerning the proper stages of growth for the harvesting of the crop for syrup manufacture. A method for the determination of the individual organic acids of the sorghum juice has been perfected and a study of the development of these acids and their effect upon the process of manufacture and quality of the resultant syrup is being investigated. Incidentally, the development of the glucoside which yields hydrocyanic acid was studied and the stages of growth at which the sorghum plant is likely to be poisonous to stock were determined. A study of the pro-

gressive development of the different sugars in the sorghum plant is also under way.

Investigations conducted last year with sodium silicate as an egg preservative were repeated this year and led to the definite conclusions that the water-glass on the Minnesota market is practically all obtained from the same source, is of two or three grades, but has a comparatively limited range of alkalinity, that within a much larger range of alkalinity than that exhibited by market samples of sodium silicate solution, the preserved eggs are not appreciably affected, that deposition of silicate from solution depends upon the exposure to the air and amounts of carbon dioxide present, that deposited silicate may be re-dissolved by boiling with a little lye and such solutions are equal in every respect to fresh solutions. A satisfactory test has been devised whereby the relative value of a solution which has been used through a season can be readily ascertained. These investigations are now completed and their results will be published in bulletin form.

Samples of wild rice plant were secured directly from the lakes where it is grown, and samples of commercial stocks of the material as prepared for food were secured from four different localities. These samples have been submitted to thoro analyses. The data secured furnish detailed information as to the composition of the product as it is now being prepared for human food.

A study of the effect upon the composition of the grain and straw of several cereals when grown in mixtures of varying proportions was inaugurated this year. The various mixtures were grown and harvested and the proportion of grain and straw of each kind carefully determined by the Division of Agronomy and Farm Management. Eighty-four samples of these grains and straws have been received and are in process of analysis.

Division of Soils.—At the beginning of the fiscal year, the work on soils and fertilizers was transferred to the new Division of Soils. Some of the projects have been discontinued, while others have been reorganized and two new ones added. Soil-absorption studies have been continued. The first part of the project as originally outlined has been completed and the results are being prepared for publication.

The practice of furnishing fertilizers for experiments in coöperation with farmers has been discontinued and the plans of the fertilizer experiments at Crookston and Grand Rapids have been radically changed. Experiments were started at Waseca and Morris and a new series added at University Farm. Experiments, using acid phosphate and raw rock phosphate, both alone and in combination with barnyard manure, were started at University Farm, Waseca, Morris, and Crookston on a corn-wheat-oats-clover rotation and at Grand Rapids on a corn-oats-clover rotation. At Crookston a more complete experiment, employing nitrogen and potassium as well as phosphorus fertilizers, has been started on a barley-clover-potato rotation. At Morris and Crookston plots have been seeded to alfalfa as a permanent crop, using as fertilizers, gypsum, acid phosphate, potassium sulfate, and a combination of the last two. A

single cooperative experiment is being conducted with fertilizers on mineral soils. In this the agricultural agent of Ramsey County is to keep in close observation the planting, care and harvesting of potatoes, corn and tomato crops on twenty or more small experimental tracts located in different parts of the county, while the fertilizers used are being donated by a local company.

Very little additional laboratory work on peat soils has been done during the past year but an extensive investigation is planned for the ensuing fiscal year in the hope of classifying the Minnesota peat areas to such an extent as to permit of an intelligent application of the results obtained by the European Peat Experiment Stations. The cooperative fertilizer experiments on peat soils referred to in the last annual report proved highly unsatisfactory, the crop being harvested only on one of the four farms. On a small field of peat soil at the North Central Experiment Station, Grand Rapids, experiments are being carried on during the present season, using potatoes, oats, clover, and grasses. Barnyard manure, lime, steamed bone-meal, raw rock phosphate, potassium sulfate, and sodium nitrate are being used singly and in various combinations. An assistant has been detailed to keep the plots under close observation throughout the growing season and to make a careful study of the changes in the moisture and temperature conditions of the soil from day to day. One cooperative experiment on peat soil is being conducted at Meadowlands, the owner furnishing the different fertilizers. These, both with and without lime, have been applied to lettuce, cabbage, potatoes, barley, clover, and grasses.

Investigation was begun during the year on the composition of the soils of the different glacial drift sheets. Samples of soil were collected from five virgin fields. Determinations of the physical constants and chemical analyses of the most important constituents are being made to determine what definite connection, if any, exists between the different glacial formations and the character of the soils found upon them. The work has already been carried far enough to show that the content of phosphorus and potassium and the physical properties affecting the supply of moisture do not exhibit radical differences.

Only very limited progress has been made on the new project started late in the year, studies of the movement of water in soils, under the Adams Fund. Some field studies have been made. The physical constants of a large number of soils, including those examined in the field studies and others collected for laboratory investigations, have been determined. It is planned to include in this study the lightest sands, the heaviest clays, intermediate loams and the different types of peat soils found in the state.

Division of Dairy and Animal Husbandry.—Investigations on Nutrient Requirements in Meat Production and the Composition of Steers at Various Stages from birth to block have progressed very satisfactorily and one phase will be ready for publication during the next fiscal year. Incidentally a large amount of data on the feed required in steer production has been accumulated, affording comparison of summer pasturing followed by stall feeding, with continuous stall feeding from birth. This

project is carried under the Adams Fund. It is planned to begin a series of experiments with swine covering the same lines of investigation.

Some special studies will be made in the application of our present knowledge of feeding, to the feeding of yearling steers for market, the feeding of lambs for market, and in rearing and feeding horses.

The studies of steers in relation of food to product have been continued. The animals in group VI having reached an average weight of about 1,140 pounds, were sold after one steer had been taken out for slaughter and analysis. Group VII was divided into two groups. One steer was slaughtered and analyzed, and then lot I was continued in stall feeding while lot II was sent to Waseca to be pastured during the summer months. A preliminary report on the composition of steers at various ages, from birth to 1,400 pounds is being prepared. This project is being carried under the Adams Fund.

Some experiments have been inaugurated to determine which method of planting and cutting corn silage will return the greatest yield of net nutriment. Corn was planted in three ways and will be harvested at two stages of ripeness, to be used in digestion experiments.

The swine investigations during the past year were a continuation of work done the previous year on a comparison of pasture plants for maintaining dry brood sows; the results during the past year were very similar to those of the year previous, and emphasize further the importance of providing suitable grain ordinarily required in the dry lot. The best results have been secured from rape; oats, peas and rape; oats; and sorghum, in the order named. This work will be continued for another season.

Our experiment in contagious bovine abortion was commenced in the autumn of 1911, in an observational manner and with limited tests on young cattle. In the spring of 1913, four heifers were purchased and used for this investigation. Since then a larger number has been added to the group. The results secured are very encouraging. Abortion can now be regularly produced in laboratory animals with almost one-hundred per cent certainty. The presence of the disease in cows can be determined by a test of the blood.

In connection with our poultry investigations, an economic study of duck culture in small flocks has been undertaken. From feeding records kept at University Farm this season, it would appear that in flocks of twenty or more, the feeder would realize about twenty-five cents per hour for his time and that that figure would rise materially as the number was increased. Ducks when fed unstintingly are ready for the market in from nine to eleven weeks.

Records of the cost of growing the chick during the feathering age have also been kept and indicate that in this, the most expensive period of production, the cost of feed exceeds one-half the lowest market price. Records of the cost of production for a flock of White Leghorn males, from feathering age to maturity on range by the hopper method, are being kept. So far they show that the flock has more than doubled in weight in fifty-seven days and at a feeding cost of less than seven cents per pound

gained. At the low average price of twenty cents per dozen for eggs produced, a flock of thirty-nine White Leghorns, having been confined in enclosed quarters for one year and a half, shows receipts of over 30 per cent above the maximum feeding cost. Had the waste from a family table, which is nearly always available, been used, the cost would have been reduced materially.

Division of Entomology.—During the past year, plans for the reorganization of the Division of Entomology were completed. Four sections were made, including: (1) Vertebrate Pests of the Farm, and Mill and Warehouse Insects; (2) Spraying, and Tree Insects; (3) Parasites and Field Crop Pests; and (4) Truck Crop and Greenhouse Insects.

A number of experiments on spraying potatoes for the potato beetle were conducted in different parts of the state. These proved that for the three insecticides used at the usual rate, arsenate of lead was better than either Paris green or arsenite of zinc. Arsenate of lead and iron sulphide was tried on apple trees as spray against plum curculio. The arsenate of lead proved the better of the two. On plum trees, arsenate of lead proved its superiority over arsenite of zinc and iron sulphide.

The work on the housefly has been carried over from the previous year, the University Farm serving as the location for the investigations. Attempts were made to find some substance which would prevent flies from breeding in manure piles. Observations were also made upon disposal of garbage as related to breeding of flies in small towns. The question of hibernation of the housefly was also given consideration. It is intended to complete these studies the coming season and publish a full report.

The work on mosquitoes during the past season was confined to field observations in the vicinity of the Twin Cities. The breeding places of our common species were studied as well as methods of control which are applicable to our local conditions. The work will be continued another season.

Some advance has been made in working out the life-history of the "jigger-mite" which attacks man in the vicinity of many of our lakes. At least two more seasons will be necessary to complete the investigation. A few new observations have been made in connection with studies on orthoptera but the project as a whole will have to wait for another outbreak for completion.

The study of the life-history of the Clover Seed Chalcid was continued, with a search for natural parasites which might be of use in its control. Field experiments were conducted to determine the effect of different methods of handling the crop on the amount of infestation of the seed. We hope to complete the work by the end of this season and publish a complete report. Data were collected on the amount of damage done to crops by the Wheat Stem Maggot. Investigations were conducted to determine its food plants, especially among the wild grasses, and to determine its methods of hibernation.

As no specimens of the joint worm could be found in the state, this Adams Fund project will be suspended for the present.

The main work with truck crop and greenhouse insects has been in connection with the use of hydrocyanic acid gas for fumigation to ascertain, from a scientific standpoint, what conditions influenced the success of treatment. Greatest progress was made upon the study of penetration of the gas into the plant and the factors influencing penetration. Considerable information was obtained on the action of cyanide after it had penetrated the plant and also the insect, but this information is not yet complete. A study of the cucumber beetle and its effective control was taken up with considerable success and the results will be published some time during the present winter in a circular from the State Entomologist's office.

Forestry Division.—At the Cloquet Forest Experiment Station, the most pressing problems are the securing of reproduction, either natural or artificial, upon forest lands now destitute of trees, and the determining of the proper species, stock, and methods to use in the different types of forest lands. Experiments have been carried on in transplanting to secure the best stock by the fastest and cheapest method. A method of transplanting by means of a horse and plow has been worked out that promises to cut down this item of cost considerably. A set of experimental tools was made and the cost of planting a thousand trees in various types of soil with various tools determined. Very extensive experiments have been initiated with a view to determining the right species and the proper stock for the many situations to be found in this portion of the Lake States. Experiments to determine the proper time to thin so as to do the most good at least expense have also been begun. Studies have also been started which will determine the amount of wood produced naturally on swampy land and the length of time necessary to produce a profitable crop. Work has been carried on in the way of planting hardwoods and shrubs exotic to this region. The Bureau of Plant Introduction has sent many different varieties of poplar and willow from China, many of which are making a very good growth and give promise of surpassing our native species. All of the work at the Cloquet Forest Experiment Station is carried on in coöperation with the National Forest Service.

Division of Horticulture.—Work in fruit-breeding has been confined to studies of fruit characters, sterility in fruits, and hardiness.

Special emphasis has been given to the study in inheritance in clonal varieties. The hybrid plums at the Fruit Farm, which offer special opportunities for studies of this nature, have been used. A large part of the work has been of a statistical nature, seed, fruit, and leaf characters being analyzed largely from this standpoint. The work upon this particular lot of material is nearing completion and the results show that the inheritance of characters in the F_1 generation in clonal varieties is not constant as is ordinarily expected in Mendelian phenomena. Work on sterility is largely of a cytological nature, altho some studies are being made from the standpoint of actually testing pollen under field conditions. The sub-project with the grapes has been completed and this report is now in press. The work at present is being continued with the

strawberry and the plum. While the work on these at the present time is incomplete, the results to date show that the nuclei of mature pollen in both the plum and strawberry are abnormal, degenerated, and disorganized in many of the sterile or partially sterile varieties. A large amount of material was fixed during the blooming season the past spring and is now in process of being sectioned for further study. With the plum, many of the hybrids at the Fruit Farm are showing interesting and unusual behavior in the production of pollen and pistils. The results at the present time indicate that some of our hybrids between Americana and Triflora are self sterile. This work however will need to be checked further.

In the study of hardiness in fruits, the work on the physiological behavior of dormant twigs will be continued with the object of testing further the conditions which bring about the greatest loss of water from dormant twigs. The material available for this work at the Fruit Farm is increasing from year to year. The past season notes were taken on the per cent of winter killing on several hundred different crosses of the strawberry, as well as the hybrid plums. The per cent of winter killing in the strawberries varied from a perfect stand to as high as sixty per cent killed. Most of the varieties stood the winter well, but there was a marked difference in the per cent of killing under practically similar field conditions. In the plum crosses between *P. Americana* and *P. Triflora*, some have been severely injured by the winter in past years, while some have proven sufficiently hardy to suffer no injury from winters such as 1911-12. The results of the tests of these hybrids are interesting in that they show that when a semi-hardy variety, such as the Burbank, is crossed with a hardy variety, such as the Wolf, the progeny inherit cold resistance differently. Observations on this subject are extended to the seedlings which have been sent out to the trial stations. The breeding work for hardy fruits is being continued with the apple, plum, pear, cherry, raspberry, strawberry, gooseberry, currant, and the grape. A special effort has been made in the last two years to get on hand a representative collection of the hardy varieties of apples. Emphasis will be placed upon this line of work in the future. A start was also made in the selection of improved types of the blueberry. Examination of a large number of wild plants shows rather distinct types as to fruiting habit and berry. The facilities at present have not permitted any breeding work with the cranberry, but it is the intention, as soon as possible, to include the cranberry in the list of fruits for improvement.

The project on fruit breeding has been carried on under the Adams Fund.

In the variety test studies, one half of the apple trees have been removed in the variety plat in order to permit the proper development of the remaining trees and several Hibernial and Patten Greening trees have been re-grafted to eighty-nine supposedly hardy varieties and seedlings secured from various sources. Over ninety-five per cent of the grafts started finely, but later many were either killed or badly injured by the blight, which was very severe. The old plum and apple orchard which

contained many worthless and unknown varieties, was torn out and replanted with over three hundred new and standard varieties of both small and tree fruits.

Arrangements have been made with the Northeast Demonstration Farm and Experiment Station at Duluth, the State Hospital for Inebriates at Willmar, and the North Central Experiment Station at Grand Rapids, to test out the value of sod versus tillage and the effect of fertilizers on tree growth and productiveness. At Duluth the land has been cleared and the trees purchased, so the experiment will be fully under way by next year. At Willmar, part of the orchard was planted this season and the remainder will probably be set out in 1915, and at Grand Rapids the orchard work will be started next year. If possible, similar cooperative orchards will be started before long in all of the fruit or prospective fruit districts within the state in order to determine exactly the best methods of growing fruit trees under the respective soil and climatic conditions.

In the vegetable investigations, special attention has been given to the study of the influence of crossing in increasing the yield and earliness, and in selection and breeding. Ten F_1 generation tomatoes have been carefully compared this season with their parents to determine the increase, if any, in vigor, productiveness, and earliness. Previous work has shown an increase of one fifth greater yield in the F_1 generation than the higher yielding parent, and if this gain is consistent, the commercial possibilities are of no little importance. The total yields have not been calculated but the quality of the fruit equals that of the standard varieties. Several strains of the Hubbard squash have been tested and a selection made of several types which vary in color, shape, and wartiness. These types will be propagated and a further selection made of the desirable marketable and peculiar types. This experiment should show the inheritable types that are "bound up" in the variety Hubbard. A test of a large number of varieties of onions in the last few years has shown the presence of a remarkably large number of types. A large number of these types have been selected and self-pollinated in order to determine in what manner the characters are inherited and also ultimately to secure types which possess only desirable characters. Crosses have also been made between various colored types in order to determine how the characters segregate. Numerous individual plants of the Refugee bean and the Alaska pea were self-pollinated and the fruit saved for future work. The object of our experiment with the bean and the pea is to determine whether pure lines or strains may be isolated within the variety, and if so, in what manner they differ. Several hundred hills of the Early Ohio and Sir Walter Raleigh varieties of potato were dug separately in 1913 and the product of each hill planted as a unit in 1914. From the amount of growth of the vines and the yield there is apparently marked inheritable differences in the value of individual hills. The adverse season—a too wet period followed by a hot and dry spell—affected the physiological function of the plants and practically all of the plants showed symptoms of the leaf roll. However, since all of the plants were grown under similar conditions, the variations, if due to diseases, indicate a difference

of resistant qualities in individual hills. Tests of these poor, medium, and good hills will be carried on in the northern part of the state, where diseases are less abundant, and also at University Farm, and the results compared. Owing to lack of immature seed and good seed stock, most of the contemplated work on the factors that increase or maintain yield of varieties had to be omitted this season. The continued seed test of the varieties which had been grown in 1912 at Moorhead, Zumbra Heights, and University Farm, and then grown under the same conditions in 1913 at University Farm has been repeated this season. Contrary to last year's results, which decidedly favored the Moorhead stock, the three lots were nearly on a par. A large number of seedlings produced at this station were given further test. The promising ones will be given a thoro test on various soils.

The season of 1914 has been especially good for the development of nearly all plants, shrubs and ornamentals on the campus. The perennial section started last year has been added to and an unusually small loss has resulted from winter killing. Many varieties have been tested for hardiness and planting purposes. The seedling peonies flowered for the third time and many good varieties have been marked for observation next season. The standard sorts have been divided and replanted for comparison with certain new varieties and seedlings. The hedge plot which was begun some twenty years ago, has been added to this season and notes taken as to the desirability of some of these plants for hedge purposes. Among the newer hedge material that seems promising is *cotoneaster acutifolia*.

The old greenhouse was torn down and a larger house of more modern style was erected.

Veterinary Division.—In view of the serious hog cholera situation, it seemed wiser to devote the energies of our Veterinary Division very largely to the production of hog cholera serum. Considerable experimental work has been done, however, and some valuable data have been collected. Perhaps the most significant feature has been the demonstration that the serum-only method wisely used in sick herds and properly followed up by disinfection and common sense sanitation is very effective and does not offer any possibility of spreading cholera. An important experiment in control on a large scale has been undertaken during the year in Renville County, in cooperation with the National Department of Agriculture and the State Live Stock Sanitary Board. The serum-only method is being used exclusively.

Work with contagious abortion has been continued. The work in the field has consisted mainly of the collection of blood samples for the complement fixation test. This method has proved to be fairly satisfactory as a means of diagnosis and for determining the extent of the disease in a herd. The pathology of sterility, which is one of the phenomena of abortion, has been studied in regard to importance of cystic ovaries and persistent corpora lutea.

Data covering the first four years' work on stable ventilation, a project carried under the Adams Fund, have been carefully analyzed,

selected, and prepared for publication. Laboratory material covering three additional years has been partially prepared for publication. The research work has been continued upon the histology and physiology of normal hogs' blood.

Work on swamp fever has been continued, in coöperation with the Federal Department of Agriculture. A considerable amount of work has been done to obtain an accurate laboratory diagnosis, but apparently as yet without definite results.

Northwest Experiment Station, Crookston.—At the Northwest Experiment Station, work on rotations was continued. The major seven-year rotation has been changed to a six-year rotation with the seventh field of that series seeded to alfalfa. This was desirable for the reason that we already have a seven-year experiment rotation and needed additional land for alfalfa investigations. The fields comprising these two rotation series have been used to produce pedigreed seed. These rotations have been carried on for four years and are beginning to show decided differences. The questions of weed control in connection with rotations, on land difficult to drain in this latitude, is one that will receive careful study in the future.

Fertilizer experiments, in coöperation with the Division of Soils, have been reorganized as stated in the report for that division.

A test was made as to the time of sowing winter wheat with the result that the earliest sowing produced the highest yields. This work will be continued. Minnesota Grimm alfalfa continued to show its superiority in yield and in hardiness. Alfalfa was also sown to determine the results of sub-soiling with a deep tillage plow as compared with ordinary plowing. One half of the field was sown with a nurse crop and the remainder without a nurse crop. A good stand was secured in both fields but the field without the nurse crop goes into winter stronger and thicker. The general summary of the work with the different grasses indicates that additional work must be done as results show a wide range.

At this Station the most satisfactory method of quack grass eradication on fields only partially infested, has been planting the field to hill corn and subjecting the areas infested to a continuous and severe cultivation.

The rate-of-seeding tests were continued with oats and wheat but results are erratic. Variety tests were also continued. A variety test of corn was conducted in coöperation with the Division of Agronomy and Farm Management. Northwestern Dent had the highest average yield. Other work with corn for seed and feed and for fodder is in progress. Great interest is being shown in corn production in the Red River Valley and excellent results are in evidence on all sides.

The fiber flax investigation was continued and tests were made of home-grown Holland, and Russian fibre flax. Records were kept in yield of fibre and in seed per acre, and results thus far obtained appear to be very promising. This experiment is carried on in coöperation with the Bureau of Fibre Investigation of the United States Department of Agriculture.

The work in testing varieties of potatoes and of testing methods of spraying and treating seed potatoes, of seed selection, and methods of planting, has been continued. The Burbank variety from new seed gave the highest yield during the past year. Last year Carman No. 3 was first. In the spraying tests no conclusive results have yet been obtained. The data on seed selection show a slight advantage for hill-selected seed as compared to cellar-selected seed, with both of these methods far superior to seed from field run and small potatoes. Extensive variety tests of garden vegetables have also been continued.

West Central Experiment Station, Morris.—The West Central Experiment Station is just beginning to be able to report progress in its experimental work. The five-year rotation which was begun four years ago on one hundred acres of land which had been very poorly farmed previous to that time and was full of weed seed, is beginning to show decided results in our studies of weed eradication, increased yields, and general soil improvements. This year four fields out of the five were free from mustard and all were free from wild oats. Due to excessive rain during May and June, Yellow Foxtail became troublesome in the corn fields. Otherwise weeds have given little trouble this season. The crop yields have been steadily increasing, especially corn and clover hay. This season Wisconsin No. 7 corn has been used on the major rotation. It has matured and promises an excellent crop. Two cuttings of clover and timothy were secured, both the heaviest that have yet been produced on the farm. This year's seeding of clover is excellent.

The ten-acre field of Minnesota Grimm's Alfalfa seeded in 1913 came through the winter with a perfect stand and this season made an average of five tons per acre for the three cuttings. Fifteen acres were seeded in July this season. The variety test work was increased and the results show a greater yield for the Grimm and the Baltic. The Turkestan alfalfa gave the poorest average out of the three cuttings. Twenty-one strains were started in the nursery this year and are in excellent shape.

This season a four-year rotation of corn, wheat, oats, and clover in four series of eighteen plots each, has been started. The fertilizers used are rock phosphate and acid phosphate, both alone and in combination with barnyard manure, and with barnyard manure alone. It is planned to continue this experiment for at least eight years.

This year the variety work with wheat and oats was continued upon thirty-one plots. Marquis wheat showed a higher yield than any of the other standard varieties.

North Central Experiment Station, Grand Rapids.—The work at the North Central Experiment Station shows in its results that dairying for general conditions is without any question the most profitable system of farming and entirely practical for the majority of farmers. Hog raising to a limited extent, and poultry raising can be carried on with dairying.

Oats, clover, fodder corn, potatoes, and rutabagas have been found the most profitable field crops for general conditions. Practically all the field crops common to Minnesota have been grown successfully on the Experiment Farm, but the crops mentioned have been most satis-

factory in connection with dairying, when the amount of land under the plow is limited. Oats has produced larger yields per acre than other grains, has proved better adapted to new land, and the better quality of its straw for feeding has been of advantage. Clover has been grown with continuous success by seeding with a grain crop of any kind. On rich land it produces a limited amount of fall pasture after the grain has been cut, without injury to the next year's hay crop. It has yielded two cuttings of hay every season and has been very effective in building up the humus of sandy soil. It has been of particular value in a system of crop rotation necessary to insure large yields and keep up the fertility of the soil. Fodder corn has been of special advantage in producing a large amount of feed on a small area of land in a single season. Fodder corn planted from May 2 to June 1 has produced a crop September 1.

Potatoes have proved the most profitable field crop to market from the farm. The average yield of potatoes on the Experiment Farm for ten years has been 225 bushels per acre. The average yield for 1911, 1912, and 1913, has been 306 bushels per acre. These large yields with a comparatively small cost of production make potatoes an especially desirable crop for the farm of limited size. Rutabagas have been more reliable in the production of field roots for stock than other varieties of stock roots. The seed have produced a better stand, they are hardier under unfavorable conditions during their early growth and are more easily cared for. Roots can be made to take the place of grain to a considerable extent and the large yield secured from a small area of ground makes them especially desirable in dairying on the small farm.

The farms of the timbered section of Northwestern Minnesota have on an average less than twenty-five acres under the plow. When a living must be made from this amount of cultivated land in farming, large yields are necessary and for this reason special attention has been given to the production by practical methods of large yields in field crops. The first fact worthy of note is that as the number of cows has been increased, the yield of the field crops has increased. Through feeding all the crops produced on the farm except the potatoes and considerable purchased grain feed in addition, and carefully applying all the manure to the fields, the soil has been enriched. The Experiment Farm has had one hundred acres in field crops for the past ten years. The dairy herd has been increased from twenty to one hundred head in the same length of time; sixty of which are cows and heifers in milk. This number of dairy cattle with the horses, pigs, and poultry kept on the farm has made the supply of manure such that each field has been manured at the rate of twelve tons per acre every third year the past few years.

A full report and general review of the work of this station will be found in the forthcoming report of the Experiment Station of the University of Minnesota.

Northeast Demonstration Farm and Experiment Station, Duluth.—The development work begun a year ago has been continued. Experiments

have been outlined for the coming year, to include the cropping of ten or more acres of newly-cleared land, getting the rotation in complete operation, growing of pure bred grains, etc. White Leghorns will be the principal breed of poultry kept and the only work attempted will be the breeding and feeding for egg production, poultry farm management, and demonstration of marketing possibilities of the special Farm Label and the Parcel Post. Variety tests of apples will also be taken up.

Southcast Demonstration Farm and Experiment Station, Waseca.—The farm at Waseca has been divided into two tracts, a demonstration farm of two hundred acres, and an experimental tract and building site of forty-six acres.

The demonstration tract has been farmed during the year at some disadvantage owing to the lack of sufficient drainage. The main tile drains and some laterals were put in last fall. A new building site for the farmstead was located on the east side of the farm. Land has been broken for a windbreak and shelter belt and the fields have been permanently laid out for a five-year major rotation of grain, hay, hay, corn, and corn. A permanent pasture is provided on some of the wetter land. No attempt has been made to do any special experimental work on the demonstration unit, the effort being to bring that part of the farm under cultivation, to get it properly equipped and stocked, and to operate it as a model farm. It will serve a valuable experimental purpose in that it will provide a means of securing accurate farm management data. Some experiments in steer and hog feeding were carried on but there was not difference enough in the gains made to draw conclusions, and it is intended to repeat the experiment the coming winter.

During the spring, four series of plots were laid out for fertilizer tests, in coöperation with the Soils Division. The work this year is preliminary to the permanent plots. Crops of wheat, oats, corn, and clover were grown. About one hundred rows of corn were planted in the investigation of the relation of show points and yield in corn. In coöperation with the agricultural instructor of the Waseca High School, experiments were carried on in comparison of the varieties of corn grown in the vicinity.

OFFICE OF PUBLICATIONS

The Office of Publications passed into the hands of a new editor, Mr. William P. Kirkwood, on August 1. Plans are being made to extend more largely the service furnished to the newspapers and agricultural journals of the state, as part of the work of the Division of Agricultural Extension. The press of the state have shown a generous willingness to coöperate for the spreading of news and educational material from the Experiment Station and College of Agriculture. A plan to encourage the live stock industry of the state through a series of articles to be used by the country press through the winter is receiving great encouragement from newspaper editors.

Experiment Station Bulletins.—The following is a list of Station

bulletins written by members of the staff, and published since August 1, 1913:

Bulletin 136. Rope and Its Uses on the Farm, by J. B. Frear, Division of Agricultural Engineering.

Bulletin 137. Minnesota Wheat Investigations, Series II. Marquis Wheat, by A. C. Army, Assistant Agriculturist, Division of Agronomy and Farm Management; and Milling Quality, by H. C. Bailey, Cereal Technologist, Division of Agricultural Chemistry.

Bulletin 138. A Study in Cereal Rusts. Physiological Races, by E. C. Stakman, Assistant Plant Pathologist, Division of Plant Pathology and Botany.

Bulletin 139. Minnesota Weeds, Series II. Description and Identification, by W. L. Oswald, Assistant Botanist, Division of Plant Pathology and Botany; and Eradication, by Andrew Boss, Chief of the Division of Agronomy and Farm Management.

Bulletin 140. Investigations in Milk-Production, by T. L. Haecker, Dairy and Animal Husbandman.

Bulletin 141. The Acridiidae of Minnesota, by M. P. Somes, Division of Entomology.

Bulletin 142. Selection and Preparation of Land for Cranberry Culture, by C. L. Lewis, Division of Agricultural Engineering.

The Experiment Station Bulletins varied in editions from 3,000 to 20,000.

Extension Bulletins.—Nine Extension Bulletins passed through the office in the course of the year. A list of these will be found in the report of the Division of Agricultural Extension. In the same place will be found mention of special publications such as are sent to school teachers, to newspaper editors, and to others.

WHAT OUR COLLEGE GRADUATES ARE DOING

The question has been frequently asked, "What are our graduates doing?" Altho complete information is not available, the following data compiled from our records and the records of the Alumni Association, suggest an answer to this question.

OCCUPATIONS OF GRADUATES

Graduates in General Agricultural Courses:	No.
In national, state and research work.....	37
Farming.....	19
Agricultural teaching.....	35
In occupations closely related to agriculture.....	15
Work not related to agriculture.....	8
Unknown.....	58
Total.....	172

Graduates in four-year Home Economics Courses:	
Teaching and research work in Home Economics	42
Married	18
of these, 11 taught home economics before marriage.	
Unknown	31
Total	91
Graduates in Forestry Courses:	
National and state forest service	29
Foreign forest service	3
Students	4
Teaching and Research, including a leading Professor of Forestry and one employe of B. P. I.	7
Horticultural work	2
Lumber business	17
Occupations related to forestry	6
Occupations not related to forestry	3
Unknown	4
Deceased	1
Total	76
	339

IMPORTANT CHANGES IN PERSONNEL

There were comparatively few changes in personnel during the year. Assistant Professor W. H. Frazier and Assistant Professor G. W. Walker resigned from the Division of Soils and their places were filled by Mr. C. O. Rost, M.A., and Mr. R. A. Gortner, Ph.D. Professor J. O. Rankin resigned as editor and his place was filled by Mr. W. P. Kirkwood, B.A., formerly country-life editor of the Minneapolis Journal. Miss Greta E. Smith, Instructor in Textiles, resigned to continue her studies in the East and her place was filled by Miss Grace P. Gillett. Miss Dorothy Loyhed resigned from the English work in the School and her place was filled by the appointment of Miss Ruth Mohl, M.A. Dr. L. E. Willey resigned from the Veterinary Division to accept an appointment at Ames. Dr. J. T. E. Dinwoodie resigned to accept a position with a serum manufacturing company and Dr. H. C. Kernkamp was appointed in his place. Associate Professor George A. Works accepted the position as head of the Department of Agricultural Education at Cornell University and Mr. W. H. Bender, of Ames, Iowa, was appointed. Mr. E. C. Davis, Instructor in Agricultural Education, resigned and his place was filled by the appointment of Mr. W. F. Lusk, Ph.B. Mr. P. J. Olson, on the Agronomy staff as Instructor, will be given a permanent appointment and will have charge of the Agronomy work in the school. Miss Bess L. Fishback, M.A., was appointed to have charge of the courses in Foods and Management in the School. Miss Mary E. Blythe, B.S. in Ed., and Miss Louise Baldwin, will assist in the work in Textiles in the School. Miss Mabel Trilling will have general charge of the Textile work in the School. Miss Marion Weller, Associate Professor of Textiles, whose appointment was made a year ago, to take

effect August 1, reported in June of this year and took charge of the Textile work in the summer session. Mr. R. C. Ashby, Professor of Animal Husbandry at the Washington State College, was appointed Instructor in Animal Husbandry. O. B. Jesness, B.Agr., was appointed Assistant in Marketing in our Division of Agricultural Economics. Arrangements were made for a transfer of Mr. A. J. McGuire on August 1, from Grand Rapids Sub-Station to the Central Agricultural Extension Office here, and Mr. Otto I. Bergh, Agronomist at the Crookston Station, was made Superintendent of the Grand Rapids Station. Mr. F. L. Kennard was appointed Agronomist at the Crookston School and Station. Miss Juniata L. Shepperd, who had charge of the Domestic Science work in the School, was transferred to the Extension Service. Mrs. Margaret Blair, who had charge of the Domestic Art work in the School, will be on leave of absence the coming year. Associate Professor C. P. Bull, who was on leave of absence, has returned to duty. Miss Delilah Pearce, Instructor in Nursing, and head nurse at the School, resigned on account of ill health and Miss Anna Laue was appointed head nurse and Miss Dorothy Motl was appointed as Instructor in Nursing.

On May 4 Professor T. L. Haecker, head of the Dairy and Animal Husbandry Division, reached the age limit, but in view of the fact that he had extensive experiments in animal nutrition not yet completed, the Board of Regents authorized him to retain temporary supervision of the Dairy and Animal Husbandry work, and as soon as practicable, he will give his entire attention to the research work in Animal Nutrition.

BUILDINGS AND PERMANENT EQUIPMENT

Plans were completed and work was begun on the Home Economics Building, for which an appropriation of \$75,000 was granted by the last legislature. It will be completed about December, 1914. The growth of the Home Economics work has been so rapid that this new building will not only be fully occupied but practically all of the old space formerly occupied by the Foods and Management and Textile work will have to be used. A considerable addition to this building should be built at the earliest possible moment.

An appropriation of \$26,000 was provided for alterations in the heating plant. The plant has been put in as good condition as possible. The main sources of fire dangers have been removed and a fireproof addition, constructed as a part of the permanent plan, will be completed in the fall of 1914.

The electric railway connecting the two campuses and the switch connections for freight, made little progress during the year owing to litigation in connection with the condemnation of right of way. The matter was finally settled, however, and the work was started and the railway will be ready for use about November 1.

The old greenhouses were replaced by new structures of concrete and steel frame throughout. Additional houses were constructed for

Agronomy, Botany and Plant Pathology, Entomology, and Soils. A storage cellar was constructed in connection with the soils greenhouse.

The addition to the horse barn was completed and a new poultry house added. Alterations in the Chemistry Building, an addition to the Dairy Hall, alterations in the Dining Hall, and renewal of equipment in the Boys' Dormitory, were all completed as planned. The grading in front of the new Engineering Building was completed and much of the farm refenced.

The construction of the Plant Pathology Field House has been delayed owing to the pressure of other construction work. The Veterinary Pathology Plant was also delayed, as the question of location has not yet been settled, and the future handling of the hog cholera work had to be considered in this connection.

Plans for a Gymnasium were completed during the year and the building will be ready for use about April 1, 1915.

Plans for the ice and cold storage house were also completed and it is expected that the building will be ready by December 1.

At Crookston a Central Heating Plant was constructed and most of the buildings connected with it. A Dormitory for boys was practically completed during the year. A grain-storage and cleaning plant costing \$6,000, a machinery shed, a swine barn and a small greenhouse, were completed during the year. The connection with the city sewer of Crookston was made.

No buildings were constructed at Morris or Grand Rapids.

At Duluth there was considerable experimental land clearing and general experiment work. Two cottages, two barns, a hog barn, a milk house, and machine shed were completed at Duluth during the year.

At Waseca an Institute Hall was completed, also feeding sheds and yards. Alterations of old buildings and reconstruction of the barn were also completed. A new well was dug on the demonstration section of the farm. Considerable drainage was installed and some of the fencing completed. Plans for the Superintendent's house were also made and approved.

SPECIAL RECOMMENDATIONS FOR THE NEXT BIENNIIUM

Increases in Staff.—Considerable increase in staff will be required in the College and School work to enable us to reduce the size of the sections and to provide for the largely increased number of students. A considerable increase will be necessary also in the department of Construction and Repairs and care of buildings. The increase in staff is essential not only to secure better instruction but also better to utilize buildings and equipment. If the work can be sectioned so as to use class rooms and laboratories both forenoons and afternoons, the buildings can be fully utilized, but of course the staff will have to be greatly increased. However, the expense is much less than it would be to provide sufficient building equipment for the half-day use of classrooms and laboratories as is now the general rule. Some additions will also be necessary in the Experiment Station to provide for the increased demands

in Agricultural Economics, Agronomy and Farm Management, Agricultural Engineering, Botany and Plant Pathology, Entomology, Soils, etc. The salaries of the present force will also have to be increased in some cases in order to hold the men.

Needed alterations and additions to buildings.—An addition to the new Home Economics Building should be provided for, practically duplicating in size the present structure. The power house should be completed on the lines of the new construction. The Cafeteria and Dining Hall should be completely overhauled and put in more sanitary condition. A laundry equipment should be provided and general repairs in the nature of increasing fire resistance should be made to this building. The old blacksmith shop should be repaired and remodeled for the use of Agronomy, Entomology, and Plant Pathology, as a greenhouse work room. A fireproof vault should be provided for Plant Pathology records.

Grading.—Considerable grading will need to be done around the new gymnasium and much road improvement should be provided for. The main roads should either be oiled or macadamized. The portion of Cleveland Avenue adjoining the Agricultural Grounds should be paved. Half of the cost would be borne by the City of St. Paul.

New buildings.—A general laboratory building is a necessity unless the teaching force is considerably increased. A Seed House for storing and cleaning seed produced for distribution is highly desirable. At the present time the main stocks of pure bred seed are stored in firetraps and are exposed to destruction by rats and mice as well as to danger of fire. There are no adequate facilities for giving instruction in Agricultural Machinery. A building for this purpose is an urgent necessity.

Attention has been called to the need of a hospital to care for contagious cases developing in the dormitories and rooming houses occupied by students. The original plan approved by the Board of Regents and the joint legislative committee was to construct such a building at University Farm this next biennium. Further study of the matter makes it apparent that such a building should be available as a part of the General University Hospital Equipment. We are recommending therefore that this building be transferred to the Hospital, thirty-five beds to be available for School of Agriculture students, and an ambulance provided for the speedy and safe transfer of patients.

There is a great demand for the organization of a School for Bakers. This will require the construction of an inexpensive building. An additional greenhouse for the Soils Division is necessary as well as a number of other minor farm buildings. The present hog cholera serum plant has a maximum capacity of five million cubic centimeters of serum. The plant was constructed originally for experimental purposes. Its enlarged capacity is on the basis of temporary construction, owing to the fact that it cannot be continued on an enlarged scale in its present location. If the manufacture of serum is to be continued by the Experiment Station, a suitable plant will have to be constructed immediately. It is estimated that this will cost, with equipment, about \$50,000. It is urgently recommended, however, that this work be transferred from the

Experiment Station to the State Department of Agriculture, if such is established, and that the plant be located somewhere in connection with the Union Stock Yards so that the cost of securing hogs for the work may be reduced and carcasses suitably disposed of. At the present time it is necessary to burn the carcasses of the virus hogs, but at the Stock Yards these could be disposed of to a rendering plant at a saving of several thousand dollars a year.

Additional land.—I wish also to renew my recommendation regarding the necessity for purchasing additional land for the use of the Station. The Quinn Farm of 80 acres has been sold to the Twin City Motor Speed-Way Company. We have used this land for the production of silage and for the growing of increased stocks of seed wheat, seed oats, and Minnesota No. 13 corn. This tract also had on it one of the series of fertilizer plots as there was no other land available for such work. There are two tracts of thirty acres and fifteen acres respectively which lie approximately in the center of the University Farm. This land is urgently needed and should be secured as soon as possible. With the exception of the dairy pasture, which is suitable for no other purpose, and the land devoted to campus and necessary paddocks, all of the land owned at University Farm is used for strictly experimental purposes such as pathological and entomological experimental plots, rotation plots, soil fertility plots, cultural and variety tests, horticultural plots, seed breeding plots, etc. All fodder corn, hay, clover, oats, and other grains are grown in part on rented land, but most of the grain used for feed is necessarily purchased. It has been necessary to place some of the experimental plots on rented land as described above, but this is a dangerous proceeding as in the case of the Quinn tract cited above, where we have lost practically all we have put into the fertilizer work on that land owing to the fact that it is now to be sold. It should be said also that in connection with the trial grounds, some ordinary crops are grown for the purpose of keeping the land clean and provide necessary rotation, but this only keeps the land in condition for investigational work and is not to be interpreted as ordinary farming. This matter was gone into fully in the last biennial report and it is not necessary to present the needs in further detail here.

Crookston and Morris.—The general maintenance appropriations at Crookston and Morris will need to be increased and it is highly desirable that better dining hall facilities be provided, as has already been mentioned.

Soil Survey.—Attention has been called in former reports to the necessity of a Soil Survey of the State. As this is a matter which should be taken care of by the Experiment Station, it is recommended that provision be made for coöperation with the United States Department of Agriculture, in conducting the survey.

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 of the University during the session 1913-14.

Attendance.—The anticipated decrease in the number of students in attendance has continued. The total number of students registered during the session was 176, as compared with 214 in the preceding session. If the night students attending during each session be disregarded, the registration of students during the session of 1913-14 was 162, as compared with 176 students in attendance during the session of 1912-13.

TABLE I. REGISTRATION

	Regular		Special		Total	
	1912-13	1913-14	1912-13	1913-14	1912-13	1913-14
First Year.....	55	44	27	30	82	74
Second Year.....	30	49	9	6	39	55
Third Year.....	58	27	8	6	66	33
4th Year Night.....	8	12	2	1	10	13
					197	175

Aside from the necessarily diminishing number of night students, I think the decrease in attendance is largely due to severe requirements in the classroom and in examination. Our students have not yet learned to regard the work in the Law School as the full-time task of a well-trained man. Hence the number of failures upon examination is still distressingly large, requiring a correspondingly large number of students to be excluded from the school. It is also becoming increasingly apparent that the average high-school graduate, even the twenty-one years of age, has little chance of successfully completing the course of instruction as given. We may therefore expect the number of special students entering the Law School to become steadily less.

Faculty.—The only important change in the faculty personnel was the substitution for Assistant Professor Hugh E. Willis, resigned, of Professor Eldon R. James, formerly of the University of Wisconsin. Upon Professor James's resignation at the close of the session to become Dean of the Law School of the University of Missouri, Professor E. G. Lorenzen, of the University of Wisconsin Law School, was elected as his successor. Mr. J. C. Benson was also appointed instructor in Practice in connection with the work of the Legal Aid Bureau, hereinafter further referred to.

Lecturers.—Among the lecturers who have during the past session supplemented the regular instruction given by the members of the faculty,

special mention should be made of the work of Judge Homer B. Dibell, Commissioner of the Supreme Court of Minnesota, who gave an extensive and valuable course extending throughout the year, upon Extraordinary Legal Remedies. Judge Dibell refuses to accept any compensation for his work in the Law School. His work is of great excellence, and he is entitled to the thanks of the Regents. Another course of lectures that proved highly valuable to the Law students and to other members of the University community was that upon Anti-Trust Legislation, delivered by Honorable William H. Taft, Ex-President of the United States. In addition to the lectures above mentioned, courses of from four to ten lectures were given by the following prominent members of the Minnesota bar: Charles W. Bunn, Thomas D. O'Brien, Christopher D. O'Brien, Arthur L. Helliwell, Charles S. Jelley, Hugh V. Mercer, and John W. Willis.

Instruction.—(1) Curriculum. The reorganization of the curriculum of the Law School, begun in the autumn of 1911, has now been completed, and may fairly be said to represent the result of the best thought and of the experience of the leading educational institutions in this country. The work of the first two years is rigidly prescribed, but that of the third year permits a certain amount of election so as to allow students to begin in this, the last year in the Law School, the specialization in the broad field of the law which is becoming more and more common and necessary.

(2) Teaching Practice. The effort heretofore made to develop an efficient course in Practice has been vigorously prosecuted and with gratifying success. Professor Morgan, with the assistance of Mr. Stinchfield, has greatly extended and improved the course of instruction offered in the class room and in the Practice Court room, so that we may reasonably cherish the hope that we shall be able to refute the general charge made by the profession, that young men are graduated from the law schools without knowing how to institute or try an action at law. Professor Morgan deserves the highest praise for the indefatigable industry and high intelligence which has characterized his efforts to solve this difficult problem of the efficient teaching of Practice.

(3) A Legal Clinic Established. I am glad to be able to report that, with the assistance of the Associated Charities, there has been established in the City of Minneapolis a Legal Aid Bureau, in charge of an attorney who is an instructor in Practice in this faculty, in which our senior students, by regular assignments, have an opportunity to get much and varied experience in the actual practice of law. During the year represented by the session 1913-14, nearly 1,800 separate cases passed through this office. This "legal clinic" promises to supply the long-needed agency for teaching law students something of the practice of the profession by actual experience in practice.

Library.—The library continues to make gratifying progress, both in the acquisition of additional books and in efficiency of administration. The following figures briefly indicate the growth of the library since August 1, 1912, when the present librarian, Mr. A. C. Pulling, took charge:

Volumes in library August 1, 1912.....	17,000
Volumes added during 1912-13.....	1,560
Volumes added during 1913-14.....	1,740
Volumes in the library August 1, 1914.....	20,300

Of the 1,740 volumes added during the session 1913-14, 733 were acquired by purchase, 563 by gift, and 444 by exchange. It thus appears that 907 volumes, having a market value of nearly \$2,000, were, through the industry and ingenuity of the librarian, acquired without cost to the University. The books given in exchange were duplicate sets of Minnesota Session Laws, which have for years accumulated in large numbers in the basement of the Law School. Actual expenditures during the session were as follows:

Salaries	\$2,375.00
Books—Case Books.....	\$ 720.76
Reports and Texts.....	2,832.07
	3,552.83
Binding	131.05
Supplies	20.00
	\$3,703.88

At the close of the fiscal year there were additional outstanding orders for books amounting to \$1,257.80.

The increasing value of the Law library, as well as the inadequate shelf room for the books now in the library, not to mention those that must be procured in the future, points to the necessity of providing, at no very remote time, adequate fireproof housing for the Law library.

Tabulated statistics of scholarship.—Following are certain tables of statistics, showing in summary form the work done by the students in the Law School during the session.

Table II shows the scholarship statistics of all classes.

TABLE II. SCHOLARSHIP STATISTICS, 1913-14

	1st year		2nd year		3rd year	
	1st sem.	2nd sem.	1st sem.	2nd sem.	1st sem.	2nd sem.
1. Total enrollment.....	69	52	55	53	33	28
2. Number taking examinations.....	61	49	55	51	27	22
3. Number passing all examinations.....	19	22	28	22	16	16
4. Number delinquent in one subject only.....	10	5	6	9	5	3
5. Number delinquent in three or more subjects.....	22	14	7	11	3	1
6. Percentage of failures and conditions to total examinations taken.....	40	26	18¾	22½	15	6
7. Percentage of successful students to total enrollment.....	27½	42½	51	40	49	57
8. Percentage of successful students to total taking examinations.....	31	45	51	43	60	74

Table III concerns only the first-year class, and is intended to show the effect of preliminary training upon the success of the students in the study of law.

TABLE III. PRELIMINARY TRAINING AND SCHOLARSHIP
FIRST YEAR CLASS, 1913-14

	Regular				Special	
	Academic seniors and graduates		Having two years of college		Less than two years of college	
	1st sem.	2nd sem.	1st sem.	2nd sem.	1st sem.	2nd sem.
1. Number enrolled.....	17	13	25	22	25	16
2. Number taking all examinations.....	16	11	23	22	22	16
3. Number passing all examinations.....	6	8	8	9	5	5
4. Number delinquent in three or more subjects.....	3	2	7	6	12	6
5. Percentage of failures and conditions to examinations taken.....	30½	18½	34	27½	54	42½
6. Percentage of successful students to total enrollment.....	35	61	32	41	20	31

Table IV shows the number of conditions, failures and incompletes given to all the classes during both semesters of the session.

TABLE IV. CONDITIONS, FAILURES, AND INCOMPLETES

	Regular students	Special students	Total
First semester			274
Incompletes.....	4	0	4
Conditions.....	140	84	224
Failures.....	25	21	46
Second semester			230
Incompletes.....	17	1	18
Conditions.....	98	60	158
Failures.....	40	14	54

In tables II and III, item 3, showing the number of students passing all examinations, is significant as indicating the proportion of the students who are thought to have done thoroly satisfactory work.

Item 5 in table II and item 4 in table III indicate the number of students whose work was so unsatisfactory as to require their being dropped from the school.

These tables show clearly these two facts: first, the percentage of successful students to the total enrollment (meaning by "successful student" one who has passed all his examinations) is distressingly low; and secondly, that, considered as groups, those students who have had the advantage of a full college course are much more successful than those who have had only two years of college work, and that the latter class,

in turn, are much more successful than the special students who have had less than two years of college work.

These statistics considered as a whole are rather discouraging in that they indicate that the standard of scholarship in the Law School is still much lower than is consistent with the attainment of our desire to make this Law School of equal excellence with the leading institutions of the country. Nevertheless I think that we are justified in believing that the work of the students in the class room is in fact steadily improving. Many of our students are still handicapped by the fact that they are under the necessity of working several hours each day at outside employment in order to meet in part their expenses while in the Law School. There are individual cases in which the student, by reason of superior ability, is able to do his work in the Law School in a highly creditable manner while doing more or less work on the outside; but, as a general rule, the student who can not give substantially all of his time to his work in the Law School, can not expect to do successful work of the quantity and quality now expected of him in the best American law schools.

During the year a beginning was made in the establishment of an alumni fund to be loaned to Law students in need of financial assistance. It is hoped that this fund may be made sufficiently large to render assistance to all worthy and capable students in need of it, so that they will not be required to handicap themselves, often to the point of failure, by outside work.

Student self-government.—The Law faculty are of the opinion that the best government for students, in a professional school, at least, is self-government. Every effort has been made to stimulate and guide the students' desire to govern themselves with reference to all matters not affecting scholastic standards. At the beginning of the session a club room which had been fitted up in the basement of the Law School Building, was opened and turned over to the students, who assumed the responsibility for the proper conduct of those who made use of the room. A committee made up of representatives of all three classes was appointed and given charge of this room. The results proved quite satisfactory. A more important step was taken in the inauguration of the so-called honor system with reference to the conduct of examinations. The students in the Law School voted by a large majority to adopt this system, and it was formally put into effect in the final examinations of the session. The faculty have every reason to believe that the students not only assumed their obligations under this system seriously, but also that no cheating whatever occurred on any of the examinations.

Night classes.—The session of 1913-14 completed the fourth year of the course of those students who entered the Law School as candidates for a degree in 1910. Of the twelve members of this class, eight were duly graduated.

In addition to the instruction given to the regular students of the fourth-year night class, regular courses were given under the auspices of the General Extension Division of the University. These courses

corresponded substantially with the night courses formerly offered for graduation to regular night students. The total enrollment for the year was thirty-one; but of the twenty-seven who registered during the first semester, no fewer than twelve dropped out during or at the close of that semester. With a few exceptions, these night students in the Extension classes have proved to be ill-prepared for the exacting work required in the study of law. This lack of preliminary preparation and the inability of the students to secure the time necessary to make a reasonable amount of preparation for their recitations caused the work of these students to be so unsatisfactory as to raise a serious question as to whether the University is justified in making expenditures, which may roughly be put at \$5,000, in maintaining these courses. Instruction in these night classes was given by the members of the Law faculty, assisted by Messrs. H. S. Mitchell and E. C. Carman.

Equipment.—During the session 1913-14 modern equipment with chairs and running desks was installed in the second-year class room, and work was begun in installing similar equipment in the third-year class room. With all three class rooms thus equipped, the work of instruction can be carried on much more comfortably and satisfactorily. The equipment of the club room in the basement, to which students may repair to talk and smoke, has added much to the comfort of the students and the efficiency of the building as a whole. As now equipped, the Law building affords quite a satisfactory home for the Law School, with two notable exceptions. These are (1) the exceedingly bad ventilation of the first-year class room (room 104) and the second-year class room (room 102); (2) the nearness of the Great Northern Railroad tracks, upon which passing trains and shifting freight locomotives make so much noise as to require the suspension of class exercises, during those parts of the year when windows remain open, for a considerable portion of the time, which may reasonably be estimated at not less than ten per cent.

Application has been made to the Superintendent of Buildings to install some device to secure better ventilation in the class rooms referred to, but he has not yet succeeded in finding a satisfactory device.

With regard to the nuisance created by the railway company, it is my opinion that steps should be taken by the proper authorities looking to its abatement. It is intolerable that a part of so large and valuable a plant should be rendered comparatively useless for a considerable portion of the time by reason of the noise, often needless, made by the use of the Great Northern Railway tracks.

Respectfully submitted,

W. R. VANCE, *Dean*

THE MEDICAL SCHOOL

To the President of the University of Minnesota:

SIR: Following is a report of the Medical School for the year 1913-14.

The Medical School conducts the following educational activities: (a) The Medical School (proper), (b) the University Hospitals, (c) the School for Nurses, (d) the School for Embalmers, (e) the School for Public Health.

THE MEDICAL SCHOOL (PROPER)

The Faculty.—The year 1913-14 was the first conducted by the reorganized Faculty. I assumed the duties of the deanship on August 1, 1913.

The following appointments to the Faculty were made during the year: Robert A. Hall, B.A., M.A., Ph.D., Assistant Professor of Pharmacology; J. F. McClendon, Ph.D., Instructor in Physiology; Albert C. Potter, B.A., M.D., Instructor in Pathology and Bacteriology; Margaret Warwick, B.S., M.D., Instructor in Pathology and Bacteriology.

The following reappointments to the Faculty were made during the year: Thomas B. Hartzell, D.M.D., M.D., Research Professor in Mouth Infections; Soren P. Rees, B.S., M.D., Assistant Professor in Medicine; Arthur Sweeney, B.A., M.D., Lecturer in Medical Jurisprudence.

The following promotions were made: Richard E. Scammon, Ph.D., from Associate Professor to Professor in Anatomy; Emil S. Geist, M.D., from Instructor to Assistant Professor of Orthopedic Surgery; Frederic W. Schultz, B.A., M.D., from Instructor to Assistant Professor of Pediatrics; Carl C. Chatterton, M.D., from Assistant to Instructor in Orthopedic Surgery; Charles R. Drake, M.D., from Assistant to Instructor in Medicine; Ernest M. Hammes, M.D., from Assistant to Instructor in Mental and Nervous Diseases; Angus W. Morrison, B.A., M.D., from Assistant to Instructor in Mental and Nervous Diseases; Horace Newhart, M.D., from Assistant to Instructor in Diseases of the Eye, Ear, Nose and Throat; Harold Pederson, B.A., M.D., from Assistant to Instructor in Medicine; Fred J. Pratt, M.D., from Assistant to Instructor in Diseases of the Eye, Ear, Nose and Throat; Charles A. Reed, B.S., M.D., from Assistant to Instructor in Orthopedic Surgery.

The following resignations were accepted: E. A. Baumgartner, B.A., M.A., Instructor in Histology and Embryology; E. H. Parker, M.D., Instructor in Diseases of the Nose and Throat.

Through the death of Dr. J. Clark Stewart on June 25, 1914, the Faculty lost one of its most valued members. He had been associated with this School and the Medical Colleges preceding it since 1884. Acting in succession as Professor of Histology, of Bacteriology, of Pathology, of Surgical Pathology and of Principles of Surgery, and developing several of these departments from their foundations, he left his mark on

almost every branch of medical teaching. Moreover his concept of medical education was always in advance of the times. Consequently his influence in shaping the growth of the Medical School during the rapid changes of recent years was very important.

Registration statistics.—During the year 1913-14, 169 students were registered in the Medical School, distributed as follows: 66 in the third (freshman) year, 36 in the fourth (sophomore) year, 37 in the fifth (junior) year and 30 in the sixth (senior) year. The degree of Doctor of Medicine was conferred upon 30 students. Six students engaged in graduate work in departments of the Medical School. The Shevlin Fellowship was held by Sakyō Kanda, working in the Department of Physiology.

Curriculum.—The course of study has been revised so as to allow greater flexibility and freedom. The total number of credit hours required for graduation has been reduced, giving the students more time for outside study and individual development. The specific requirements of the departments have been further diminished in order that elective work may be introduced, with the end in view of stimulating interest and individuality. A plan of clinic clerkships has been developed under which each sixth-year student will spend two or three hours daily for half a year in the hospital in the first hand study of disease. This is a decided step in advance.

Clinical year.—The requirement of a fifth or clinical year will go into effect the coming year. This means that those students who complete their class studies in June, 1914 (with the exception of some who were already matriculated in the University when the regulation was adopted), will not receive their M.D. degrees until they have served one year as interns in approved hospitals, under such rules as the faculty may prescribe.

Graduate work—Teaching fellowships.—Two serious needs are recognized by medical educators everywhere. There is a need first for properly organized training in the medical specialties. The Medical School has arranged to offer courses to this end, open to graduates of high-grade medical schools who have had also one year of general intern service or equivalent experience. The courses will occupy three years, will be both theoretical and practical, will include research, and will lead to the degree of Doctor of Science in the specialty chosen. The degree of Master of Science similarly qualified will also be offered. These advanced degrees will be administered by the Graduate School of the University. The number of students will be limited to the facilities of the Medical School. At present graduate students can be received only in Surgery, Eye, Ear, Nose and Throat Diseases, General Medicine, Pediatrics, Nervous Diseases, Obstetrics and Gynecology, and possibly Orthopedia. Students entering these courses on the regular basis will pay the Medical School tuition fee.

The second need in medical education is for thoroly trained young physicians to act as full-time assistants in the clinical departments. The Medical School proposes to meet both the needs which have been described by appointing teaching fellows in the clinical departments. These

men will be carefully selected graduate medical students and candidates for the advanced degree. They will receive small salaries for service as teachers and assistants and will devote their full time to hospital, dispensary, and laboratory work during eleven months of each year. We shall start the session of 1914-15 with five or six such fellowships and hope to see the number increased within the next two or three years to thirty.

Provision is also made for graduate scholarships in medicine the holders of which will receive free tuition and will give certain service in the clinical departments. The Regents have so far authorized five such scholarships.

Through its provision for graduate students, graduate scholars, and teaching fellows in medicine, the Medical School believes that it has taken a step of the greatest importance for the future of medical teaching and the medical profession.

Hospitals.—Concerning the University Hospital consult page 100 of this report.

As the result of a year's experience a new and better arrangement has been entered into between the Medical School and the Minneapolis City Hospital. One half of the cases are assigned to Staff A, the members of which are nominated by the Medical School. A similar arrangement has been made with the City and County Hospital, St. Paul, covering most of the services of that institution.

Relations with other divisions of the University.—During the last year a marked spirit of coöperation has been developing between the Medical School and other Colleges of the University. The departments of Anatomy and Physiology have been made regular departments of the College of Science, Literature, and the Arts. Appropriate courses in these sciences may now be elected by any student as part of a liberal education. General Bacteriology is open to academic college students and is required of certain students in the College of Agriculture. Physiology is required of Home Economics students. The Medical School has always done a large amount of teaching for the College of Dentistry. The relations newly established show that the same kind of service can be extended to other divisions of the University.

On the other hand the new curriculum of the Medical School, through its elective privileges, will permit medical students to take appropriate instruction outside the Medical School proper. Certain courses in advanced chemistry, physics, animal biology and psychology have been found appropriate for the purpose.

Needs.—The imperative need of the Medical School is an increase of its hospital facilities. Undergraduate teaching of the the best kind can not be undertaken without ample and varied services in all the medical specialties. For acceptable graduate teaching such services are even more imperative. At present we have undergraduate provision only for the main branches. The specialties are almost unrepresented in our hospital. The privileges accorded at the municipal hospitals of the Twin Cities are valuable but these hospitals are not primarily teaching institutions. Their staffs are composed of loyal, enthusiastic teachers; but these men

are primarily active practitioners. The time they give to the hospitals and to teaching is contributed from busy professional lives. The institutions are too far away. The municipal hospitals can always be employed as supplementary agencies but they can never take the place of the University Hospital. This institution should be doubled in capacity. There can be no hesitation in this matter if the Medical School is to take front rank. Nor should the expense be charged narrowly to medical education, for no other part of the University budget goes back so directly to the people of the state. Hundreds of patients, who without proper treatment might have become charity charges, every year go from our hospital to the productive ranks of the population. Many self-respecting but unfortunate people are saved from an overwhelming burden which might easily have crushed their independence of spirit and added to the parasitic and dependent element of our population. I cordially endorse all that the Superintendent of Hospitals has to say concerning desirable extension.

THE UNIVERSITY HOSPITAL

The report of the Superintendent is herewith submitted as follows:

The admissions to the different services, births, and deaths were as follows:

Medical, including neurology and pediatrics.....	550
Surgical, including ophthalmology and oto-laryngology....	691
Obstetrical	287
Births	258
	—
Total	1,786
Deaths	97

The daily average number of patients was 124 and there were 292 clinics held.

The average cost per diem per patient was \$1.65, which is \$0.36 less than the per capita cost the preceding year. This decrease is due in part to the fact that no clinical salaries were charged against the hospital the past year, whereas a charge of \$8,000.00 was made the previous year. In greater part the decrease is due to a larger daily average number of patients (124 as compared with 108) and to the more economical purchase of supplies. The number of new patients and total attendance at the Out-Patient Department were as follows:

1913-1914		An increase of
New patients.....	13,575	2,024
Total attendance	47,347	6,890

The daily average attendance was 155.21.

The attendance by divisions was as follows:

Division	New Patients	Total Attendance
Medicine	2,561	8,111
Surgery	1,857	6,871

Skin	1,235	4,394
Nose and Throat	1,490	4,355
Eye and Refraction	2,244	6,796
Ear	653	3,173
Gynecology	674	4,862
Obstetrics	391	800
Neurology	255	1,853
Pediatrics	1,515	3,347
Genito-Urinary	463	2,221
Orthopedics	237	564

The following figures are of interest as showing the growth of the Out-Patient Department during the past ten years:

Year	Number of new patients	Total attendance
1903-1904	2,270	8,891
1904-1905	2,478	9,323
1905-1906	2,656	10,141
1906-1907	2,714	9,978
1907-1908	2,871	10,531
1908-1909	3,410	11,897
1909-1910	4,206	15,110
1910-1911	6,636	24,223
1911-1912	9,229	33,190
1912-1913	11,501	40,457
1913-1914	13,525	47,347

The Out-Patient Department Building at 1806-1810 Washington Ave. South has been outgrown. Approximately six times as many patients were registered in the year 1913-1914 as were cared for in 1903-1904. The crowded conditions are such as to render the proper care of all patients difficult. New quarters for the Out-Patient Department should be provided during the next biennial period, and the location of the Department should be changed to the Medical School Campus.

In April, 1914, at the request of the Superintendent of the Minneapolis City Hospital and upon the authority of the University administration, the building at 206 State Street Southeast was opened upon a per diem cost basis for the purpose of caring for City Hospital patients convalescent from contagious diseases in order to assist the City Hospital in meeting the unusual demands made upon it by large epidemics of scarlet fever and diphtheria. Between April 3 and May 16, 1914, 576 days of hospital care were given 46 patients for which \$1,036.00 were collected and credited to Elliot Hospital support. The building at 303 Washington Avenue Southeast was opened several times during the period for the purpose of isolating University Hospital patients developing contagious disease after admission, and to care for University students and employes suffering from contagious disease. The University

Hospital has never been able to meet properly reasonable demands for the care of cases of contagious disease developing among its patients, or numbers of the University student body afflicted with contagious disease, owing to lack of proper facilities. Such demands can be met only by the provision of space in a modern building, built and equipped for the purpose.

I find it necessary again to refer to the unsatisfactory housing facilities afforded the School for Nurses. The number of nurses in training has steadily increased and will of necessity increase still further upon the completion of the service building, now in process of construction, since its occupation will release space in the Elliot Memorial Building which will permit an increase in the capacity of the hospital of forty beds, thus requiring ten more nurses. The buildings at 417-419 Delaware Street, 312 Church Street, and 327 Church Street, are now occupied to their full capacity by nurses, and January 1 next another building to house twenty nurses will be required. I therefore renew my recommendation of two years ago that a suitable building be provided to house the Training School for Nurses.

For the greater part of the time admissions to the Hospital during the past two years have been delayed by the existence of waiting lists in different services. These delays frequently occasion ill-feeling toward the Hospital on the part of applicants for admission, but have been unavoidable since the capacity of the hospital is insufficient to permit the acceptance of applications for admission promptly. In order properly to provide for the admission of the patients entitled to care at the University Hospital and to meet teaching requirements of the Medical School its capacity should be at least doubled.

Respectfully submitted,

L. B. BALDWIN, *Superintendent*

THE SCHOOL FOR NURSES

The report of the Superintendent is submitted as follows:

Senior student nurses.....	7
Junior student nurses.....	14
Accredited nurses entered.....	9
Accredited nurses withdrawn.....	3
Student nurses matriculated.....	13
Student nurses withdrawn.....	3
Student nurses graduated.....	6
Certificates to accredited students.....	4

During the latter part of the year all classes and lectures have been held in the afternoon, thus eliminating evening lectures. One new course of value has been added during the past year. We call it "Invalid Occupation," and it is intended to teach nurses the importance of keeping convalescent patients, children especially, pleasantly occupied and entertained. This course is elective in the senior year.

Applications both for the full course, and for a year of additional training, are increasing each year. The need for a Nurses' Home is urgent for two reasons—first, in order that we may relieve our crowded, unsanitary housing conditions, and second, that we may be provided with proper teaching equipment.

One further need which we hope to supply in the near future, is a teaching assistant who will have charge of the practical nursing work in the wards.

Respectfully submitted,

LOUISE M. POWELL, R.N., *Superintendent*

THE SCHOOL FOR EMBALMERS

This is a short course which was organized in 1913-14 at the request of the Minnesota Funeral Directors Association, which generously agreed to finance the instruction during a trial period. The School is conducted by a committee appointed by the Medical School and representing, in addition, the School of Chemistry and the State Board of Health. Thirty-five students attended the first session, which occupied six weeks beginning January 5, 1914. The passing of the examination of the School for Embalmers is accepted by the State Board of Health for the licensed embalmer's certificate.

THE SCHOOL OF PUBLIC HEALTH

The need for the organization of public-health teaching and investigation in the University has been apparent for a long time. There has been difference of opinion as to how this work should be articulated with the existing University units. It is apparent that many activities both in various divisions of the University and also in the State Board of Health must be coördinated if effective work in public health is to be maintained. As a result of numerous conferences during the past year it has been agreed that, pending the time when Public Health shall be organized as an independent unit with a staff and budget of its own, this work shall be in charge of an Executive Committee consisting of the President, the Dean of the Medical School, the Executive Officer of the State Board of Health, the ranking instructor in Public Health in the Department of Pathology, Bacteriology, and Public Health, and the ranking instructor in Sanitary Engineering in the College of Engineering. This committee reports to the Administrative Board of the Medical School. The legislative budget of the Medical School contains a request for funds for public-health work; and the Executive Committee is now engaged in formulating a course of study for health officers and other details of organization. It is hoped to have the School of Public Health fully constituted by the beginning of the next school year.

Respectfully submitted,

E. P. LYON, *Dean*

THE COLLEGE OF DENTISTRY

To the President of the University:

SIR: I herewith submit my report as Dean for the year 1913-1914.

Four-year course.--With the increased incidence of caries of the teeth and mouth diseases, naturally follows a demand for skilled dentists. It is not merely technical skill that is wanted; the part to be filled at present by the dentist involves more general knowledge; he should be able to adjust himself to community life and conditions. While some readjustment has taken place to meet modern demands, it is apparent that the next move must be to prepare the student more efficiently for professional work and to have more time for the actual dental course as well. Accordingly, the Dental Faculties Association of American Universities unanimously adopted to recommend to their various governing bodies to extend the course to four years and it is unofficially understood in this body as well as elsewhere that this should be put into effect with the session beginning in September, 1916. The Regents of Minnesota at a meeting held June 10, 1914, took the following action:

"Voted that it is the sense of the Board that if a majority of the Dental Colleges in the Association of University Dental Colleges decides to adopt a four-year course, the University of Minnesota will be favorably disposed toward such an extension of the dental course."

The Universities, as well as other bodies interested in the welfare of humanity, should see to it that this move really becomes effective at the time proposed at the very latest. There can be no good reason for its postponement in America. Viewed from the standpoint of our general high efficiency in medical and other sciences, our social and economic conditions, the only comment should be in regard to the lateness of the move.

The full report of the Committee on Education of the above body is published in the *Dental Cosmos*, June, 1914. The essential features are: first, that this course includes sciences and other subjects, which better prepare the student for professional study; second, the subjects taken are also of value in other callings, so that a change involves practically no waste; third, the technical subjects of the first year are planned actually to test the student's fitness for his life work; fourth, it allows a more even and graded distribution of the work, which can under the new conditions be more thoroly assimilated; fifth, it broadens the student's outlook and in a general way prepares him more perfectly for a life of usefulness.

Owing both to limited room and demands upon this College the admittance of students according to preparation is necessary; about twenty per cent of the present enrollment have had at least one year of academic work; the Curriculum Committee will soon have plans perfected for a readjustment of the curriculum so that these students will practically

take the course proposed by the Educational Committee of the Dental Faculties Association of American Universities. In this way the four-year course seems more like an evolution, an organic outcome of conditions, rather than an abrupt departure from the past.

To provide adequately for the present number of students some remodeling and new equipment is required and with the almost certain future increase in attendance this problem should be met at once. The total cost need not exceed \$3,000.

Dental Research.—Pathological investigations for the past five years have proven that research in this particular field should be recognized by the University to the extent of attaching it to the chair of Clinical Pathology with consequent change of title to the head of the Department.

Foreign students.—What seems of special interest and encouragement is the continued attendance of foreign students, both undergraduate and graduate. Another item of similar nature is the many visitors not only from Europe and the Far East, but from every corner of the United States.

Summer School.—The Summer School had an enrollment of over thirty students in 1914, some of them from other Universities; its continuance, however, should be based upon immediate rather than anticipated demands.

Respectfully submitted,

ALFRED OWRE, *Dean*

THE COLLEGE OF PHARMACY

To the President of the University:

SIR: I herewith submit my annual report for the year 1913-14.

Registration.—The College of Pharmacy closed its twenty-second year on July 31, 1914. The University commencement on June 11, 1914, was the twenty-first of the College. A total of 30 students graduated; 28 from the regular course and 2 from the master's course. The total registration during the year reached 98—64 juniors, 32 seniors and 2 graduate students. The enrollment of the year before was 86. This increase in enrollment is due no doubt to the fact that the entrance requirements have been increased to high-school graduation to begin September, 1915. Eighteen students dropped out of the course during the year. Four of these were dropped by the faculty because of poor scholarship; five discontinued on account of illness; one to take up music; three on account of lack of funds; one transferred to the College of Agriculture and the rest left for other sufficient reasons. The faculty gave regular instruction to a total of 171 students, including 73 medical students. The medical students composed two classes, the sophomore and junior. In addition the faculty gave several lectures to the medical class of nurses and to several high-school classes.

Geographical distribution of students.—The student body represented the following political divisions:

FOREIGN COUNTRIES:		Le Sueur.....	3
Canada.....	1	Lincoln.....	4
STATES:		McLeod.....	2
Iowa.....	3	Mille Lacs.....	1
Montana.....	1	Mower.....	2
New York.....	1	Nobles.....	1
North Dakota.....	1	Norman.....	2
South Dakota.....	2	Otter Tail.....	1
Wisconsin.....	6	Pennington.....	1
Minnesota.....	83	Ramsey.....	7
MINNESOTA COUNTIES:		Redwood.....	2
Anoka.....	2	Rice.....	2
Blue Earth.....	1	Sibley.....	1
Brown.....	2	Stearns.....	1
Carlton.....	1	St. Louis.....	4
Chippewa.....	2	Todd.....	1
Cottonwood.....	1	Wabasha.....	2
Faribault.....	1	Waseca.....	1
Goodhue.....	2	Washington.....	1
Hennepin.....	24	Winona.....	2
Itasca.....	1	Wright.....	4
		Yellow Medicine.....	1

Instruction.—No important changes in the curriculum were made during the year. The larger quarters now occupied by the College afforded somewhat better facilities for conducting the regular work. Altho a dispensing laboratory is provided in the new building because of lack of equipment, the work in dispensing had to be conducted in the old way, employing the portable dispensing cabinets. Materia medica was

for the first time taught within the College itself as the result of an agreement between the College and the Department of Pharmacology of the Medical School, which latter department heretofore gave the instruction in materia medica to pharmacy students. Heretofore, the College gave instruction to junior medical students in the subject of practical pharmacy, but the Medical School requested that this instruction be given to the sophomore class. In meeting this request the College of Pharmacy gave instruction during the year to the two medical classes.

Among those outside of the faculty who gave instructive lectures to the student body are to be named the following: Mr. F. A. Upsher Smith on the subject of ampoules; Mr. Winthrop G. Noyes on pure food and drug legislation; Dr. Justin S. Brewer on new synthetics used in pharmacy and perfumery; Mr. E. A. Tupper, Secretary of the State Board of Pharmacy, on the State pharmacy laws; Mr. Charles H. Huhn on the practical aspects of the practice of pharmacy. Instruction was also afforded the students by visits to the wholesale drug houses of the Twin Cities. At each, competent guides explained numerous pharmaceutical processes conducted on the manufacturing scale. Field instruction in botany was afforded on the several botanical trips made by the class in charge of Dr. Newcomb. Dr. C. Naumann McCloud gave the usual course of lectures on *First Aids to the Injured*.

Faculty changes.—Mr. Charles H. Rogers, who had been appointed instructor in pharmacy in the spring of 1913, resigned as of July 31, 1914, having received and accepted a call to the University of West Virginia. This call included a promotion in rank to an assistant professorship and an increase in salary of \$700. No permanent successor has been named and I fear that we cannot find a competent one, unless we meet the prevailing keen competition for good men.

Free Dispensary Drug Room.—The drug room of the University's Out-patient Department dispensed a total of 18,797 prescriptions during the year. The number of prescriptions dispensed the year before was 15,621. Practically all of these prescriptions were dispensed by senior pharmacists under direction and constant supervision. This work is systematized as much as work of this kind can be. Students receive regular instruction and are rated upon their work. The practice thus afforded is growing more valuable to the students from year to year.

Outside activities.—The outside activities of the faculty during the past year exceeded the usual amount of service rendered to the state, to pharmacists and to others. It included a larger number of identifications of drug specimens and preparations submitted by pharmacists; a continuation of the work on the preparation of federal standards for a number of drugs, and comments on federal standards prepared by others; exhibits of plants from the medicinal plant garden and representative products from the pharmaceutical laboratories at the meetings of the Minnesota State Pharmaceutical Association at Minneapolis, the National Association of Retail Druggists at Philadelphia, the American Pharmaceutical Association, the American Conference of Pharmaceutical Faculties, the National Association of State Boards of Pharmacy and the Michigan State

Pharmaceutical Association at Detroit, Michigan; lectures on drugs grown and harvested by the College, before the Hennepin County Medical Association, the Ramsey County Medical Association, the Minneapolis Retail Druggists Association, the Northwestern Branch of the American Pharmaceutical Association, the Minnesota Academy of Sciences, etc.; twenty-one lectures and addresses before various pharmaceutical bodies and colleges of pharmacy at St. Paul, Chicago, Detroit, Buffalo, Boston, New York, Brooklyn, Jersey City, Philadelphia, Washington, D.C.; six lectures in as many Minnesota towns on pure foods and drugs as part of the University Weeks' Extension work; the formulation and provision of the program of the Scientific Section of the Minnesota State Pharmaceutical Association's annual meeting, the conduct of the Section sessions (a member of the faculty has been chairman of the Section for the past nine years) and the correcting and editing of the text constituting the published proceedings; the chief address at the convention in connection with the very extensive drug and chemical exhibit held at Madison Square Garden, New York City, in January; much unavoidable A.Ph.A. committee and council work.

Important offices held by faculty members.—The secretaryship of the Minnesota State Pharmaceutical Association; membership in the Council (the executive body) of the A.Ph.A.; membership in the Publication Committee, A.Ph.A., which committee has in charge the important function of publishing the National Formulary (30,000 copies of the third edition sold to date), the fourth edition of which is now on the press, and the publication of the Association's monthly Journal, regarded as the foremost journal of its kind; secretaryship of the Northwestern Branch, A.Ph.A. A member of the faculty visited the important countries of Europe during the summer vacation as a member of a group of pharmacists who studied European pharmaceutical conditions.

The new building.—The College moved into its new building (old Millard Hall remodelled and fireproofed) during the summer of 1913. The building was not entirely ready for the housing of the College. Altho the equipment was gradually added during the year, the instructional work was not impaired in any wise. Already the pharmacognosy laboratory, the plant house laboratory and the small recitation room are taxed to their capacity. The equipment of the building is not yet entirely completed.

Departmental library.—The pharmaceutical departmental library was not employed extensively during the year, partly because of the incomplete equipment and partly because of the lack of a library assistant. During the ensuing year the classes will do regular work in the library.

Raising the standard of pharmaceutical education.—The entrance requirements of the College have been increased to the completion of the high-school course or an equivalent to become effective with the year 1915-16. This increase in requirements received the approval of the Minnesota State Pharmaceutical Association at its meetings held in January. The College and the Association have coöperated in many things but not until now has the Association given its approval to a high-

school training as a prerequisite to the study of pharmacy. The next step will be a subject requirement within the high-school requirement. The College has not yet seen its way clear to offer in entirety the recently-authorized three- and four-year courses, but it has accepted one student for advanced standing in the four-year course. Negotiations looking to the formulation of the curricula for the two proposed courses are under way and as soon as the faculty is sufficiently strengthened, no doubt the courses can be offered.

A shorter college year.—There is really a demand for a longer interim between college years. The majority of pharmacy students seek employment in drug stores during the summer months. They find it increasingly difficult to find positions unless they can enter upon them not later than the first of June and continue in them until the first of October. That period in a way constitutes the practicing pharmacist's summer season. As many students are obliged to earn their living while at school, the faculty is often requested to excuse students before regular work is over in the spring and as often to excuse lateness of registration in the fall. The faculty has handled these cases individually and has been obliged to decide them negatively for the student in most instances. Of course I do not suggest the shortening of the University year because a shorter year would be to the advantage of the College of Pharmacy. In our own case I believe a shorter year would increase our enrollment.

Larger salaries needed.—We have for three consecutive years lost men on account of the low salary offered, and the search for authorized additional men discloses the fact that really good men are very scarce, and are so well placed that our available salaries are not attractive to them. The College ought to be placed in a position to meet the competition for good men. The faculty has always been undermanned and now that the College is fairly well housed and equipped it should next be strengthened in its faculty.

Lines of future growth.—While the College has a very comprehensive program of future development, it feels the necessity of first giving its attention to the present needs of the College, which are the organization of the three- and four-year courses, the completing of the equipment of the Pharmacy Building and the strengthening of the faculty.

Medicinal plant garden and laboratory.—The work connected with these has been conducted much as last year. The interest on part of the public in the garden is increasing and the inquiries concerning medicinal plant cultivation are constantly increasing. We reply to all inquiries, but the correspondence is really becoming burdensome because of the limited office force of the College.

Respectfully submitted,

FREDERICK J. WULLING, *Dean*

THE SCHOOL OF MINES

To the President of the University of Minnesota:

SIR: I herewith submit my report for the University year, 1913-1914.

Registration.—The total registration during the year was one hundred twenty-nine (129) distributed as follows:

Seniors	9
Juniors	19
Sophomores	13
Freshmen	27
First year students.....	61
Total	129

Geographical distribution of students.—During 1913-1914 students have been registered from Minnesota counties as follows:

Aitkin	1	Morrison	1
Becker	1	Olmstead	1
Blue Earth	1	Otter Tail	2
Brown	2	Ramsey	30
Crow Wing	1	Rice	1
Goodhue	2	St. Louis	5
Hennepin	51	Swift	1
Hubbard	1	Wabasha	2
Jackson	1	Washington	2
Kandiyohi	1	Watonwan	1
Lake	1	Winona	1
Mille Lacs	1	Wright	1

Students were registered also from outside the state as follows:

Arizona	1	North Dakota	2
Florida	1	South Dakota	2
Iowa	2	Wisconsin	6
Nebraska	1	Peru	1
New Jersey	1		

Withdrawals.—During the year forty-six (46) students withdrew. These students were distributed by classes as follows:

Seniors	0
Juniors	0
Sophomores	1
Freshmen	7
First year students.....	38

The reasons for such withdrawal are as follows:

Deficient	21
Financial dishonesty	1
Financial	4
Health	3
Cancelled before attending classes.....	2
Unknown	6
To schools and colleges outside the University of Minnesota.....	5
To schools and colleges within the University of Minnesota.....	4

The curriculum.—The administration of the mining work by Professor George J. Young has necessitated some slight changes of minor importance.

The new courses in metallography introduced by Assistant Professor Samuel L. Hoyt are successfully meeting the needs of the Department of Metallurgy. Other courses are offered to meet special requirements of students in other colleges.

Experiment Station.—During the period beginning August 1, 1913, and ending August 1, 1914, 269 cases were brought to the attention of the Experiment Station as against 253 of the preceding year.

These included the burning of clay for the Minnesota Geological Survey; work for the State Mine Inspector; assays for gold and silver; examinations of small hand specimens, and large scale concentration tests for interested parties. All samples submitted were from the state of Minnesota.

Work done for the Minnesota Geological Survey: Nineteen (19) separate burns were made, in which 384 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 Staff.

Work for the State Mine Inspector: Upon the request of Mr. F. A. Wildes, State Mine Inspector, 69 determinations were made as follows: Iron 24, silica 3, sulphur 21, alumina 21.

Gold and silver assays: Fifteen (15) gold and 14 silver determinations were made on samples submitted.

Work done by the Minnesota Geological Survey: During this period no samples were submitted which required work done by the Geological Survey.

Work done by the School of Chemistry: During the above period 6 samples were submitted to the School of Chemistry which required 13 separate chemical determinations.

Specimens examined: There were 142 samples submitted which required merely an examination or simple blow-pipe test to identify. Many samples were brought in by interested parties and much time was spent in conferences and consultations.

Large-scale concentration tests: The following concentration tests were made:

Company	Mine	Range	Sample Wgt.Lb.
Tod-Stambaugh Company	Morton	Mesabi	3,100
Pittsburgh Steel Ore Company	Rowe	Cuyuna	3,600
Inland Steel Company	Thompson	Cuyuna	3,600
Crosby Exploration Company	Kennedy	Cuyuna	3,600
Republic Iron & Steel Company	Schley	Mesabi	18,000
Interstate Iron Company	Buckeye	Mesabi	3,600
Butler Bros.	Quinn	Mesabi	60,000
E. J. Longyear	Sullivan, No. 2	Mesabi	4,000
John Junior Mining Company	John Junior	Mesabi	1,000
Pitt Iron Mining Company	Wacoutah	Mesabi	600

This work was practically continuous. In nearly every case various officials of the companies were present at the tests. The Morton, Buckeye, Sullivan, No. 2 (University), and Wacoutah are state leases.

The interest shown by the mining companies in our experimental work has been very gratifying. Most of the ore is furnished free of all charges. The Great Northern and the "Soo" railroads haul without charge all ore for experimental purposes from the Mesabi and Cuyuna ranges. Information gained from the various shipments is especially valuable to the state owning large mineral holdings. Such information is of great assistance in preparing reasonable and scientific estimates for the Tax Commission. Future leases of state mineral lands where wash ore is found must be governed largely by the results obtained at the Experiment Station, if justice is to be done both free owner and lessee.

The above mentioned tests were made possible by the installation of the necessary equipment for conducting operations on a large scale. Many of the units of the plant were designed and built in our own shop under the direction of our staff.

The treatment of low grade magnetites of the eastern Mesabi, the adaptability of peat to the smelting of iron ores, the possibility of the beneficiation of manganiferous ores are now under investigation.

Publications: Bulletin No. 2, *The Preliminary Concentration Tests of the Mesabi Ores*, has been published and was very favorably received. Bulletin No. 3, *Preliminary Report on the Concentration Problems of the Cuyuna Ores*, is now in preparation and will be ready for press shortly.

Service to the Minnesota Tax Commission: The work of making ore estimates for the Minnesota Tax Commission begun June, 1909, has been continued and to date there have been estimated approximately 1,750,000,000 tons of ore. These estimates are used as a basis for the assessed valuation of mineral properties by the Commission. There have been added by reason of our services to the state, 108,978,327 tons over that reported by the operating companies. Each ton would pay to the state and local government about ten cents. If an estimate be made of our services figured on the increase of tax receipts from the above mentioned tonnage increase it would be based on 10,897,833 dollars.

The ores upon the range known as the Cuyuna, both merchantable and non-merchantable, have been estimated since the date of our last report, and there have been found 86,403,541 tons of both grades, of which practically 51,000,000 tons are now merchantable. This work, as well as that on the Mesabi and Vermilion ranges, is growing in volume and becoming more complete as time goes on. The tonnage of the Cuyuna range is not included in the 108,978,327 tons given above.

The services of the School of Mines have been satisfactory to the Commission as well as to the mining interests, as evidenced by expressions of approval.

Changes in Staff.—There have been no changes in the staff of the school during the period covered by this report.

School of Mines Building.—Ground was broken for our new School of Mines Building July 25, 1914, sixteen months after the old building

had been destroyed by fire. It is expected that the new building will be occupied at the opening of the college year, September, 1915. The delay in getting into permanent quarters has had a demoralizing effect particularly on the student body.

Future needs.—If the School of Mines is to continue to meet successfully the increasing demands made upon it, an increase of staff, of salary, and equipment must be provided. The geological wing of the mining building should be built as soon as possible. The proximity of mining to geology would ensure a strong, combined technical library, greater efficiency, and closer coöperation. The old ore testing building is not adapted to our present needs. If governmental coöperation is to be expected through the Federal Bureau of Mines, a suitable location and new structure will undoubtedly be required.

Respectfully submitted,

W. R. APPLEBY, *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, 1914.

Since my last report to you, important changes have taken place in the School of Chemistry. During the past year Chemistry has moved from the old to the new laboratory; from a badly crowded, poorly ventilated building to a large, perfectly ventilated, fireproof laboratory.

The New Laboratory.—Unfortunately the appropriation granted by the legislature was not sufficient to complete the building as planned. On the contrary, only three quarters of the building could be completed by the appropriation, and this only after the original plans had been materially reduced in size; after the parapet wall and roof house had been left out, after changing tile floors and walls to common cement and after a large part of the equipment, tables, hoods, etc., had been cut out. This unfortunate condition is doubtless due, in a measure at least, to the increase in the cost of labor and building in general.

Assimilation of old equipment.—Lack of funds has made it necessary to utilize all of the old equipment not completely disintegrated by acids, fumes, etc. This old equipment is now being installed as rapidly as possible. While it does not fit in the new building as the new equipment would have done, nevertheless some of it has undergone a remarkable transformation and will serve well for some time to come.

In spite of the fact that practically all of the old equipment has been utilized, several of the smaller laboratories can not be equipped at present and additional funds will be necessary to put them in good working order.

Delay in the completion of the New Laboratory.—While the contract called for the completion of the new laboratory by August 1, 1914, the engineering part of the work is still incomplete. The contractor has evidently done his best. There is no doubt but that he found the work far more difficult than he had anticipated. This delay has naturally retarded our work of installing laboratory tables, etc. Only two large laboratories are near enough finished at the present time to begin work. The others are being completed as rapidly as possible. We hope that all the large classes may begin laboratory work by November 10.

Students.—We now have more students taking chemistry than ever before. When all of the laboratory work is commenced every available table will be occupied. While the number of students taking chemistry has increased, the number of students registered in the School of Chemistry has decreased. This decrease may be due to two or three causes: first, increase in mathematical subjects; second, change in credit hours; and third, to the fact that the students in the five-year course in Arts and Chemistry this year for the first time register for the first three of the five years in the Academic College. From all indications the total num-

ber of students in the School would be about the same as last year under the same conditions.

Research work.—During the last year the following subjects have been under investigation:

- a. The phase rule—continuation of work begun last year.
- b. The relation between the concentration and the colligative properties of solutions.
- c. The sulphur compounds in illuminating gas.
- d. The determination of vapor pressures of certain saturated solutions and salt hydrates.
- e. The terpenes.
- f. The replacement of metals by one another in non-aqueous solutions.
- g. The adsorption of silica.
- h. The inversion of starch by dry hydrochloric acid gas.
- i. The electrolytic preparation of magnesium.
- j. The corrosion of underground iron and lead pipe.
- k. The viscosities of certain lubricating oils.
- l. The determination of the atomic weight of antimony.
- m. The utilization of waste wood—continuation of work.
- n. Catalysis—continuation of work begun last year.

In addition to the above investigations a general survey of the whole field of Industrial Chemistry is being made with the idea of pointing out to the business men of the country the absolute necessity of a rapid development of the various chemical industries owing to conditions brought about by the great war.

Respectfully submitted,

GEORGE B. FRANKFORDER, *Dean*

THE COLLEGE OF EDUCATION

To the President of the University:

SIR: I herewith submit my report as Secretary of the College of Education for the year ending July 31, 1914.

REGISTRATION

The College of Education registers: (1) students who have completed at least the freshman and sophomore years of the College of Science, Literature, and the Arts, or some other college at the University of Minnesota or elsewhere, (2) graduates of the advanced course of approved Normal Schools, to whom it grants sixty credits of advanced standing, (3) graduate students, (4) unclassified students, chiefly teachers who are engaged in service and who do not yet possess a bachelor's degree.

At the annual commencement, June 11, 1914, 50 students were graduated from the College of Education. The total registration for the year amounted to 111.

The following shows the registration for the years 1912-1913 and 1913-1914.

TABLE I. REGISTRATION IN THE COLLEGE OF EDUCATION

	1912-1913	1913-1914
Juniors.....	42	27
Seniors.....	41	55
Graduate Students.....	18	4
Unclassified.....	5	25
Total.....	106	111

Registration according to courses.—The total number of registrations in all courses amounted to 824, distributed as follows: History of Education, 265; Secondary Education, 39; Principles and Organization of Secondary Education, 131; Theory of Teaching, 17; Principles and Organization of Elementary Teaching, 16; School Administration, 49; School Sanitation, 79; School Supervision, 18; School Systems, 28; Rural Education, 15; Religious Education, 22; Industrial Education, 17; Seminar courses, for students taking advanced studies, 38; Practice Teaching, 30; Philosophy of Education, 15; Classroom Management, 38; Educational Psychology, 6; Technique of Reading, 3.

Registration—sources of enrollment.—Students registered in the College come chiefly from the following sources: (1) from colleges within the University of Minnesota, (2) from colleges outside the University

of Minnesota, (3) from normal schools, (4) from theological schools. Table II shows the students classified upon the basis of these types of institutions.

TABLE II. INSTITUTIONS FROM WHICH COLLEGE OF EDUCATION STUDENTS COME, 1913-1914

1. Colleges of the University of Minnesota	
Science, Literature, and the Arts.....	26
Agriculture	3
Other colleges	2
2. Colleges outside the University of Minnesota	31
Carleton	2
Hamline	5
Dakota Wesleyan University.....	1
Bethel College, Newton, Kansas.....	1
University of North Dakota.....	1
Western Union College.....	1
University of Utah.....	1
Wells College	1
Iowa State College.....	1
Downer College	1
3. State Normal Schools in Minnesota	15
Duluth	2
Mankato	15
Moorhead	6
St. Cloud	13
Winona	5
	41
4. Graduates of Normal Schools outside of Minnesota.....	9
5. Theological Schools	2
6. Foreign Schools (Holland).....	1
7. St. Paul Normal School.....	1
	13

THE YEAR'S WORK

Professional training for students in other colleges.—The College furnishes professional instruction and training for an increasing number of students registered in other colleges in the University of Minnesota and in the Extension Division.

The following table shows the number of such students receiving instruction in this College during the past year.

TABLE III. NUMBER OF STUDENTS TO WHOM THE COLLEGE FURNISHED PROFESSIONAL TRAINING, 1913-1914

1. Extension Division, including correspondence courses.....	12
2. Department of Home Economics.....	45
3. College of Science, Literature, and the Arts.....	311
4. College of Education.....	69
5. Graduate School	8
Total	445

Practice teaching.—The practice teaching conducted in the University High School under Miss Alice Mott, the Principal, has been carried on under the greatest difficulties. This is no place to enumerate the handicaps of the past, nevertheless the courage and sacrifice of Miss Mott deserve more than passing comment. During the past year 30 students, prospective teachers, did their practice teaching here. Only five of this number were registered in the College of Education.

Appointment Bureau.—Seventy-seven of the 216 high schools in Minnesota and 10 high schools in other states were supplied with teachers during the past year, through the College of Education appointment bureau. One hundred and five University graduates in the class of 1914 were aided in securing positions. Of the 50 graduates of the College of Education, 30 secured teaching positions, distributed as follows: Superintendents, 3; High School Principals, 6; High School Assistants, 10; High School Normal Training Departments, 7; Normal School position, 1; Manual Training, 3.

School visitation.—The policy of school visitation by members of the College of Education faculty has been pursued with much greater vigor during the past year than ever before; 122 schools were visited in 98 towns; 180 addresses were delivered before audiences varying in character and composition all the way from those composed of school pupils to teachers' state and sectional meetings and commencement addresses. The estimated aggregate attendance at the addresses amounted to 37,100.

Only through such visitation can members of the faculty keep in touch with the schools and their problems, but its advantages are not confined to the College of Education, for it fosters friendly relations between the public schools and the University as a whole, and gives opportunities for conferences leading to mutual understanding and sympathy.

Summer School.—The Summer School conducted under the auspices of the College of Education and the State Department of Education had a total enrollment of 674 students, including courses in Medicine and Dentistry.

Superintendents' and Principals' Short Course.—The College of Education, in conjunction with the State Department of Education, offered at the University during the spring meeting of the superintendents' section of the Minnesota Educational Association, March 23-27, 1914, a short course for superintendents, including city and county superintendents, and principals, high school, graded school, etc.

The registration for the short course was 227; the attendance at the meetings was on the whole exceedingly gratifying.

The lecturers were all men who have gained national reputation in dealing scientifically with the immediate problems confronting superintendents. Lotus D. Coffman, Professor of Education in the School of Education of the University of Illinois, gave five lectures on School Supervision. Lightner Witmer, Professor of Psychology in the University of Pennsylvania, delivered five lectures on Individual Education, followed by round table. F. G. Bonser of Teachers College, Columbia

University, gave five lectures on Industrial Education. David P. Snedden, Commissioner of Education of the State of Massachusetts, delivered an address at a general meeting.

The benefit of these courses was not limited to the superintendents, as many students of the University attended. It is impossible to estimate the value to the state and its schools which will result from bringing 300 superintendents and principals into yearly contact with men capable of giving them scientific guidance upon school problems.

The Minnesota experiment attracted wide attention. The United States Bureau of Education saw fit to issue a special news bulletin upon the Minnesota Short Course, and already a number of states are planning to follow Minnesota's example.

The College is deeply indebted to the State Department for the aid and support which it gave in this its initial attempt. The expenses of three of the lecturers were paid by the State Department, the expense of only one being paid by the College. It is uncertain whether the State Department can be depended upon to continue such aid indefinitely. The sum paid by the College of Education was drawn from the balance of its summer school budget. If the Short Course is to be continued it would seem that the budget of the College of Education ought in the future to include an item to defray the expenses of this short course.

INCREASED FACILITIES FOR WORK

New building for College and University High School.—The building formerly occupied by the School of Mines, largely destroyed by fire, was remodeled, fireproofed, and renovated throughout for the purpose of housing the College of Education and the University High School. The building consists of three stories: a half basement, a first and a second floor. The basement, two recitation rooms on the second floor, and all of the first floor except the offices of the Dean have been reserved for the University High School. The remainder of the second floor is devoted to the College of Education. The building contains sixteen classrooms, including a chemistry laboratory, a physics laboratory, domestic science and manual training rooms, sewing room, a large high school assembly room, and a large lecture room. There are also excellent offices for members of the College and High School staffs, and rooms for library facilities and student organizations.

Faculty additions—College and High School.—To the College of Education was added during the past year Mr. Raymond A. Kent, as Assistant Professor of Education and Principal of the University High School. During the past year, Mr. Kent was on leave of absence in order that he might act as secretary of the Minnesota Educational Commission. Mr. Kent began his duties as principal in the fall of 1914.

Mr. B. F. Pittenger, appointed in June, 1912, began his duties as instructor in the College in the autumn of 1913. Mr. Pittenger's work has included certain classes in the history of education, in experimental education, extension work and the investigation of the training of rural school teachers. This investigation, carried on during the past year will

be ready for publication in the fall of 1914. The results of Mr. Pittenger's investigation were printed as a bulletin prior to the writing of this report, November, 1914.

Most of the additions during the past year were made in connection with the University High School in planning for its entrance into the new building in the fall of 1914. The following teachers were appointed in June, 1914: Mrs. Sarah A. Allen, English; Miss Ray L. Leland, History; Miss Mary Gould, German and Latin; Mr. Carl Fosse, Science; Mr. Emil Josi, Manual Training.

NEEDS OF THE COLLEGE

A greatly increased budget imperative.—The designation "college" would seem a misnomer if viewed from the standpoint of the support the College of Education has received in the past. It seems no exaggeration, speaking from this standpoint, to say that the College of Education has never been a college except in name. Its budget, if compared with that of other colleges, suggests little more than a poorly supported department. Without greatly increased financial support it will be impossible for the College to profit by the great opportunity which the educational conditions of the state offer. How large is the increase needed will be suggested by the following presentation of needs.

Increased equipment needed.—The present equipment in certain departments is wholly inadequate.

New departments needed.—The University through the College of Agriculture offers definite training courses for (1) teachers of agriculture and (2) teachers of home economics. There are a number of other fields calling for just as definite training as those for which special departments should be developed within the College of Education. Three of these should be provided at once: (1) a Department of Superintendence and Supervision; (2) High School Normal Teachers' Training Department; (3) a Department for Training High School Commercial Teachers.

Department of superintendence and supervision.—The College of Education cooperating with the College of Science, Literature, and the Arts, has attempted in the past to provide four classes of teachers: (1) training for teachers of the ordinary high school branches; (2) superintendents; (3) principals; (4) high school normal training teachers. Altho it has offered certain studies, designed to meet the special needs of these last three classes of teachers, what it has done has been wholly inadequate. Those intending to become superintendents and principals should be as definitely prepared as those expecting to become teachers of English or Agriculture. This definite preparation demands the establishment of a department of superintendence and supervision.

Need of commercial education department.—There has been for a number of years a growing demand in the State for commercial teachers and the high schools have been forced to go to the ordinary business colleges for them. The possibility of special appropriations from the State

to the high schools which maintain such departments will greatly increase the demand for commercial teachers. The College of Education ought to be prepared not later than the fall of 1915 to give definite preparation for high school commercial teachers. The University already offers courses in Economics, Accounting, and certain other branches immediately associated with such preparation. Consequently nearly all that is needed at the present time is money to purchase equipment for a commercial department in the University High School and to pay the salaries of the necessary instructors.

Department for high school normal training teachers.—Certain courses are being offered at the present time in the College of Education to prepare teachers to take charge of high school departments for training rural teachers. The College admits to such courses only those who have (1) had actual experience in rural schools, (2) completed a normal school course. It is exceedingly necessary that the University should recognize its obligation and opportunity here and develop a strong department within this field.

Practice teaching required by State law.—Practice Teaching is no longer a question of what the College of Education recommends and desires. At the session of the Legislature of 1913, the following act was passed:

"From and after August 1, 1915, all candidates for teachers' certificates by examination, renewal, or endorsement of credentials, except those who have taught successfully for at least eighteen months in the public schools prior to such date, or those receiving a second grade or limited certificate, must have completed such a course [practice teaching] of professional training for teaching not exceeding thirty-six weeks, as may be prescribed by the state superintendent."

Practice teaching in Minneapolis Public Schools.—The present provision for practice teaching is at best a makeshift. At the time of the writing of this report (November, 1914), through the assistance and courtesy of Superintendent Spaulding and the Minneapolis Board of Education, plans are under way to endeavor to secure for students of the University the opportunity for practice teaching in the Minneapolis schools. The value of such opportunity can hardly be overestimated. Nevertheless, it is generally agreed among those who have studied the problem that the first practice teaching ought not to be done in the public schools, but in a practice or model school under the direct control of the College or department responsible for this training. Here alone can conditions be controlled. It is just as essential that those training teachers be able to control conditions in the first stages of this training as it is for the experimenter to be able to control conditions in his experimental laboratory.

Larger Practice School needed.—The present arrangements, tho making a great advance, are clearly unsatisfactory. Some students will secure all or approximately all their practice teaching in the University practice school; others, if the arrangements referred to above be effected, will secure all their practice teaching in the public school. Every student should have both types of experience before being allowed to seek

a permanent teaching position in the public schools. This is the plan already pursued by the best normal schools, and it should be adopted in the immediate future by the College of Education. For the sake of carrying into effect such a plan a much larger practice school than the present University High School is absolutely necessary.

Practice teaching in public schools should be required of all.—The period of practice teaching should be lengthened. Every student should be required to have at least six weeks experience in the University Practice School and this should later be followed by six weeks teaching in a public school.

Practice teaching should not be limited to Minneapolis schools.—Altho the value of the opportunity of doing practice teaching in the Minneapolis schools can not be overestimated and represents a great advance over previous conditions, it should never be forgotten that the conditions in the Minneapolis schools are widely different from those in the schools in which the majority of the University students will do their first teaching. As soon as possible, therefore, arrangements should be made to secure opportunities for University students to do practice teaching in smaller high schools. There is within an hour's ride of Minneapolis on trolley or railway a sufficient number of small towns where conditions would be typical, to furnish all the necessary opportunity for such work.

Supervisors of practice teaching in public schools.—In order for practice teaching done in public schools or elsewhere to be valuable, it must be supervised not merely by the experienced teachers in charge, but by the College of Education also. In this way alone will the College of Education have first-hand knowledge of the work of its student teachers and be able also to direct and train them. To carry on such supervision it will be necessary to add immediately one and in the future more than one supervisor who shall spend his time visiting the public schools where students are doing their practice teaching.

Training teachers needed for High School.—The College of Education can not train teachers unless it has teachers who are trainers in charge of the various departments of its High School.

The report of the Principal of the High School makes evident the needs within this field. It should be emphasized here, however, that the needs of the High School are the needs of the College. The most pressing needs of the College as well as of the High School are funds to engage training teachers of high caliber who shall have charge of the various departments within the High School. Such teachers, it is agreed, should devote at least half of their time to actual teaching in the High School of high-school subjects, and the remainder to the training of teachers to teach these subjects, and to the giving of so-called "teachers' courses." The College was fortunate in securing teachers of experience and training to head its various departments for the year 1914-1915, but the wretched salaries paid to them almost without exception will make it impossible to retain them or to secure in their places individuals capable of doing the high-class work which must be done if the College is to

fulfill the needs and satisfy the demands of the State educational system.

Qualifications of training teachers.—It is most desirable to secure for this work individuals who have been actually engaged in training high-school teachers, but whether or not this is possible, training teachers in the University High School should possess the following qualifications: (1) unqualified success in high-school teaching; (2) special professional study devoted to the studies which they are teaching in the University High School, and which they are preparing others to teach; (3) strong, attractive, inspiring personality.

Such training teachers may be secured.—Altho the number of training teachers who can present all the above qualifications is limited, they do exist, and in view of the fact that the fundamental aim and function of the University is to serve the State and in view of the fact also that the University pays the salaries required to secure specialists in the fields represented by other colleges, the University can not consistently refuse to pay the salaries required to secure the best teachers available to carry on this training work.

Probable salaries necessary.—The University must hold itself ready to pay on the average of \$2,500 to High School training teachers of the above qualifications.

Necessary additions to the College Faculty.—If the College of Education is to take its place among institutions of first rank the faculty of the College of Education must be further enlarged so as to represent in a more specialized way certain aspects of professional training. There should be added immediately to the faculty of the College of Education a professor of Scientific Methods of School Administration and one in Educational Psychology. These two positions should be created and filled before the opening of the year 1915-1916. In addition to these two the following additions should be made in the near future: (1) Vocational Training and Guidance; (2) Secondary Education; (3) Elementary Education; (4) Statistical Aspect of School Administration; (5) School Sanitation, Hygiene, and Public Health; (6) Educational Sociology.

The College should, in every case, insist upon securing men of established reputation. It can not in its present condition afford to experiment with men who have merely training and promise. In some cases men could be secured to handle more than one of these courses. In other cases an instructor added to the faculty of the College of Education could also serve the University.

Vocational Guidance Director.—Many of the leading high schools in the United States at the present time employ a director of vocational guidance whose duties are limited almost entirely to making a study of local industries and consequent vocational opportunities on the one hand and of ascertaining so far as is possible in a scientific way the fitness of the students within the school for the various industries and vocations. It is difficult to understand why universities have failed to recognize their opportunity and obligation here. Surely there is no place where guidance in the choice of vocations is needed more than in the University. A specialist attached to the College of Education could perform this service

for the student body of the University as well as give courses in the College of Education in this most important field.

Teachers' courses in subject matter and method.—The law requires that prior to undertaking practice teaching, students shall have pursued in preparation for this work a teachers' course. Such courses, it is understood, shall deal primarily with the subject matter as taught in the high school with the high-school method of presenting the same. The number and character of such courses at present offered within the University is totally inadequate. Some departments offer no such course and investigation shows that certain courses so styled are in reality not teachers' courses in any sense. The College of Education and the various departments in the College of Science, Literature, and the Arts, must see to it at once that in every subject for which the College of Education prepares high-school teachers, there shall be offered satisfactory teachers' courses. It is conceded that if the College of Education is to be held responsible for the quality of the preparation of teachers sent out from the University, it must have the right of approval of teachers' courses as well as those selected to give them.

RECOMMENDATIONS

Four-term plan.—It is highly desirable that while students are doing their practice teaching in the public schools, they should be relieved entirely of their ordinary university studies. This could be done if a four-term college year were adopted. It might then be possible for the College of Education to require prospective teachers to plan their courses in such a manner as to leave one term during their course largely free for teaching in the University High School and in the public schools.

Summer Session.—The Summer Session needs to be completely reorganized and placed upon an entirely new basis. The range of salaries has been too low. The University appropriation of \$1,000 is a ridiculous sum to devote to a phase of university activity which offers unlimited opportunities for usefulness. The Summer School body is made up largely of teachers. The University should appropriate sufficient funds to secure men of national reputation to give courses during the summer. If superintendents and teachers knew they would find in the University Summer School educators of national and international standing, not only would the attendance upon the Summer School be increased, but the standing it would have and the returns it would make to the teachers and to education of the state would be immeasurably enlarged.

Respectfully submitted,

F. H. SWIFT, *Secretary.*

THE GRADUATE SCHOOL

To the President of the University:

SIR: With the organization of the Graduate School upon an independent basis, the University of Minnesota may be said to have attained its majority. By this act it gave definite notice that it would henceforth take its place, not as a parasitic institution, living upon the scientific productions of other institutions and other times, but as a contributing member in the advancement of science—the highest function for which universities are organized.

In taking this stand, the University has assumed large responsibilities, which it must measure up to. Practically the last of the larger universities to lay emphasis upon advanced work as an essential function of a state-endowed institution, the University has had, nevertheless, a creditable record in the past, but one with which we must in no sense remain content.

The calling of a new member of the educational staff, charged with the definite function of the administration of the Graduate School and the development of its interests, more definitely than any other administrative act, gave evidence that henceforth we were permanently to do graduate work at this institution.

Organization.—In the shaping of favorable conditions for the instructors and students, many elements are necessary. Among the minor but necessary features is an organization, flexible enough to find a place for the newest recruit in the ranks of creative scholarship, and vigorous enough in its concentration of authority to enable those charged with the responsibility to deal with unsatisfactory conditions. It was, therefore, among the first duties of the past year to get under way a proper organization, to institute records, forms and minor regulations, which by their definiteness would enable the University administration to give a full account of what it was attempting and what it had accomplished.

Office records.—As Dean of the Graduate School, I found myself in a more favorable position to accomplish some of these things than had my predecessors, inasmuch as the funds of the Graduate School now provide for a secretary and for the equipment of an office, and the printing of the necessary material for its records. Henceforth I think it will be possible, on the basis of the material now gathered concerning a student, to determine the qualifications upon which we admitted him; the courses for which he registered; the record he made in them; and the reports concerning his examinations and thesis when the question of advanced degrees is involved.

Previous organization.—The administration of research work and its publication, both as covered by the Graduate School and individual research, has hitherto been administered by three committees: the Execu-

tive Faculty, the most important—the Dean of the Graduate School was a member but not chairman; the Research Committee, which apportioned funds, of which he was ex-officio chairman; and the Publications Committee, of which he was not necessarily a member. It seemed evident that it would be wiser to combine the functions of these various committees into one strong centralized committee pursuing a unified policy with regard to all of the interests so closely related, and instituting when it chose, sub-committees for the performance of any of its functions. Such a central administrative committee in a Graduate School should not represent colleges or departments, but rather, scientific groups, whose personnel and equipment places them in a position to do graduate work, and therefore, to have an interest both for themselves and their students in graduate school problems.

Reorganization.—It was with these ideas in mind that a plan for the reorganization of the Graduate School was drafted and submitted to the Educational Faculty of that body on May 19, 1914. In order that the plan there adopted may find a permanent place in the public records of the University, I incorporate it here as an essential part of my report.

“1. The Graduate Faculty shall be made up of all those approved as qualified to give graduate instruction. Its chairman is the Dean of the Graduate School. It shall meet at least three times a year to discuss and pass upon matters relating to the general educational policy of the Graduate School and to recommend candidates for degrees.

“2. Matters of Graduate School administration shall be vested in the Dean and an Executive Committee.

“3. The Executive Committee shall consist for the present of seven members, one each from the following groups:

- a. Social Sciences and Law,
- b. Physical Science, Mathematics and Engineering,
- c. Biological Sciences,
- d. Philosophy, Psychology and Education,
- e. Language and Literature,
- f. Medicine,
- g. Agriculture.

“4. The members of the Executive Committee shall be appointed annually by the President.

“5. The Executive Committee with the Dean shall determine, subject to the authority of the President and Regents, and in accordance with any general regulations adopted by the Graduate Faculty, matters of curriculum, membership in the graduate teaching faculty, expenditure of funds, admission to graduate study and such other matters as usually relate to the proper administration and development of graduate work in the University.

“6. Within each group represented in the Executive Committee there shall be constituted a Committee, of not less than three members, on graduate work, to whom may be referred questions concerning qualifications of candidates for advanced degrees, their program of studies and

such matters as may be referred to them by the Dean or Executive Committee. Membership in these group committees shall be determined by the group, except in the case of Medicine and Agriculture. In the latter the appointment shall be made by the Dean of the Graduate School on nomination of the Dean of the College.

"7. The member of the group on the Executive Committee shall be ex-officio chairman of the group and a member of its committee.

"8. The Dean and Executive Committee may constitute from time to time such other committees as may be deemed necessary."

On the basis of this plan you have appointed the Executive Committee for the year 1914-15 as follows:

Social Sciences.....	William A. Schaper
Physics, Mathematics and Engineering...	William E. Brooke
Biological Sciences.....	Hal Downey
Philosophy, Psychology and Education....	Fletcher H. Swift
Languages and Literature.....	Hardin Craig
Medicine.....	Dr. C. M. Jackson
Agriculture.....	E. M. Freeman

Student advisers.—Besides this committee and the Graduate Committees, I have, in the registration of graduate students sent each one of them to a special adviser, presumably the man best qualified to help him in the formation of his study program, and have constituted him the student's adviser and the chairman of his committee if he is a candidate for an advanced degree. Changes in his program, announcement of thesis subject, and similar matters are made by the student on the advice and with the definite approval of his adviser.

Publications.—Before the reorganization of the Graduate Faculty, the Committee on Publications had outlined the plan by which the University Research Bulletins supported by the funds of the Graduate School were thereafter to be put forth. In place of the scheme to establish a series for each department was substituted the wiser plan of a series for each scientific group. I say wiser, for we are at the beginning of the period of productive scholarship and it would be almost certain under the circumstances that departments could not produce rapidly enough to maintain continuity in a series of scientific bulletins. Occasional issues at greatly separated times would not be sufficient to attract the notice of the scholarly world and to obtain a hearing for the contributors. For the present it is more reasonable to expect that no one of the groups represented in the Graduate School will, as a group, produce enough material in a given year to constitute a worthy contribution from the University in this larger field. At the present we have established the following series:

- Social Sciences
- Biological Sciences
- Physics, Mathematics and Engineering
- Languages and Literature
- Philosophy and Psychology

The Publications Committee also determined to continue the Current Problems Series. At the present time we have published the following issues in these various series, and I have added under each the title of monographs either now in press or so near completion as to enable me to provide for their publication during the coming year:

Studies in the Social Sciences
(Continuing Studies in Economics)

1. Thompson and Warber, A Social and Economic Survey of a Rural Township in Southern Minnesota. April 1913.
2. Matthias Norberg Orfield, Federal Land Grants to the States, with Special Reference to Minnesota. In press.
3. Edward Van Dyke Robinson, Early Economic Conditions and the Development of Agriculture in Minnesota. In press.

Studies in the Physical Sciences and Mathematics
(Continuing Studies in Chemistry)

1. Frankforter and Frary, Equilibria in Systems Containing Alcohol, Salts and Water. December 1912.
2. Frankforter and Kritchewsky, A New Phase of Catalysis. February 1914.

Studies in the Biological Sciences
(Continuing Studies in Public Health)

1. Herbert G. Lampson, A Study on the Spread of Tuberculosis in Families. December 1913.

Studies in Language and Literature

1. Esther L. Swenson, An Inquiry into the Composition and Structure of Ludus Coventriae; Hardin Craig, A Note on the Home of Ludus Coventriae. In press.

Current Problems

1. William Anderson, The Work of Public Service Commissions. November 1913.
2. Benjamin F. Pittenger, Rural Teachers' Training Departments in Minnesota High Schools. In press.
3. Gerhard A. Gesell, Minnesota Public Utility Rates. In press.

This list indicates a very encouraging development, due in most cases to the results of aid given in the past few years to the research work now being completed and prepared for the press. The prospects for future material of special worth are very good. In the matter of publication, we should develop as active and vigorous a policy as our funds allow. This should not be limited merely to adding numbers to the existing series, but wherever possible other publishing activities at the University now leading an uncertain existence should be taken over as University publications and put upon a sound basis.

The University of Minnesota does not at the present produce or support any journal in any field of learning, nor does it issue any series of bulletins making available for the public or secondary school teachers the results of recent scholarships here and elsewhere. It would be a wise and proper application of the term "University Extension" if in the near future, departments interested in the Social Sciences would put forth a quarterly periodical on public affairs, dealing with matters of state, local, and municipal administration and interests of economic and sociological

importance to the people of this and neighboring states. It has been pointed out by the Romance Department that there is an inviting and unoccupied field for the publication with University aid of a periodical dealing with French Literature since the Seventeenth Century. As soon as the Department feels itself properly manned and equipped with library material, and therefore willing to undertake such an enterprise, it would be a credit to the University to be able to give it financial support in the early and more trying years of its existence.

Our Current Problem Series is a most excellent one, but it should be supplemented by monthly or quarterly bulletins from our better departments, issued principally to the high schools of the State, discussing from their standpoint, problems of scholarship and method in the various fields and reviewing and summarizing the latest literature for those who do not have ready access to it. Such an undertaking as I have suggested would not only encourage scholarship by providing for it avenues, but would also make the results of university work more nearly the "current coin" of the instructional and social force of the State.

Assignment of research funds.—The Research Committee for this year apportioned the funds in June, 1913, and I beg to submit a statement concerning these funds and the work done upon them.

- Clarence M. Jackson. The effect of inanition upon white rats of various ages. \$250 for assistant. Investigation not completed; to be continued.
- Thomas G. Lee. Early stages of the development of embryos. \$250 for assistant. Investigation not completed; to be continued.
- John B. Johnston. Evolution of the cerebral cortex in mammals. \$500 for assistant. Fund reverted, due to his leave of absence.
- Henry F. Nachtrieb. Ganoids of Minnesota. \$250 for expenses and \$50 for material. Fund could not be used for this purpose and reverted, but later in the year Mr. Nachtrieb was granted \$225 for the purchase of a collection of butterflies, probably one of the most complete of its kind in the country.
- Hal Downey. Research on mast cells. \$250 granted. Research articles prepared and published in German scientific periodicals.
- Charles E. Johnson. Embryological studies of vertebrates. \$50 for expenses of trip. Fund reverted.
- Frederic E. Clements. Reclamation of bogs. \$590 granted. Transferred to budget 68a.
- Department of Chemistry. \$600 for research material and expensive pieces of apparatus for advanced work.
- Edward Van Dyke Robinson. Economic development of Minnesota. \$275 for material and assistance. Resulted in Dr. Robinson's extensive monograph now in press, *Early Economic Conditions and the Development of Agriculture in Minnesota*.
- George F. James. Analytic study of the history and the present status of

- secondary education in Minnesota. \$150 granted. Resulted in Mr. Pittenger's forthcoming bulletin in the Current Problems Series on *Rural Teachers' Training Departments in Minnesota High Schools*.
- George D. Shepardson. Research on telephony. \$200 for materials. Fund reverted.
- Franklin R. McMillan. Reinforced concrete floors. \$500 granted. As some of these experiments must run over a series of years, the data have not all been gathered, but with continued support this series of experiments will contribute largely to our knowledge of the use of reinforced concrete in floors.
- Frank F. Grout. Origin of ore deposits. \$50 granted. Fund expended for collection of minerals.
- Oliver Bowles. Identification of opaque minerals by optical methods. \$25 granted. Fund reverted.
- Frederick Klæber. Research on Beowulf. \$200 granted. Part of fund used for books.
- Wallace Notestein. Photographing editions of notes of English Parliaments. \$260 granted. Fund used in securing unpublished diaries of the Parliaments of 1628-29. On the basis of this material Mr. Notestein is preparing an extensive monograph, which promises to be of value in the history of the Seventeenth century England. It will appear in our research publications during the coming year.
- J. Frank Corbett. Surgical problems concerning the kidney and the thyroid. \$100 granted. Resulted in technical articles in technical magazines.
- Elexious T. Bell. Lipoids of the kidney. \$125 granted. Resulted in technical articles in technical magazines.
- Anthony Zeleny. Cause of absorption in electric condensers. \$250 granted. Fund expended for assistants in a series of investigations.
- Alois F. Kovarik. Absorption of beta and gamma rays by gases. \$410 granted. Fund expended for radium.
- Frederick H. Scott. Physiological action of certain glands in the body. \$75 granted. Part of fund expended for instruments.
- Gisle Bothne. History of Scandinavians in America. \$150 granted. Fund expended for assistants in gathering material.
- Albert E. Jenks. Amalgamation and ethnic investigations. \$300 granted. Fund expended for assistants.

Problems.—As the Graduate School in its work touches almost every part of University activity, a discussion of its problems would be practically a discussion which passed in review all the advanced work of the University and the part which each college and department plays in the development of this type of work. It has been at Minnesota, it seems to me, the policy to let graduate work develop out of the growing strength of departments and colleges, rather than to superimpose it upon the

present academic organization with its own special funds and personnel. This means, therefore, that the problems of the Graduate School are at present the problems which relate to the full and proper development of every department, either doing or planning to do advanced work. Each and every one must, in its equipment and teaching force, be a going concern, fully able to take care of its introductory and advanced undergraduate work. No department will strengthen the Graduate School which does not have well-trained, scholarly men, ambitious to do creative work, with programs so arranged that while doing full justice to the first demands of their professorship, they will find time and physical energy to do the thing which has led them to select the scholarly life. Instructors with fourteen to seventeen hours of undergraduate work are in danger of being lost to the world of scholarship at the very beginning of their career, and thus of being condemned by the University, which expects everything of them, to give only one kind of service for the rest of their lives.

Library.—The matter of equipment, instruments, and books is scarcely secondary in its importance in the development of graduate work, or even respectable advanced work of any kind at the University of Minnesota. In this matter of equipment I place the Library first without hesitation. It is almost axiomatic that without a library there can be no university, or university work worthy of the name, and no discriminating student or academic man is deceived by voluminous announcement of courses when a glance at the strength of the library shows that by no possibility could the work offered be seriously undertaken or carried through. Without library equipment we can neither expect to add distinguished scholars to our faculty nor keep the ambitious and capable ones whom we have. No part of our physical plant is so essential in securing and holding the best type of instructor and the best type of student. The importance of the library can scarcely be overstated in its relation to every phase of the University's academic work, and certainly not when it is considered in relation to our efforts in the field of research and scholarship. Our Library, as a collection of books, is at present totally inadequate in all but two or three fields. Even these are threatened with the loss of their good rating by inability to carry out policies earlier inaugurated.

The best single method of strengthening the Graduate School at Minnesota and aiding its undergraduate work as well is to make available the largest possible sum for the strengthening of its Library.

Teaching strength.—In the matter of teaching strength we are making progress in our various faculties, but must definitely keep at the work of strengthening certain important departments, until we have in them models of the fullest teaching and scholarly efficiency.

Relation to colleges.—It is my feeling that in all of these matters the Graduate School should be for the present a cooperating partner, and that it will best serve the University by doing all that it can to help the existing educational and administrative units in everything that relates to their full and proper development.

Summer School.—Among the matters of importance to many departments, as well as to the Graduate School, is that of the Summer School. Of interest to many, it seems as a result to have been championed and developed by no interest in particular. With its possibilities for the public-school teachers of the State who already have their Bachelor's degree and desire to do advanced work, and thus take back into the secondary schools the results of their studies, it is a matter of more than institutional importance. I hope that in the budget of the coming biennium it will find a definite place with a sufficient appropriation, and that as soon as it can be done all the educational resources and interests available will be organized and developed in a real University Summer School.

Personnel.—In closing this report I can not pass without notice of the loss of two men from our faculty who have been interested in its development, and each in his own way, have helped to maintain the scholarly ideals of the University. I refer to Professor Frank M. Anderson and Professor F. H. Constant. It is a matter of congratulation, on the other hand, that among our recent appointees there are so many young instructors who are interested in scholarly work and who have already given proof of their intellectual ability by finishing the work for the Doctor's degree and are now planning to go on in their work. In addition to these, it seems to me not inappropriate to note that in the appointment of Professors Olmsted and Searles in the Romance Language Department; Professor Stauffer in Geology and Paleontology, Assistant Professor Buck in the Department of History, and Professor Lorenzen in Law, we have added in the upper ranks men who will help in the maintenance of the best ideals and the accomplishment of the best work for which universities are organized.

Statistics of registration.—I append at the close of my report the statistics of the registration of the Graduate School for the past year. As they are the first which have been made, so far as I can find, under these various headings, I am unable to draw comparisons. The enforcement of the requirement that any one registered in the Graduate School should not only be a graduate of an acceptable institution, but also doing graduate work, resulted in the exclusion of about twenty students, who under other interpretations of the rules might easily be added to the registration.

REGISTRATION 1909-1914

Year	Graduate study	Master	Doctor	Men	Women	Totals
1909	35	73	19	78	49	127
1910	43	67	18	78	50	128
1911	68	60	18	96	50	146
1912	54	84	21	101	58	159
1913	52	103	28	114	69	183
1914	10	123	42	118	57	175

GRADUATE STUDENTS DOING FULL OR PART TIME WORK

	Full time	Part time	Total
Men.....	71	47	118
Women.....	39	18	57
Total.....	110	65	175

DISTRIBUTION ACCORDING TO YEARS OF GRADUATE WORK DONE

First year	Second year	Third year	Fourth year and over
89	48	30	8

MEMBERS OF THE STAFF REGISTERED IN THE GRADUATE SCHOOL

	Men	Women	Total
Instructors doing graduate work*.....	35	1	36
Graduate students serving as assistants.....	11	3	14
Graduate students holding scholarships.....	6	18	24

*One Assistant Professor.

GRADUATE STUDENTS, MAJORING IN DIFFERENT DEPARTMENTS

DEPARTMENT	Men	Women	Total
Animal Biology.....	2		2
Animal Husbandry.....	2		2
Animal Nutrition.....	1		1
Agricultural Chemistry.....	2		2
Agricultural Education.....	1		1
Agronomy.....	2		2
Anthropology.....	1	2	3
Anatomy.....	4		4
Astronomy.....	1		1
Bacteriology.....	1		1
Botany.....	2	1	3
Chemistry.....	22		22
Comparative Philology.....	2	2	4
Economics.....	6	1	7
Education.....	5	3	8
Embryology.....	1		1
Entomology.....	1		1
English.....	8	13	21
Farm Management.....	5		5
French.....	2	1	3
Geology.....	6		6
German.....	2	8	10
Greek.....	1		1
History.....	4	12	16
Forestry.....	1		1
Biology.....	1		1
Latin.....	1	1	2
Mathematics.....	4	2	6
Metallography.....	1		1
Pathology.....	2		2
Philology.....	1	2	3

GRADUATE STUDENTS—Continued

DEPARTMENT	Men	Women	Total
Philosophy.....	2		2
Physics.....	2		2
Physiology.....	1		1
Plant Pathology.....	1	1	2
Political Science.....	3		3
Psychology.....	1	3	4
Scandinavian.....	3	1	4
Sociology.....	3	3	6
Soils.....	6		6
Structural Engineering.....	1		1
Zoology.....		1	1
Total.....	118	57	175

EDUCATIONAL INSTITUTIONS REPRESENTED IN GRADUATE SCHOOL

University of Minnesota.....	80	Nashville.....	1
Other Colleges*.....	53	Nippon, Japan.....	1
Albion.....	2	Northwestern.....	3
Arizona.....	1	Nebraska.....	7
Augustana.....	1	North Dakota College.....	1
Bethel College.....	1	Oberlin.....	1
Bombay, India.....	1	Ottawa.....	1
Carleton.....	4	Otterbein.....	1
Chicago.....	1	Pennsylvania State College.....	1
Clark.....	1	Radcliffe.....	1
Concordia.....	1	Rome, Italy.....	1
Copenhagen.....	1	St. Olafs.....	6
Cornell.....	1	St. Petersburg, Russia.....	1
Dakota Wesleyan.....	1	Smith College.....	1
Goucher.....	1	South Dakota.....	1
Gustavus Adolphus.....	1	Stanford University.....	3
Hamline.....	9	Texas.....	1
Highland.....	1	Toronto.....	1
Iowa.....	2	Toulouse (France).....	1
Illinois.....	2	Utah.....	1
Kansas Agricultural College.....	1	Union College.....	1
Kansas University.....	3	Vassar.....	1
Knox.....	1	Wabash.....	1
Lawrence.....	1	Washington State College.....	1
Lombard College.....	1	Wittenburg.....	1
Luther College.....	3	Wisconsin.....	7
McPherson College.....	1	Wartburg.....	1
Michigan.....	2		
Missouri.....	1	Total from other colleges.....	95
Montreal.....	1	Total registration.....	175

*In cases where the rating of the college is low, the students' entry blanks show extra undergraduate or summer school work here or at other institutions or tested qualifications in their major work.

These 175 students distributed their work over about 165 courses each semester. The statistics of this registration by courses would consume too much space, and as it was largely in classes with advanced undergraduates, would convey an inadequate idea of the instructors' work. With the sharper differentiation between graduate and undergraduate courses introduced in this year's announcements, it will be possible to offer some statistics on this point next year.

Of the total registration of 175, 80 were graduates of the University of Minnesota and the other 95 came from 53 institutions in this and other countries. The number from our own colleges is respectable, but when compared with the percentages and figures of the registration of other

Graduate Schools does not indicate that we are excessively dependent upon our own colleges as feeders. Indeed, the increase in the number of graduates of our own University who go on into the Graduate School might well be taken as one of the indications of the increasing spirit of scholarship among instructors and students upon our own campus.

The fact that we have but four fellowships and one endowed scholarship indicates that we are not subsidizing graduate students, one of the most common complaints now made against graduate organizations.

The registration, however, shows that a considerable number of our force holding the rank of instructor are doing graduate work. This number should decrease as we set higher standards for our appointment to this rank and make it clear that holders of instructorships should already be "free of the guild" and ready to give us their full services and to devote such time as they have for research towards independent work.

I should possibly say that in reference to the graduate students holding scholarships or assistantships, thus enabling them to pursue graduate work, the number would be slightly larger if certain departments had been more efficient and vigorous in finding assistants of this type. As the approval of such appointments is a function of the Dean of the Graduate School, I think it advisable to say that in the future, the exceptions granted in the way of allowing undergraduates to occupy these places will be made only upon the strongest possible evidence that the department has not been able to secure graduate appointees.

MASTERS DEGREES GRANTED IN 1914, BY DEPARTMENTS

DEPARTMENT	MINNESOTA GRADUATES		OTHER COLLEGES		TOTALS		
	Men	Women	Men	Women	Men	Women	Total
Agricultural Chemistry	..	..	1	..	1	..	1
Agricultural Economics	1	..	..	..	1	..	1
Animal Husbandry...	1	..	..	..	1	..	1
Botany	..	..	1	..	1	1	1
Chemistry	2	..	2	..	4	..	4
Economics	..	..	1	..	1	..	1
Education	..	1	..	..	..	1	1
English	1	3	..	2	1	5	6
Farm Management...	1	..	1	..	2	..	2
Forestry	1	..	..	..	1	..	1
French	..	..	1	..	1	..	1
Geology	3	..	2	..	5	..	5
German	..	2	..	..	..	2	2
History	..	3	..	2	..	5	5
Latin	..	..	..	1	..	1	1
Mathematics	..	..	..	1	..	1	1
Philology	..	1	..	..	..	1	1
Political Science	1	..	..	..	1	..	1
Psychology	..	1	..	1	..	2	2
Scandinavian	1	..	1	..	2	..	2
Sociology	..	1	..	..	..	1	1
Soils	..	..	1	..	1	..	1
Totals	12	12	11	7	23	19	42

Doctors of Philosophy

Harold Hiram Brown, B.A., '09, M.A. '10, Syracuse University. Major, Chemistry; Minor, Mineralogy; Thesis: *Contribution to our Knowledge of the Chemistry of Wood; Douglas Fir and Its Resin.*

Julius Valentine Hofmann, B.S. in For. '11, M.F. '12, Minnesota. Major, Botany (Sylviculture); Thesis: *Natural Reproduction of Coniferous Forests.*

Doctor of Science

Harry Vaughn Harlan, B.S. '04, M.S. '09, Kansas Agricultural College. Major, Agronomy; Minor, Plant Pathology; Thesis: *Some Distinctions in our Cultivated Barleys with Reference to their Use in Plant Breeding.*

Shevlin Fellowships 1913-14

Science, Literature, and the Arts...Zoe Donaldson, B.A., '12, Minnesota
Agriculture.....Gerald Philip Plaisance, B.S. in Agr. '13, Minnesota
Chemistry.....Victor Yngve, B.S. in Chem. '13, Minnesota
Medicine.....Sakyo Kanda, B.A., Clark University

Albert Howard Scholarship.....Sophia Augusta Hubman

Respectfully submitted,

GUY STANTON FORD, *Dean of Graduate School*

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 1913-14.

During this year there were registered in the University 1,570 women. The academic distribution is as follows:

DURING THE REGULAR SESSION OF 1913-14	
Science, Literature, and the Arts.....	903
Education	71
Graduate	57
Agriculture	200
Law	2
Medicine	7
Dentistry	7
Pharmacy	10
Chemistry	4
Nurses	36
<hr/>	
Total, regular session.....	1297
DURING THE SUMMER SESSION, 1913-14.....	273
<hr/>	
Total	1570

The distribution as to residence was as follows during the regular session of 1913-14:

At home	809
With friends or relatives.....	44
In private families	64
In lodging houses.....	194
In sorority houses	61
In dormitories	123
In absentia	2
<hr/>	
1297	

Self-government.—The Women's Self-government Association and the Home Economics Association have made a promising beginning in the work of self-government. The scattered residence of the women naturally increased the difficulty of securing effective teamwork, but in spite of this handicap real interest and enthusiasm was shown in carrying out the program outlined last spring.

A year's trial has demonstrated both to freshmen and to upperclassmen the value of the system of senior advisers: To the former, through the receiving of friendly counsel and direction at a critical time; to the latter, in the developing of a sense of steadying responsibility. The success of the system is so closely dependent on the personality of the advisers that too much care can not be exercised in their selection. It is better to have a few thoroly competent and conscientious, than a great

many mediocre and indifferent, advisers. For this reason the number appointed to the honor for the year 1914-15 has been appreciably smaller. They will be selected from the junior instead of the senior class, as was the case this year.

The revised point system has been used with admirable results. Under the present plan, leaders who have heretofore been overburdened are not eligible for offices exceeding the prescribed number of points. In this way both their health and their scholarship have been safeguarded. By this more normal distribution of offices, a greater number of students have been given a chance to participate moderately in college activities, and thus train their powers of leadership. Further revision of the system has been made in the listing of new activities, and in the increasing or the diminishing of the number of points given to the old, in proportion to the amount of work required.

The function of the House Council is to strengthen the principle of self-government in Sanford Hall, the sorority houses, and the lodging houses. Representatives from each of these bodies constitute the council; the President has a seat on the Executive Board of the Women's Self-government Association. After organization, the first work of the council was to formulate rules governing evening study hours and evening social engagements. A copy of these rules has been sent to Sanford Hall, to the sorority houses, and to the lodging houses. The enforcement of these regulations during the coming year naturally depends on the hearty coöperation of every woman living on the campus; it depends, in other words, on the strength of the idea of self-government. Sanford Hall and the sororities have already coöperated helpfully with the general plan of the House Council. It has been more difficult to reach the lodging houses, which are many and scattered and naturally less accessible through their lack of organization. It is fully expected, however, that with the present organization, which gives representatives in the council from each of the larger houses, a deepened responsibility to maintain self-government, will be developed.

Social life.—The women of the University do not suffer from a lack of social diversion. Many agencies are at work to provide wholesome entertainment, and Shevlin Hall, the women's building, offers a convenient and delightful meeting place. The Young Women's Christian Association and the Women's Self-government Association, both separately and together, plan receptions, dances, and parties which every woman may attend, and where as hostesses members of these associations look out for the new and diffident students. At the reading hour in Shevlin every Wednesday afternoon, many women gather around the open fire and listen to the Director's reading aloud, as a restful close to a busy day. The social hour of the Women's Self-government Association, inaugurated this year, has helped as much as any single influence to bring together all the women, sorority and non-sorority, into friendly comradeship. Every Friday afternoon a different group act as hostesses. After tea is served, there is dancing, or music, or quiet talk before the fire, where questions of the day are freely and frankly discussed. Fre-

quently, faculty women and alumnae add by their presence to the interest and pleasure of these gatherings. By all these means an attempt is made to foster a spirit of friendly good fellowship, at the same time that opportunity is given to cultivate the spirit of hospitality and the tact of social experience. The social activities of the women, however, are by no means limited to the parties just described. Indeed, they have become so exacting as in some cases to impair both health and scholarship. In consequence there is a growing tendency among the students to limit all social affairs to Friday and Saturday nights. The first step in this direction has been taken by the Senate Committee on Student Affairs, which recently made the following rule: "All all-University (i. e., all social functions open to all students in the University), all intercollege, college, and class social functions shall be restricted to Friday and Saturday nights or nights immediately preceding University holidays. It is fully expected that within the coming year private organizations will impose the same restriction and thus confine all social activities on the campus to these two nights." It is a pleasure to mention in this connection the Minnesota Blue Book compiled by the Senate Committee. It is the first systematic effort made to define and classify student organizations, and to state the obligations of chaperones as well as the courtesies due them.

Sanford Hall.—Several changes in the administration of Sanford Hall took place at the close of the year, the most important being the resignation of its Director, Miss Elsie P. Leonard, who since the erection of the Hall has ably organized and directed the management. As her successor, Miss Helen F. Jackson of Simmons College, combines successful teaching experience with expert knowledge of dormitory supervision, it is expected that she will maintain the present high standard of administration. The Dean of Women wishes again to emphasize the advantages and the obligations of students living at Sanford Hall. At a price slightly lower than that charged by the average boarding house, a home is provided thoroly equipped for the comfort and well-being of the students. A resident nurse is at hand to give prompt attention to the ill or indisposed, the Director and chaperones to assist with tact and sympathy in the social life of the Hall. The opportunities given for wholesome, well-ordered living constitute no unimportant part in the training and development of young women. It is by virtue of these advantages that the residents of Sanford Hall have an obligation to the University. Through their efforts should be encouraged greater dignity and decorum in conduct, a nicer regard for the amenities of life, and, above all, a profounder sense of the value of character in creating the finest community spirit.

Sororities.—During the year a local sorority, Sigma Beta, has been organized, thus making eleven sororities in the University. Sophomore pledge day, from which so much had been expected in the way of minimizing the evils of rushing, has not proved successful, judging from the action of the Pan-Hellenic Association. For the coming year pledge day has been set towards the close of the first semester. Those who were interested in the experiment of sophomore pledge day regret that it was

not given at least a two-years' trial. One year is hardly sufficient to test it thoroly.

During the year, the Dean of Women has met with the chaperones of sorority houses in order that common problems of house management be discussed and possible methods of solution adopted. Heretofore the weak spot in house administration has been not the lack of regulations, but the lack of proper machinery for their enforcement. There is a tendency among the sororities to remedy this defect by applying more thoroly the principle of self-government and by securing as chaperones women whose training and character fit them to be guides of youth.

There has been a determined effort on the part of many of the sororities to strengthen their scholarship, to place social activities in a more normal relation to the real purpose of a University education, and to improve standards of taste and conduct. In these ways many of the sororities have strengthened their organizations and at the same time served the University.

The Elizabeth Northrop Cottage.—This is the first of what is hoped may become a system of coöperative houses. Members of the Student Division of the Faculty Women's Club initiated the plan, rented the house from the University at a nominal rate, secured the furnishings, and made it ready for occupancy. The house provides a home for eleven students, the chaperone, and the working housekeeper. By every student giving about one hour's service a day it is estimated that the cost of living for each individual will probably not exceed \$16.00 per month. Residents of the house will be selected from the list of applicants by a committee composed of the President of the House, the President of the Women's Self-government Association, and the Dean of Women. Much enthusiasm has been shown in the experiment by both faculty and students. Should it prove successful, as every indication now promises, it is hoped that the system of coöperative houses may be established during the coming year.

Lodging houses.—During each semester all the listed lodging houses on both campuses were inspected by the resident nurse at Sanford Hall, and a written report of the condition of each submitted to the Dean of Women. Houses which failed to meet the regulations concerning segregation and the receiving of callers, or to maintain conditions of cleanliness and sanitation have not been re-listed. Plans made by students to live in lodging houses not on the list have been consistently discouraged. Such private arrangements have usually been made in the early fall at a time when it is impossible to inspect new houses and list them. It has seemed only fair to give the preference to those already inspected and approved.

There have been this year comparatively few cases of adjustment arising from students leaving houses in the middle of a semester. This has been due in a measure to the fact of a late pledge day, which did not necessitate the freshman's transfer from a lodging to a sorority house. It is also due to a growing sensitiveness of the moral obligation to keep a contract, tho there may be no legal constraint.

Physical education.—The report of the Director of Physical Educa-

tion (pages 172 to 176) reviews in detail the year's work. Through the close coöperation of this office with that of the physical director, a most vigilant supervision of the health of the students is effected.

With the opening of the gymnasium new opportunities for the physical training of women are suggested. The increasing interest in all agencies that make for health has naturally emphasized the need for scientific physical training. The demand for directors and teachers in schools and colleges, in recreation centers, in welfare work, is steadily becoming more urgent. It is hoped that in connection with the new gymnasium a department for the teaching of physical training may be organized, which in thoroughness of equipment may compare favorably with the department of physical education at Wellesley College. Many courses already offered in the University—in the Medical School, and in the departments of Home Economics and Physical Training—would naturally be utilized in the development of such a department.

Employment for self-supporting students.—During the year 168 University women were either wholly or in part self-supporting. As heretofore the chief means of support were teaching, tutoring, clerical work, library work, and housework. The impossibility of resolving housework into a fixed system often renders it undesirable as a means of support; students are frequently most pressed with demands from their employers at times when their college work is heaviest, and as a result, both their health and studies often suffer. It is hoped that next year the hours of employment can be somewhat standardized and that more work of a less uncertain nature than housework can be found for students who need it.

Vocational guidance.—Beyond the publication in 1911-12 of a University bulletin on *Careers for College Women*, no definite work has been possible in the matter of vocational guidance. It is planned, however, next year to hold regular hours for vocational conferences with students, and to have for students' use a carefully selected collection of pamphlets and circulars giving information on kinds of work other than teaching available to women. In the professional schools of the University liberal opportunity has already been given to prepare for vocations other than teaching. The organization of a department for the teaching of physical education as already suggested, the development of a course in institutional management in the department of Home Economics, and a library course in connection with the proposed new library would, however, greatly enrich these opportunities. The increasing demand for trained workers in these fields makes an early development of these courses highly desirable.

Loan funds and scholarships.—The urgent need for an emergency fund pointed out in the last report of the Dean of Women has already been generously met. The Loan Fund for Women Students of the University, amounting to \$3,373.00, was established from the proceeds of a play written and staged by Mrs. George E. Vincent and given under the auspices of the Faculty Women's Club. It is to be administered by a committee of the club, of which the Dean of Women is chairman. The Home Economics Association Loan Fund, amounting to \$250.00, has

also been established during the year. The amount was raised by the members of the Association at a Christmas bazaar given for the purpose. It is available only to women in the Home Economics department.

The completion of the Maria L. Sanford Scholarship Loan Fund makes four scholarship funds, carrying annually \$100.00 or more, open to University women: The Minneapolis College Women's Club Scholarship, the St. Paul College Women's Club Scholarship, and the Puritan Colony Scholarship Loan.

Educational administration.—As a member of the Administrative Board of the College of Science, Literature, and the Arts and of the Students' Work Committee of the College of Agriculture, the Dean of Women gives no small amount of time and thought to the supervision of women's work. The monthly meetings with delinquent students, particularly freshmen, afford opportunities for direction and guidance as well as correction, necessary in a great University, where the needs of the individual students may easily be overlooked.

In concluding, the recommendation already made that a wing be added to Sanford Hall, is again strongly urged. It is of the utmost importance that out-of-town students be properly housed, with the assurance of safe and wholesome living conditions. Moreover, the present scattered residence in lodging houses makes it impossible for the administration to exercise the kind of supervision now maintained at Sanford Hall. By the building of a wing and the further development of the plan of coöperative houses, adequate provision could be made for all out-of-town students.

Respectfully submitted,

MARGARET SWEENEY, *Dean of Women*

UNIVERSITY EXTENSION

The following statements have been prepared by the directors of the Agricultural Extension Division and the General Extension Division:

AGRICULTURAL EXTENSION DIVISION

During the year ending July 31 1914, the Agricultural Extension Division has had in its employ thirteen men and three women who have devoted full time to Agricultural Extension work. Six men and one woman devoted part time to the work. This is in addition to the County Agents, Farmers' Institute workers and office force.

Farmers' Institutes.—The Farmers' Institute work has been handled through the same organization as the Agricultural Extension work, altho supported by a separate appropriation and administered by a separate board. It is in reality but a branch of the Agricultural Extension work. Institute workers are hired by the week, largely between December 1 and April 1. Nineteen men and four women were employed. 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

	Number	Total attendance	Average attendance per session
Regular institutes.....	106	59,350	182
Special institutes, consisting of Farmers' Club meetings, school officers' meetings, cooperative organization meetings, etc.....	675	55,359	82

Fifty thousand copies of *Farmers' Institute Annual* No. 26 were published and distributed free at the various agricultural meetings held in the State. *Annual* No. 26 was devoted quite largely to a report on farmers' coöperative movements in Minnesota, and has been of considerable help to communities desiring to organize along the various lines.

Farmers' clubs.—The first Extension bulletin, published January 1, 1910, dealt with Farmers' Clubs, and was widely distributed.

Considerable attention has been given to Farmers' Clubs since that time, but during the last fiscal year a man was employed to devote full time to this movement. The State High School Board endorsed the

movement as a desirable line of work for the high-school agricultural men to encourage. Most of these agricultural instructors were reached at their annual conference, and all were reached by personal letters and by copies of *Extension Bulletin* No. 46 dealing with the Farmers' Club movement.

Early in the year a general campaign was started with a view to getting a Farmers' Club in each of the 1,600 agricultural townships in the State. Town officers, rural-school teachers, county superintendents, high-school agriculturists, high-school superintendents, and others interested in agricultural development, were communicated with, and an effort was made to interest them in Farmers' Club work. The *St. Paul Farmer*, published by the Webb Publishing Company, gave excellent assistance by employing a man and devoting an entire page each week to Farmers' Club work. Later in the year other farm papers—the *Farm*, *Stock and Home*, *Northwest Farmstead*, *Northwestern Agriculturist*, and *St. Paul Twice-a-Week Dispatch*—devoted considerable space to reports from Farmers' Clubs.

All of the Institute work done during December, 1913, and a large part of that done throughout the past year was in connection with Farmers' Club meetings. Timely topics for discussion at the meetings have been furnished to the Farmers' Clubs in the state monthly for nearly four years. The Farmers' Club movement seemed to appeal to nearly everyone in the State. As a result, during the year nearly 700 clubs were organized. August 1, 1914, there were about 830 of these clubs listed with the Agricultural Extension Division.

Special trains.—During the year two special trains were operated in coöperation with two railroads in the State. One was operated on the Duluth and Iron Range Railway from May 18 to May 30, 1914. One stop was made each day, and the people with the train went out into the country, visited the farmers on their farms in the forenoon, and held meetings at the train in one of the coaches in the afternoon. This train was equipped with a home economics demonstration car, and instruction in that branch as well as in agriculture was offered. Twelve stops were made, and 2,085 people attended the lectures and demonstrations.

Another train was operated from June 8 to June 20 on the Minnesota and International Railway in coöperation with the Northern Pacific Development Agent. The train was out twelve days and made twelve stops. The train carried only dining and sleeping accommodations for those with the train. The speakers separated each morning, went out into the country and held meetings in various town halls, schoolhouses, etc., away from the railroad. Thirty of these local meetings were held—from two to four meetings each day—with a total attendance of 2,100.

The plan followed with these two trains was, so far as I know, entirely new. The lecturers were given an opportunity to see at first hand some of the conditions with which the people of the community had to contend, and were therefore better able to be of assistance. We believe the type of train operated this last year is more practical than the type of trains previously run.

Rural-school work.—Two men have continued throughout the year to devote practically their entire time to rural-school work. They have encouraged the teaching of agriculture in the rural, graded and consolidated schools, and have assisted materially in conducting industrial contests in the greater proportion of the counties.

A special effort has been made to organize Boys' and Girls' Clubs in connection with the regular Farmers' Clubs and rural-school organizations of the State. Several local school fairs have been promoted and held in connection with rural schools. All rural-school work has been conducted in close coöperation with county superintendents and teachers.

The Acre Yield Corn Contest conducted last year was finished last fall. About 700 boys and girls completed the work and had their yields checked. The boy who won the grand championship of the State produced 134 bushels, field measure, on his acre of corn, thereby winning a scholarship in the Minnesota School of Agriculture. The average for the 46 prize winners was 88.6 bushels, field weight, and 71 bushels, dry weight. In this year's acre yield corn contest 3,100 boys, representing 80 counties, have enrolled. The special work this year for the girls is a Bread-making Contest, with over 1,000 girls entered. The majority of the county agricultural societies have departments for industrial contest work, and about \$8,000 is being paid out by these associations this fall in premiums for the boys' and girls' work.

The county agricultural agents.—The County Agricultural Agent movement has grown, probably too rapidly. A year ago there were eleven county agents in the field; at present there are twenty-five, with two additional counties organized for the work, but in which agents have not as yet been secured.

Finances.—In one county in which there is an agent, the County Commissioners are making no appropriation. In two counties they are appropriating \$500 each. In the rest of the twenty-five counties, the commissioners have appropriated the full \$1,000 that they are permitted to appropriate. The appropriation made by the last State Legislature for this work permitted the payment of \$1,000 to each of twenty-five counties for the fiscal year ending July 31, 1914. As some of the counties did not organize promptly August 1, 1913, the full \$25,000 was not needed. Beginning August 1, 1914, this appropriation increases to \$35,000, and we do not wish to see the number increased above thirty-five for two years at least, or until the work is well established.

About \$5,000 of federal funds has been received to support the work in all of the counties; but the Smith-Lever Bill, which went into effect July 1, 1914, and increased funds from the Bureau of Plant Industry, have enabled us to provide \$300 of federal support for each county. This can be increased as the Lever funds accumulate. We hope eventually to be able to pay \$1,000 out of federal funds toward the employment of a county agent in each county. This will provide a fund of \$3,000 in each county, which is really needed to take care of the salary, traveling expenses and necessary office expense in connection with efficient county agent work, and it will obviate the necessity of asking for subscriptions.

Character of work.—It has been necessary for county agents to devote a large part of their time to the immediate needs of the county. They have helped to control hog cholera, to introduce better seed and better live stock; to encourage alfalfa-growing and the building of silos; to promote the exchange of seed and live stock between various farmers. They have assisted in the organization of numerous Farmers' Clubs and other coöperative organizations, and in the promotion of industrial contest work. The aim has been to get each community so organized as to be able to handle the emergency work locally, and to leave the county agent more time to develop in each county definite farm management plans that will bring about better business reorganization of farms.

Through the coöperation of the United States Department of Agriculture, it will be possible during the coming year to undertake some farm-management survey work among groups of farmers in each of several counties that will aid the county agents and others working with them to form a reasonable diagnosis of the situation in each county, and be able to suggest plans of improvement based on a thoro knowledge of present actual conditions. Two men will be started on this farm survey work early the following year, to assist the county agents.

Difficulties.—The county agent work in the State has not been entirely free from difficulties. In many counties the work was established by the efforts of enthusiasts before many of the people in the county thoroly understood the movement or were ready to support it. County-agent work is new, and even the men in charge of the work have not known how best to organize it. Men with peculiar qualifications for county agent work have not been plentiful. The work, however, has not been discontinued in any county, altho in a few instances there has been some active opposition to it.

Results of the work on the whole have been very encouraging, and it is hoped that when the newness of the movement wears off it will become a regularly-accepted and well-supported branch of the county, state and national service to the agricultural interests.

Short courses.—The holding of five-day Short Courses in the smaller towns and cities is one of the main lines of Extension work. During the past year more courses were held than at any previous time. Better equipment was furnished, consequently better work was accomplished. A carload of stock, consisting of a good type of draft horse and representatives of the chief dairy and beef breeds of cattle, was taken to each regular Short Course. During the principal Short Course months—January, February, and March—three cars were on the road all of the time and traveled over 5,400 miles. These cars of stock were transported by the various railway companies without charge. At these courses there were three or more persons from the Agricultural Extension Division. Work in home economics was given in all but four. The main agricultural work given was along stock and farm crop lines. The regular courses were held at the following places: Adrian, Albert Lea, Annandale, Bagley, Brainerd, Broton, Canby, Clarkfield, East Grand Forks, Excelsior, Fergus Falls, Fertile, Hallock, Hastings, Hutchinson, Lake Crystal,

Lakefield, Lanesboro, Le Sueur, Litchfield, Luverne, Lyle, Madelia, Madison, Milaca, Monticello, Mora, North Branch, Park Rapids, Plainview, Rush City, St. Peter, Sauk Center, Truman, Waseca, Windom, Winthrop, Worthington.

A week's work was divided between Barnum and Moose Lake one week, and Bigfork and Blackberry another week. The total attendance was 36,800 men and 18,960 women. The several county agents held three- to five-day short courses at 23 places: Ada, Adolph, Beardsley, Benson, Bird Island, Brown Valley, Clinton, Dawson, Fairfax, Gary, Halstad, Hendrum, Herman, Hermantown, Jackson, Meadowlands, Molde, Palo, Redwood Falls, Renville, Wells, Wheaton and Winnebago, with a total attendance of 18,378.

There were several Short Courses managed locally which were given some assistance. These were at Austin, Mantorville and Owatonna, making a total of 68 Short Courses, and a total attendance, counting the attendance at all sessions, 74,128. About 6,725 different men and 2,100 different women attended these courses.

Demonstration farms.—During the past year, the number of demonstration farms has been increased from eighteen to twenty-eight. The owners live on the farms themselves, and each does a man's work on his farm, has no other line of business besides farming, and farms no other area, except that designated to be farmed in coöperation with the Division. An inventory is taken about January 1 at the opening of each year's work. The Division has a five-year contract with each farmer, and the farmer agrees to follow the suggestions and plans of the Division.

Each farm demonstrates one or more lines of work, such as methods of eradication of noxious weeds, farm drainage, farm organization, selection and management of live stock and field crops, or any other line of work classified under farm management. Not more than one farm is located in a county. The idea in each case has been to direct the operations of the whole farm, so that the land, labor and capital will produce maximum results.

During the year, four hundred and thirteen visits were made to the demonstration farms by Extension workers. The following tables show yields secured on demonstration farms compared with the average yields secured in Minnesota.

COMPARISON OF YIELDS

Crop	Number of farms	Acres	Yield, bushels	Demonstration Farm's average	State's average
Wheat.....	15	289½	4,891	16.9	16.2
Oats.....	19	506	21,308	42.1	37.8
Corn.....	19	441.4	21,377½	48.4	40.0
Potatoes.....	16	60.33	8,333	137.9	110.0

COMPARISON OF DAIRY PRODUCTION 1913

FARMS	Number of cows	Average pounds of milk per cow	Average pounds of fat per cow	Average value
Rothsay.....	8	5,666.0	208.9	64.24
Hutchinson.....	10	5,625.8	219.6	75.54
Wheaton.....	8	4,849.2	196.8	60.75
Marshall.....	11	5,235.1	191.6	56.86
Belle Plaine.....	12	6,315.2	270.0	84.63
Breckenridge.....	5	6,131.7	200.0	59.21
Pipestone.....	6	5,551.2	229.4	64.81
Wadena.....	12	4,761.9	187.9	59.14
Osakis.....	11	4,786.1	186.7	61.38
Renville.....	11	6,956.6	250.4	76.63
Detroit.....	11	4,166.6	179.2	58.20
Total.....	105	60,045.4	2,320.5	721.39
Farm's average per cow.....		5,458.6	210.9	65.58
State's average per cow.....		4,000.0	150.0	47.25
Difference.....		1,458.6	60.9	18.33

County fairs.—During the fall of 1913, judges were furnished for about one hundred county and street fairs. The county fair associations depend almost entirely on the Division to furnish them with judges. This is being made more and more an educational feature of the fair, and is, we believe, an excellent way of connecting educational work and a form of entertainment. Wherever possible, the judges explain their reasons for placing the exhibits, which adds greatly to the educational value of the fair. The county-fair associations pay the traveling and hotel expenses, and the Division furnishes the judges. During the fall of 1913, entertainment features were furnished at eight county fairs. The entertainment furnished consisted of the play, *Back to the Farm*, for one afternoon and evening; a scientific demonstration of liquid air and the gyroscope, together with some reading, for another afternoon and evening; and a lecture for the third day. For the three days of the fair, a motion-picture show was kept in operation in a small tent. The venture was only partially successful. The fair associations paid approximately \$300 for the three-days entertainment, but even this left the Division somewhat short. The motion-picture feature was not at all successful, because of lack of equipment.

Special meetings.—The Agricultural Extension Division is called upon constantly for assistance in connection with all sorts of meetings, such as rural-school meetings, farmers' clubs, farmers' picnics, farmers' coöperative organization meetings, teachers' and school officers' meetings, development association meetings, etc. The Division has attempted to comply with all such legitimate requests so far as facilities permit. During the year, 1,433 meetings were held, with a total attendance of 152,096.

Publications.—Publication work has been continued along the same lines. Extension bulletins have been published as follows:

- No. 44. *Barnyard Sanitation*, by H. Preston Hoskins.
No. 45. *Mutton*, by T. G. Paterson.
No. 46. *Farmers' Clubs*, by A. D. Wilson.
No. 47. *Clover*, by A. Boss and A. C. Arny.
No. 48. *Dourine*, by W. L. Boyd.
No. 49. *Alfalfa-Growing*, by A. C. Arny.
No. 50. *The Seed-Potato Plot*, by E. C. Stakman and R. Wellington.
No. 51. *Some Internal Parasites of Domestic Animals*, by W. L. Boyd.
No. 52. *Model Farm Houses*, by Maurice I. Flagg.

The mailing list for Extension bulletins is about 45,000. Sixty thousand copies of each bulletin are published, to provide a surplus for special requests. It has been necessary to reprint a large number of Extension bulletins during the year.

Twenty-four numbers of *University Farm Press News* were published and distributed. Thirty-five hundred copies of each issue were published. This publication goes to local papers and to a few people in each community who are especially interested in educational work. It is not sent to farmers.

Every three weeks copy has been furnished to the American Press Association for an illustrated agricultural page which has been used by about fifty local newspapers.

During each of the nine school months, *Rural School Agriculture* has been published and mailed to each rural-school teacher in the state. Ten thousand copies of each issue were published and sent out.

Summer schools.—Owing to shortage of funds, the State Superintendent of Public Instruction took care of the agricultural and home economics instruction at the County Teachers' Training Schools. It is expected to continue this work next year.

Cow-testing associations.—Considerable time has been devoted to cow-testing association work. It is quite difficult to keep these associations alive, chiefly due to the difficulty of securing competent men for testers at the salary that the associations can pay. Only about four hundred cows can be taken care of by one man, and the usual price per cow for testing work varies from \$1 to \$1.50. A man qualified to work out feeding rations and give advice regarding breeding, feeding and housing of live stock, as well as one qualified to test milk, is necessary to make a success of testing association work, and it is very difficult to get a man of sufficient training and experience for from \$400 to \$600 per year. However, some very good work has been done by these associations, of which there are twelve in the state. A report is being prepared with a view to helping in the organization of new associations.

Live stock shipping associations.—There has been an unusual demand on the Division during the past year for assistance in the organization of Live Stock Shipping Associations. These associations are very successful, probably due to their simplicity of organization. No capital stock is needed; in fact, all that is required is an agreement among a number of farmers that they will ship their stock through the association. A Board of Directors is elected, who hire a manager. The mana-

ger's salary is paid out of the commission charged on stock handled. We hope to issue a bulletin soon describing in full the shipping association work, so that every community which desires to do so may take up this coöperative venture, which is saving considerable money to the communities already organized.

"*Back to the Farm.*"—The *Back to the Farm* play was handled by the Division. Two thousand copies of the play were published. Mr. Shumway, the author, was paid \$200 royalty for the State rights. The play was given in 43 places, and was received with great favor wherever it was given. We hope to be able to present it in every community in the State.

SUMMARY OF WORK ACCOMPLISHED

Meetings.—The following table does not include any part of the work of county agents.

KIND OF MEETINGS	Number	Total attendance all sessions	Approximate number of individuals attending
Regular institutes.....	106	59,350	23,850
Special institutes.....	675	55,359	55,359
Special trains (2).....	42 (stops)	4,185	4,185
Regular short courses.....	42	55,750	6,300
Special meetings.....	1,433	152,096	152,096
Total.....	2,298	326,740	241,790

Contests.—Seven hundred boys and girls completed the Acre Yield Corn Contest in 1913. The forty-six prize-winners secured average yields of 88.6 bushels, field weight, and 71 bushels, dry weight.

Thirty-one hundred boys have entered the 1914 Acre Yield Corn Contest. One thousand girls have entered the 1914 Bread-making Contest.

Demonstration farms.—Twenty-eight demonstration farms have been regularly visited.

County fairs.—Judges have been furnished for 100 county and street fairs, and harvest festivals.

Publications.—Fifty thousand copies of *Farmers' Institute Annual* No. 26, on *Coöperation*, were published and distributed; nine Extension bulletins were published, and 60,000 copies of each distributed; twenty-four issues of *University Farm Press News* published, and 3,500 copies of each distributed; sixteen pages of plate-matter furnished to the American Press Association; nine issues of *Rural School Agriculture* published, and 10,000 copies of each sent to teachers in the State.

County agents.—Twenty-five county agents have been kept in the field.

Coöperative organization work.—About thirty-five Live Stock Shipping Associations, twelve Cow-testing Associations, several elevator com-

panies, creameries, and Live Stock Breeders' Associations, have been given assistance.

Farmers' clubs.—During the year about 700 farmers, representing about 14,000 farms and 70,000 people, have been organized. This makes a total of about 830 clubs in the State, representing about 83,000 people.

APPROXIMATE DISTRIBUTION OF FUNDS IN AGRICULTURAL
EXTENSION WORK IN MINNESOTA FOR THE YEAR
ENDING JULY 31, 1914

KINDS OF WORK	Agricultural Extension fund \$62,000.00	State county agent fund \$25,000.00	Farmers' Institute fund \$23,000.00	Office of Farm Managem'nt B. P. L., \$6,960.00	Local funds, approximately
Demonstration Farms..	\$10,000.00				
Short Courses.....	10,500.00		\$2,200.00		
Farmers' Institutes.....			6,000.00		
County agents.....	4,000.00	\$21,767.97		6,960.00	\$26,223.25
Rural schools.....	6,000.00				
Publications.....	8,500.00		3,000.00		
Farmers' clubs and co- operation.....	3,000.00		3,000.00		
Miscellaneous extension work.....	12,500.00		4,500.00		
Office expense and supervision.....	7,500.00		4,300.00		
Cancelled.....		3,232.03			
Total.....	\$62,000.00	\$25,000.00	\$23,000.00	\$6,960.00	\$26,223.25

Respectfully submitted,

A. D. WILSON, *Director*

THE GENERAL EXTENSION DIVISION

INTRODUCTORY

In presenting the report of the General Extension Division for the year ending July 31, 1914, it may be well to touch upon the organization of the Division. Up to August 1, 1913, organized extension work had been conducted by the Department of Agriculture, and for some years work which could be denominated extension work had been carried on from the general University campus. However, this work was done largely by the separate departments or schools by their own volition and upon their own initiative. When the writer arrived to take up the work as director of University Extension, it was determined at a conference of those interested that all the extension activities of the University should be grouped under the term Extension Service. Under this general head there should be two divisions: the Agricultural Extension Division, of which Mr. A. D. Wilson is Director, and the General Extension Division, of which Mr. R. R. Price is Director. These two Divisions have separate fields in many ways but work in coöperation.

The General Extension Division covers as its field night classes in the Twin Cities, Duluth, and elsewhere, correspondence courses, exten-

sion lectures, and the University lyceum, the Municipal Reference Bureau, a Lantern-slide Bureau, and a Short Course for Merchants. Encouragement is also given to debating in the schools of the State and to the organization of community centers in the schools and other public buildings. These various lines of activity showed considerable development during the past year. The night-class enrollment was particularly gratifying, being double that of the year before. During the year twenty-five lyceum courses were booked and conducted and during the second half of the year contracts were made with ninety-seven communities for lyceum courses to run during the year 1914-1915. A detailed statement of the various lines of activity follows:

EXTENSION NIGHT CLASSES

REPORT OF EVENING EXTENSION CLASSES
FOR THE YEAR 1913-14

The first semester began September 29, 1913, and ended January 31, 1914. The second semester began February 2 and ended May 22, 1914.

ACADEMIC OR COLLEGIATE

CLASS	ENROLLMENT	ENROLLMENT
	FIRST SEMESTER	SECOND SEMESTER
MINNEAPOLIS		
American Democracy	7	25
British Poets	18	
Chemistry	14	14
Beginning French	12	16
Geography and Geology	28	
Beginning German		10
German III	12	12
German IV		16
Greek in English	18	
Labor and Life	48	
Mental Retardation	2	
Optics	20	
Public Speaking	24	14
Shakespeare	16	
Short Story		25
Spanish	18	14
Swimming	23	10
Wonderland of America		15
	260	171
ST. PAUL		
In coöperation with the St. Paul Institute		
American Democracy		21
Geology and Geography	22	
Greek in English		20

CLASS	ENROLLMENT	ENROLLMENT
	FIRST SEMESTER	SECOND SEMESTER
Man and His Living	21	
Man and His Living	21	
Public Speaking	21	11
Regional Geography		12
Rhetoric	5	6
Western Hemisphere		12
	<hr/>	<hr/>
	90	82
DULUTH		
American Democracy	21	
Labor and Life		20
Man and His Living	46	
	<hr/>	<hr/>
	67	20
Total Academic		
Minneapolis	260	171
St. Paul	90	82
Duluth	67	20
	<hr/>	<hr/>
Total	417	273

BUSINESS COURSES

CLASS	ENROLLMENT	ENROLLMENT
	FIRST SEMESTER	SECOND SEMESTER
MINNEAPOLIS		
Advanced Accounting Problems	11	15
Accounting, Introductory		13
Advertising		6
Auditing	19	14
Banking Practice	35	
Business English	60	
Business Law A	48	12
Business Law B		16
Business Law for Bank Clerks	29	20
Business Law C	9	
Business Law D	31	
Business Law E		22
Elements of Economics	28	17
Economic Problems		14
Principles of Accounting	45	
Railroad Traffic and Rates	31	14
Retail Selling	16	
Sales Correspondence		21
Salesmanship	68	40
	<hr/>	<hr/>
	430	224

THE PRESIDENT'S REPORT

CLASS	ENROLLMENT	ENROLLMENT
	FIRST SEMESTER	SECOND SEMESTER
ST. PAUL		
In cooperation with the St. Paul Institute		
Accounting, Advanced		17
Accounting, Introductory		19
Advertising		8
Auditing	5	
Banking Practice		23
Business Law A	17	11
Business Law B	27	
Business Law D		17
Business English	26	
Elements of Economics	6	
Economic Problems		12
Principles of Accounting	21	
Railroad Traffic and Rates'	13	4
Sales Correspondence		7
Salesmanship	48	30
	<hr/>	<hr/>
	163	148
DULUTH		
Principles of Accounting	19	9
Principles of Accounting		24
	<hr/>	<hr/>
	19	33
MANKATO		
Business Law A		26
Salesmanship		30
		<hr/>
		56
NORTHFIELD		
Business Law A		27
Total Business		
Minneapolis	430	224
St. Paul	163	148
Duluth	19	33
Mankato		56
Northfield		27
	<hr/>	<hr/>
Total	612	488

ENGINEERING

CLASS	ENROLLMENT	ENROLLMENT
	FIRST SEMESTER	SECOND SEMESTER
MINNEAPOLIS		
Architectural Design, Elementary ...	13	16
Architectural Design, Advanced	12	13

CLASS	ENROLLMENT	
	FIRST SEMESTER	SECOND SEMESTER
Applied Mechanics	15	
Cement Testing	7	
Elements of Alternating Currents...	18	6
General Electricity	5	5
Heating and Ventilating	5	
Plane Surveying		8
Power Stations	7	
Reinforced Concrete	7	
Shop Mathematics		6
Strength of Materials		9
Structural Design	7	
Telephony		7
	96	70
ST. PAUL		
In cooperation with the St. Paul Institute		
Shop Mathematics		16
DULUTH		
Reinforced Concrete, Elementary ...	12	
Reinforced Concrete, Advanced	12	
Shop Mathematics	17	2
	41	2
Total Engineering		
Minneapolis	96	70
St. Paul		16
Duluth	41	2
	137	88

SUMMARY OF ENROLLMENT

	FIRST SEMESTER	SECOND SEMESTER	TOTAL FOR YEAR
Academic Courses			
Minneapolis	260	171	431
St. Paul	90	82	172
Duluth	67	20	87
Business Courses			
Minneapolis	430	224	654
St. Paul	163	148	311
Duluth	19	33	52
Mankato		56	56
Northfield		27	27

	FIRST SEMESTER	SECOND SEMESTER	TOTAL FOR YEAR
Engineering Courses			
Minneapolis	96	70	166
St. Paul		16	16
Duluth	41	2	43
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Total	1,166	849	2,015

The tuition fees paid by students for night classes in the first semester amounted to \$6,993.00, and in the second semester \$4,841, a total of \$11,834.00. In addition to the above, twenty-four students were registered in the first semester for evening classes in the Law School and eighteen in the second semester. \$640.00 in the first semester and \$420.00 in the second semester was collected as tuition fees paid into the Law School Budget.

The total number of registrations for night classes during the year 1913-1914 was 2,015. These registrations were made by 1,558 individuals.

According to an arrangement made with the St. Paul Institute, ten per cent of the gross fees obtained from students in the St. Paul classes was paid to the St. Paul Institute. This amounted to \$137.75 for the first semester and \$129.45 for the second semester, a total of \$267.20. All Extension night classes are semester classes and the registration is, therefore, taken twice in the academic year.

COMPARISON OF ENROLLMENT FOR 1912-1913 WITH 1913-1914

	1912-1913	1913-1914
Total Academic		
Minneapolis	310	431
St. Paul	72	172
Duluth	24	87
Total Business		
Minneapolis	309	654
St. Paul	118	311
Duluth		52
Mankato		56
Northfield		27
Total Engineering		
Minneapolis	153	166
St. Paul		16
Duluth		43
	<hr/>	<hr/>
	986	2015

THE MERCHANTS' SHORT COURSE

The first Short Course for Merchants ever offered by a university was held on the campus during the week of February 9-14, 1914. One hundred thirty-eight students, mostly retail merchants from the small

towns, registered for the course. The interest was keen and continued from Monday until Saturday. The program included regular morning and afternoon sessions each day consisting of five lectures followed by discussions. The evenings were devoted to general lectures and entertainments. The principal lectures were given by Professor Paul H. Neystrom, then of Wisconsin, now of our staff; James W. Fisk, New York; H. K. Zuppinger, Editor of the *Twin City Commercial Bulletin* and the *Hardware Trade, St. Paul*. Those in attendance seemed enthusiastic in their praise of this new departure of the University and assured us that another year will see the enrollment more than tripled. It is planned to repeat the course annually, and perhaps biennially, at such times as will suit the convenience of the merchants.

LYCEUM AND ENTERTAINMENT DEPARTMENT

The Lyceum Department of the General Extension Division developed rapidly during the academic year 1913-1914. Professional talent as well as members of the University were employed. Fifty-three attractions were used altogether, 29 were connected with the University, and 24 were professionals taken from outside. Altogether there were 7 towns in which we had single numbers or complete courses. The following towns were given courses of two or more numbers: Anoka, Beardsville, Becker, Buffalo, Chisholm, Chokio, Clinton, Cloquet, Deer Creek, Duluth, Eyota, Glencoe, Granite Falls, Grey Eagle, Henderson, Jackson, Kasson, Lake City, Lakefield, Litchfield, Little Falls, Mantorville, New Auburn, New Ulm, North Branch, Ortonville, Paynesville, Plainview, Red Wing, St. Cloud, St. Louis Park, St. Peter, Sauk Center, Sherburn, Sleepy Eye, Tyler and White Bear. These 37 towns had a total of 184 numbers and the cost to the towns was \$4,675.00. The following towns had single lectures or entertainments: Ada, Aiden, Appleton, Arlington, Biwabik, Breckenridge, Brooten, Buhl, Cambridge, Clarkfield, Crookston, Crosby, Dassel, Devils Lake, N. D., Elbow Lake, Elgin, Faribault, Fosston, Glenwood, Hastings, Hector, Heron Lake, Hesper, Iowa, Hutchinson, International Falls, Lamberton, Le Sueur, Madison, Mahnomon, Moorhead, Morris, Parkers Prairie, Proctor, Renville, Redwood Falls, Rush City, St. Cloud, St. Croix Falls, Wis., Sisseton, S. D., Slayton, Stillwater, Two Harbors, Wahkon, Warren, Watertown, Wayzata, Wells, Wheaton, Winnebago and Worthington.

Courses of from five to eight numbers each were booked in 95 towns for delivery during the season 1914-1915. The contract price of these courses aggregates \$24,245.00.

Commencement addresses.—In addition to the lectures and entertainments listed above, 18 engagements for commencement addresses for members of the faculty were booked through this office.

Milton Fairchild.—Mr. Milton Fairchild, Director of Instruction, National Institution for Moral Instruction, of Baltimore, Maryland, was engaged for one month to deliver lectures and exemplify lessons in morals before Minnesota communities. Mr. Fairchild appeared in the

following towns, usually devoting three days to each town: Crookston, Morris, and Moorhead. He also gave some lectures before the College of Education and exemplified his lessons before some schools in Minneapolis. Mr. Fairchild has five illustrated lessons dealing with conduct and behavior. The lessons are entitled as follows: *The True Sportsman*; *Going to School*; *Thrift in School*; *Boys' Fights*; and *Conduct Becoming a Gentleman*. The lessons are illustrated with lantern slides made from snapshots of scenes in street life and at the games and sports of boys. An unique and forceful effect is produced by these episodes from everyday life with the running commentary of the lecturer. Mr. Fairchild has devised an unique plan for inculcating moral truths in an effective manner, at the same time avoiding the appearance of preaching. The results of this experiment will be watched with interest.

LANTERN SLIDES

During the year there arose from some of the public schools a demand for loan collections of lantern slides. It was, therefore, thought wise to make a small beginning toward providing sets of slides on educational subjects. This will make the nucleus for a future Bureau of Visual Instruction. Many Minnesota schools have now provided themselves with stereopticon lanterns, but the cost of slides is so great and any one set of slides is used so seldom in the year that it would seem to be a real economy to provide these slides at a central bureau so that they could pass from school to school and thus be in continuous use. Accordingly, two sets of slides were purchased on *Rome, the World Center of Olden Times*, two on *Following Great Men Through Greece*, and two on *The Passion Play of Oberammergau*. Each of these sets is packed in a neat shipping case and is accompanied by a typewritten lecture. It is planned to add to these sets a set on *Caesar's Helvetic Campaign*, *The Conquest of Tuberculosis*, *Views of the University of Minnesota*, and other similar sets. The sets are sent out as loans and the only expense to the borrowing school is the cost of transportation. It would be well if the Division had more money to expend on an educational work so full of promise and so capable of development. It would be a step in advance if we could also establish a central bureau for the distribution of educational films. The following schools made use of these sets of lantern slides during the past year: New Richmond, Cloquet, Comstock, Belle Plaine, Cokato, Walnut Grove, Hutchinson, Meadowlands, Worthington, Montevideo, and Marshall.

UNIVERSITY WEEKS

During the first two weeks of June, 1914, the General Extension Division managed the third annual series of University Weeks. Twenty-four Minnesota towns were each given a six-day program on the general lines of a Chautauqua program but with the educational features perhaps more emphasized. The programs were given afternoon and evening and consisted of concerts, popular lectures, illustrated lectures, scientific

demonstrations, dramatic readings, and addresses on business subjects and on various phases of welfare work. The towns visited during the week June 1-6, inclusive, and the respective managers, were as follows: New Ulm, Dr. James Davies; St. Charles, Prof. C. L. Rotzel; West Concord, Prof. L. K. Adkins; Springfield, Prof. C. F. Shoop; Windom, Prof. F. R. McMillan; New Prague, Prof. W. E. Anderson; Plainview, Prof. C. H. Preston; Waseca, Prof. O. C. Edwards; Le Sueur Center, Mr. Charles Dale; Glencoe, Mr. Thomas J. Smart; Chaska, Prof. C. J. Posey; and St. James, Prof. Samuel Quigley. The towns visited during the week June 8-13, inclusive, and the managers, were as follows: Pelican Rapids, Prof. C. H. Preston; Perham, Prof. Thomas Mitchell; Long Prairie, Prof. C. J. Posey; Monticello, Prof. F. R. McMillan; Melrose, Prof. C. F. Shoop; Fergus Falls, Mr. R. B. Oshier; Bird Island, Prof. L. K. Adkins; Sacred Heart, Prof. O. C. Edwards; Minneota, Prof. H. B. Gislason; Graceville, Prof. C. L. Rotzel; Herman, Mr. Thomas J. Smart; and Hancock, Prof. W. E. Anderson. Thirty-two members of the Faculty took part in the Weeks as participants in the program.

This year the plan was followed of having members of the University faculty act as managers in the several towns. This turned out to be a fortunate decision and to the unremitting efforts of these University men who acted as managers may be largely ascribed the unusual success of the Weeks this year. It seems to be the testimony of participants and townspeople alike that a gratifying success was attained this year, and for this reason most of the towns had satisfactory results financially. Several towns which have had University Weeks before claimed that the program this time was of unusual excellence.

There was some difficulty in booking the towns for the University Weeks of 1914. Owing to the exigencies of the reorganization of the Extension Division, the matter was delayed until so late in the season that many of the towns had made arrangements for similar programs elsewhere. The success of the present season, however, was so great that no difficulty has been experienced in booking towns for June, 1915. Twenty such towns have already been booked. It has become our policy not to go to the larger towns, but to take the towns of from five hundred to two thousand population. The towns this year were charged \$325 apiece for the Week, but it is found that at that rate the University contributes from \$2,500 to \$3,000 toward paying the expenses for twenty-four towns. I recommend, therefore, that the reserve which we carry for this purpose be increased to \$3,000. The financial report follows:

FINANCIAL REPORT ON UNIVERSITY WEEKS, 1914

Receipts		Expenditures	
Bird Island.....	\$ 325.00	Express.....	\$ 20.20
Chaska.....	325.00	Extra office help.....	64.07
Glencoe.....	325.00	Fees of participants.....	2,005.00
Graceville.....	325.00	Hotel, livery and drayage....	2,700.40
Hancock.....	325.00	Postage.....	186.00
Herman.....	325.00	Printing.....	311.40
Le Sueur Center.....	325.00	Expenses of participants, in-	
Long Prairie.....	325.00	cluding railroad fare.....	4,187.52
Melrose.....	325.00	Advertising.....	238.93
Minnesota.....	325.00	Expenses booking "weeks"....	351.48
Monticello.....	325.00	Miscellaneous, including sup-	
New Prague.....	325.00	plies, equipment and ac-	
New Ulm.....	325.00	cessories.....	607.95
Pelican Rapids.....	325.00	Carried over from University	
Perham.....	325.00	Weeks, 1913.....	68.40
Plainview.....	325.00		
St. Charles.....	325.00		
Sacred Heart.....	325.00		
Springfield.....	325.00		
Waseca.....	325.00		
West Concord.....	325.00		
Windom.....	325.00		
	<hr/> 7,150.00		
St. James.....	263.50		
Fergus Falls.....	400.25		
Miscellaneous receipts.....	17.20		
Total.....	<hr/> 7,830.95		
Amount paid in from Uni-			
versity Weeks contingent			
fund.....	2,500.00		
Amount paid in from General			
Reserve.....	410.40		
Totals.....	<hr/> \$10,741.35	Total.....	<hr/> \$ 10,741.35

CORRESPONDENCE COURSES

It has been found that there are many places where not enough students of any one subject can be brought together to form a class. In such cases it is necessary to resort to correspondence courses. Correspondence instruction has not yet been very highly developed at the University of Minnesota. During this first year of our new organization so many pressing problems arose and the work already developed needed so much attention that correspondence instruction did not receive adequate consideration. There is a field for this kind of work, but it is essential to successful correspondence teaching that the lessons be specially prepared with a view to the needs and limitations of the students. The correspondence students that we now have, came to us almost of their own accord. Very little publicity had been given to the fact that we do teaching by correspondence. It is the plan now to develop during the coming year a number of well-planned and well-written courses and then to make the opportunity known far and wide through Minnesota. In some cases it will be possible to combine the correspondence courses with occasional visits from the instructor. This can be done, of course, only where there are enough students in the town taking the same course. The following table will show the work done during the past year:

CORRESPONDENCE STUDENTS, AUGUST 1, 1913, TO AUGUST 1, 1914

Number of students enrolled from August 1, 1913, to August 1, 1914.....	83
Number of students actually carrying on correspondence work, August 1, 1914.....	76
Number who completed courses during the year.....	26
Number of fees refunded and courses canceled.....	4
Number of courses canceled but fee not refunded.....	1
Numbr of instructors giving courses.....	22

EXTENSION DEBATES

Debates given under the direction of the General Extension Division during the year 1913-1914. The following questions were debated:

1. Patronage of Mail Order Houses. *Resolved*, That the consumers of a community should patronize the local merchants and not mail order houses.
2. State Control of Public Utilities. *Resolved*, That Minnesota should have a commission appointed by the governor for the regulation of its public utilities.
3. Woman Suffrage. *Resolved*, That the women of the United States should be given the ballot.
4. Socialism. *Resolved*, That Socialism is preferable to the present order.
5. Restriction of Immigration. *Resolved*, That immigration should be further restricted by means of a literary test.
6. Legislative Initiative and Referendum. *Resolved*, That the voters in Minnesota at the next election should adopt the constitutional amendment providing for the initiative and referendum.

There were six debating squads, each composed of two affirmative and two negative debaters. Thirty-three students took part in these debates. Two squads gave their debates as evening programs for the University Weeks. Altogether these debating squads appeared in fifty-two different places in Minnesota.

MUNICIPAL REFERENCE BUREAU

Organization and Purposes.—During the summer of 1913 the municipal officials of Minnesota became interested in the organization of a state association. A preliminary conference was called for August 21, 1913, and at this meeting the organization of the League of Minnesota Municipalities was perfected.

The delegates represented at the preliminary conference were particularly interested in the establishment of a clearing house for municipal information, and provided for a Bureau of Information in Article VIII of the constitution of the League.

The Director of the General Extension Division, who was elected Secretary-Treasurer of the League, offered the services of the Division

in the organization of the Bureau. This offer the Executive Committee of the League accepted.

The Municipal Reference Bureau is designed to provide, arrange and render readily available for use of the municipal officials of the State, information, public reports, and other data bearing upon the administration of municipal affairs.

Municipal Inquiries.—Fifty-one villages and cities have called upon the Bureau for assistance since October 15, 1913. Below are given some of the inquiries received. They are illustrative of the nature of questions referred to the Bureau.

1. How are plant expenses of joint heating and electric stations apportioned between the two services?
2. Will you give me information on the amount of coal gas produced from a ton of coal; the value of the residuals and the amount and causes of unaccounted gas?
3. What have you in your files on the subject of Municipal pensions?
4. Has our village the right to order in walks along railroad properties not devoted to railroad purposes and assess the costs against the property benefited?
5. What are the provisions in Minnesota charters relating to the rights of municipalities to purchase in the open market?
6. Is an ordinance providing for a license fee of \$40 for automobiles held for hire legal?

The following are the villages and cities that have referred inquiries to the Bureau: Ada, Aurora, Blue Earth, Brainerd, Breckenridge, Browns Valley, Buffalo, Buhl, Caledonia, Chatfield, Detroit, Duluth, Faribault, Farmington, Fergus Falls, Goodhue, Hancock, Hills, International Falls, Kasota, Kasson, Lake City, Little Falls, Long Prairie, Luverne, Madelia, Mahnomen, Milaca, Minneapolis, Minneota, Minnesota Lake, Northfield, Olivia, Red Wing, Redwood Falls, St. Cloud, St. Peter, Sleepy Eye, Spooner, Stillwater, Taylors Falls, Two Harbors, Virginia, Warroad, Watkins, West Concord, Wheaton, White Bear Lake, Willmar, Winsted, and Woodstock.

Reports and Compilations.—Below are given the titles of general reports that have been issued from this office during the year. These reports, containing the practices and experiences of Minnesota villages and cities, have been mimeographed and distributed quite widely to the municipal officials of the state.

1. Special Assessments for Local Improvements in Minnesota Municipalities.
2. Coal Consumption of Municipal Water and Light Plants.
3. Central Heating Station Costs.
4. Hours of Employment and Shifts of Labor in Municipal Water and Electric Plants.
5. Minnesota Public Utility Rates. This bulletin, now in the press, contains the rates of 352 gas, water, and electric utilities. The report

presents also, some of the physical facts pertaining to operation of the units.

The Herman Survey.—In an effort to interest more of the villages and cities of Minnesota in the League of Minnesota Municipalities and to present to the State the constructive purposes of the organization, the executive committee of the League asked this Bureau to conduct a survey of one of the smaller Minnesota municipalities.

Herman, a village of 800, was selected because it appeared to be fairly representative of the smaller towns that are springing up in Minnesota without definite plans for future growth.

A party of ten spent two days in Herman looking over the field and presented their findings at a community gathering on the second day of the survey. These reports have been made with the view of making suggestions applicable to all smaller towns. The reports will be published in a separate bulletin or as a part of the proceedings of the second annual convention of the League of Minnesota Municipalities. Among the subjects investigated are the following: Drainage, water supply, accounting system, streets, fire protection, parks, trees, regulation of public utilities, library facilities, and recreation.

Limitation of the Bureau.—Most of the letters of inquiry received during this year have asked for information or advice that it has been possible to provide through correspondence. A number of letters have been addressed to the Bureau, however, that have called for technical assistance in the construction and operation of public works. Under the present organization of the Bureau these requests can not be taken care of and it is necessary to advise the municipalities to call in consulting engineers.

This raises the question of the extent of service that the University can properly render the municipalities of the state.

An engineering corps could be organized with the view of acting in an advisory capacity in the planning of improvements, letting of contracts, and supervision of construction. This would leave the field of actual design and construction to private engineers and would avoid interference with established business. Under this arrangement municipalities would be offered only preliminary advice with the view of getting the cities started in the right direction. It would not be proper for the engineers to draw up plans and specifications for pay, nor indeed, without pay, for that matter. This service could, I believe, be rendered without entering the field of the practicing engineer. A grave mistake would of course be made if the University should in any way add to its educational functions the functions of the practicing expert.

The League of Minnesota Municipalities has become interested in this problem and is now considering the establishment of an Engineering Bureau. This Bureau would act in more than an advisory capacity; it would take upon itself the technical and professional service necessary in each municipality. Few of the smaller villages and cities are in a position to secure expert assistance of which they are in need, and the establishment of a joint engineering bureau might enable them to

command high grade service. If the plan is adopted, Professor Bass of the Engineering School will probably be called upon to head the Bureau. This and the further fact that the Extension Division is very closely identified with the League may possibly subject the University to some adverse criticism. This matter should be made the subject of very careful consideration. The nature and extent of expert service that the University can render should be clearly defined.

League of Minnesota Municipalities.—The League of Minnesota Municipalities is a coöperative association of the villages and cities of Minnesota. Membership in the League is in the name of the municipality and not an individual. At the first annual convention held in St. Paul, October 16, and 17, 1913, fifty-four villages and cities were represented. On September 1, 1914, the League had a paid-up membership of one hundred and seven.

The League was organized for the purpose of enabling the municipalities to give to each other aid and information on questions of municipal government and administration. To encourage the exchange of ideas and the scientific study of these problems, the League has provided for annual conventions. The arrangements for these meetings and the administration of the League's affairs are taken care of in the offices of the Extension Division. The close connection between the League and the University is shown also by the number of University men attending the League meetings. At the Second Annual Convention of the League held at Mankato October 21 and 22, 1914, six members of the University faculty appeared on the program.

Needs of the Bureau.—Funds have not been available during the current biennium for the work of the Municipal Reference Bureau. This has been a severe handicap. Mr. Gesell's time has been divided between almost full time teaching and the development of the Bureau. To do effective work one's entire time should be devoted to these municipal matters. If this work is to be carried on properly, we should have a trained cataloger to classify and index our material. We should, also, have larger quarters with shelf space and a fund for office supplies and periodicals.

Respectfully submitted,

RICHARD R. PRICE, *Director*

DEPARTMENT OF PHYSICAL EDUCATION FOR MEN

To the President of the University:

SIR: I herewith submit my report for the year 1913-1914, together with some recommendations for the future.

Staff.—The staff of the Department of Physical Education for Men consists of a director, an assistant director, a clerk, a locker attendant, and an instructor in swimming and corrective gymnastics.

Departmental requirements.—1. Physical examination. (a) A physical examination is required of all new matriculants before registration is complete. A student is not allowed to register for the first time until he has reported to the Department of Physical Education and made arrangement to take his physical examination. This examination includes the personal history of the student; inspection of nose, throat, teeth, and the body in general; examination of heart, lungs, eyes, etc.; taking from 20 to 40 measurements, including strength tests, capacity of lungs, etc.; computation of total strength, and advice on health whenever necessary. In addition, each student examined is furnished with the gymnasium manual containing a copy of the record of his physical examination, together with a prescription of corrective exercises, as indicated by his condition.

(b) A physical examination is required of *all* students using the department privileges (showers, pool, towel exchange, gymnasium or training quarters).

(c) A second physical examination is required of all students registered for the regular gymnasium course, at the end of the school year.

(d) During the year, 1,815 physical examinations were taken by the Director of the Department: 1,293 of these were original examinations; 217 were re-examinations of those taking the required course; 181 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 student's scholastic delinquencies were due to impaired health, and 124 were examinations of applicants for admission to the National Guard Battery in the University.

2. Special lecture.—All new matriculants are required to attend a special lecture on sex hygiene before their registration is complete. The lecture was attended by 852 University students and 300 Farm School students. It was given in seven divisions—five on September 25 at 12 o'clock, noon, in different buildings on the campus, by the following staff, all members of the University faculty: Dr. J. C. Litzenberg, Dr. Chas. A. Erdmann, Dr. S. Marx White, Dr. H. L. Williams, and Dr. Earl R. Hare. A second lecture for late matriculants and first lecture delin-

quents was given by Dr. Erdmann on October 6. 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 this lecture is fulfilling its purpose.

3. Disease census.—793 students returned their disease census cards, properly filled out and signed, as required of all new matriculants. 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 for Men.

Required gymnasium course—1. Class enrollment:

Students taking the work over.....	27
Students whose registration was cancelled during the year	33
Specials (Defectives)	35
Freshmen leaders	65
Advanced class leaders (upper class men).....	10
Freshmen not included under above headings.....	158
	<hr/>
Total	328

2. Outline of course. The conducting of regular gymnasium classes as required in the University curriculum, including a course of lectures on personal hygiene to four divisions of the freshman class, containing 75 to 125 men each. These lectures are given twice per week for six weeks, at the end of which time a written examination is given in the subject. The remainder of the year is devoted to regular gymnasium floor work, which includes a course in calisthenics, elementary apparatus drills, marching, running, and athletic games. All students taking this course are required to pass eight efficiency tests, three during the first semester and five during the second. The former are in swimming, vaulting, and apparatus work; the latter in swimming, running, jumping and apparatus work.

3. Efficiency tests—(a) *First semester.* (1) Swimming. One hundred sixty-five students taking the required course passed the test of swimming two lengths of the pool, 120 feet. All students who could not swim were taught to do so. Those that did not learn well enough to meet the requirement were given an *incomplete* in gymnasium, which can be removed only by continuing with their swimming instruction until the requirement is met.

(2) Apparatus qualifications. One hundred eighty-eight 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—the buck, parallel bars, and side horse.

(3) Fence vaulting. One hundred sixty-seven students passed the qualification in vaulting a bar at the height of their shoulders without touching in going over.

(b) *Second semester.* (1) Half-mile run in 2 minutes 55 seconds: 193 students met the requirement.

(2) Running high jump, 4 feet: 184 students met the requirement.

(3) 100-yards dash, 11 3-5 seconds: 186 students met the requirement.

(4) Bar cuts, a series of exercises requiring muscular strength and coordination: 193 students met the requirement.

(5) Swimming, rescuing and restoring the apparently drowned: 163 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.

Intramural sports.—1. Basket ball. Three basket-ball tournaments were held during the winter—inter-class, inter-college, and inter-fraternity. Team trophies were awarded the winners in the latter two. It is estimated that a total of more than 200 different students participated in these tournaments. In the inter-class series a total of 24 teams competed, in the inter-college 7, and in the inter-fraternity 20. The college championship was won by the Laws. The inter-fraternity championship was won by Phi Kappa Psi.

2. Base ball. As formerly, the inter-fraternity series was organized and supervised by the department. A total of 20 teams competed and every game of the schedule was played. In the inter-class series very little interest was shown this year. No college series was attempted. The inter-fraternity championship was won by Phi Delta Theta.

3. Swimming. An inter-college swimming contest was held in April. The contest was successful in every way and several local records were established. Six colleges were represented and the meet was won by the College of Engineering, the Academics taking second place, and the Laws third.

Miscellaneous sports and physical activities.—1. Soccer football. Some progress has been made in soccer. A regular team was organized and several games played. The first inter-collegiate game of soccer played in the State occurred at Northfield, on November 8, between St. Olaf College and the University of Minnesota. It is worthy of note that the members of the team defrayed their own expenses to Northfield and return. A squad of twenty or thirty men tried out for the team, and showed much enthusiasm over this sport. Soccer appears to have a future not only at the University of Minnesota but in several colleges of the State. We expect that it will soon be recognized as one of our regular games in both intramural and inter-collegiate contests.

2. Gymnastics. (a) Elementary: Forty-five students of the Freshman Leaders' Corps participated in the annual meet of the Northwestern Gymnastic Society held in the University Armory on April 4, 1914. The exercises for beginners correspond to those given our freshmen leaders, and consequently we have always had a large entry.

(b) Intermediate. The above mentioned gymnastic society, which holds competition in three grades, also has an intermediate division, but owing to a scarcity of experienced gymnastic material we were not able to enter any intermediate gymnasts.

(c) Advanced. Our gymnastic material for this grade also was

scarce this year, and for that reason we could enter only three men. The men representing us in this grade usually represent Minnesota in the Western Intercollegiate Meet but since we had such a small number of men we did not enter a team. We can safely report that much ground has been gained in this form of sport, in spite of the fact that we did not enter a team in the Western Intercollegiate Meet. The Northwestern Gymnastic Society mentioned above is an organization with a membership of two or three hundred men from various colleges, schools, local gymnasiums, Y. M. C. A.'s, settlement houses, etc. At the last meet teams were entered from the following institutions: State School of Agriculture, Minneapolis Sokols (Bohemian Gymnastic Club), Carleton College, Hamline University, Hope Chapel, St. John's University, St. Paul Sokols, Macalester College, St. Cloud Catholic Club, St. Olaf College, Pillsbury Athletic Club, Red Wing Y. M. C. A., South High School, Turnverein, St. Paul (German), Minneapolis Y. M. C. A., University of Minnesota. This organization is in a considerable measure under the control of the Department of Physical Education in the University of Minnesota, and the director has been president of the society since its formation five years ago.

3. Wrestling. Minnesota sent a wrestling team to Chicago on April 4 to compete in the Western Intercollegiate Wrestling Meet. Our wrestling team was not as strong as it has been in former years, but this was not due to lack of interest in this form of sport.

4. Hand ball. An open tournament was held during the latter part of the year for the championship of the University in both singles and doubles. Thirty-five men competed and the tournament was a decided success.

5. Sigma Delta Psi (Honorary Athletic Fraternity). Three men have met the requirements for admission to junior grade in Sigma Delta Psi, and two of the four lack but one qualification for admission to senior grade. A total of 368 qualifications have been made to date in the various events as per requirements below. Of this number 191 are senior and the remainder junior. The fraternity now has fourteen chapters. By recent vote of the chapters six of the standard requirements have been modified so that requirements for admission are now as follows:

100-yard dash: Senior, $11\frac{3}{4}$ seconds; junior, 12 seconds.

220-yard low hurdles: Senior, 31 seconds (all standing); junior, 33 seconds (all standing).

Pole vault: Senior, 8 feet 6 inches; junior, 7 feet 9 inches.

Throwing baseball (on fly): Senior, 250 feet; junior, 200 feet.

Punting football (on fly): Senior, 120 feet; junior, 90 feet.

Two-mile run: Senior, 12 minutes 15 seconds; junior, 14 minutes.

10-mile walk: Senior, 2 hours 30 minutes; junior, 3 hours.

Putting shot: Senior, 30 feet for man of 160 pounds weight.

Graded.

Putting shot: Junior, 25 feet for man of 160 pounds weight.

Graded.

Broad jump: Senior, 17 feet; junior, 15 feet.

High jump: Senior, 5 feet; junior, 4 feet 6 inches.

Swimming (not against time): Senior, 100 yards; junior, 50 yards.

Tumbling (for seniors only): Front handspring—hand stand for 10 seconds.

6. Annual freshman-sophomore class contests. The department supervised the class contest as in former years. The sophomores won the event by a score of 25 to 5. Interest in the event on the part of both classes is diminishing year by year, and on that account it seems advisable to discontinue it. It is so recommended.

7. Swimming. This form of sport, which had been given only general attention, has this year been organized on an intramural basis, and promises much.

8. Gymnastic dancing. Classes were organized in this line of work but were soon discontinued on account of the pressure of other work. Dancing will be taken up more extensively in the future because it has proved very popular.

9. Leaders' classes in gymnastics. The department has an organized Leaders' Corps of about 65 students for class leadership. Such students as show a superior aptness for gymnastic work are organized into classes and given special instruction to qualify for squad leadership in apparatus work. At the beginning of their sophomore year these leaders are allowed to register for advanced leadership for teaching classes. Instruction is given in intermediate gymnastics, class tactics, calisthenic drills, and apparatus work, and the men are required to lead all classes and to supervise the freshmen leaders. The Advanced Leaders' Corps has from 10 to 20 members each year.

Special features of physical education work—1. First aid, consultation, and advice on health. In addition to the regular examination a considerable number of students have taken advantage of 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.

2. National Collegiate Basket Ball rules. The Director is western member of the Rules Committee and compiles all collegiate basket-ball statistics in his territory of 10 states besides collecting photos of teams, lists of names of captains, managers, and coaches, and writing up the Middle West and the Conference season for publication in the Collegiate Guide.

3. Western Intercollegiate Basket Ball Association. The Director of the Department is secretary of this association and, in such capacity, is closely connected with the interests of basket ball in the large conference institutions. This association is organized for the best interests of basket ball and is directly responsible for the high plane upon which this sport has been placed in the Middle West.

4. The Director of the Department is president of a state organization in basket ball, which is patterned after the Western Association, and which has for its object the interpretation of rules, the making of sched-

ules and providing of competent officials for college games. This organization was created by this department and is still under its guidance.

Features added during the year—1. Towel exchange. During the year a towel exchange has been established in the locker room for the benefit of students who care to make use of this privilege. Towels are furnished at the rate of 2½ cents each and may be kept out not longer than one week. This feature was a marked success. Our total receipts for the year were nearly \$400, while our expenses, which included rental for towels from a local laundry and \$10 per month for a man to care for the exchange, were about \$225. No immediate cash charges are made, but at the end of the year a charge is made against the student's general deposit fund. This enables all to get towels at any time and has no doubt been an important factor in the success of this necessary hygienic measure.

2. The year marked the beginning of grouping the defectives for special instruction, individually and in classes. This instruction is given from 8 to 10 a.m. daily. All students taking this course are required to attend three times a week. Better results could be accomplished for these cases with a wider range of hours for instruction, and with additional help we expect to do more for them in the future.

3. Special classes in swimming. (a) Intermediate life saving—Special classes were organized in life saving, including carrying of objects in the water, recovering submerged bodies, the use of life saving strokes, etc.

(b) Advanced life saving. Students taking this work must qualify in all the tests given in intermediate life saving, and then are taught *advanced life saving*, such as carrying a person simulating unconsciousness, undressing in the water over one's depth, breaking holds, etc.

Recommendations for the future—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 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 of 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 caretaker and custodian of tennis courts be appointed; (d) that an instructor of intramural sports be appointed;

(e) that two baseball fields be laid out on the newly-graded parade ground; (f) that additional medical examiners be appointed.

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 per week throughout the year (the present scheme includes only freshmen Academic, Pre-Legal, Pre-Medic, and Analytical Chemists).

6. That sophomores, in all colleges and schools in the University, be required to pursue the course in Physical Education, twice per week, indoors from December 1 to March 1, and from the opening of the autumn semester until December 1, to participate in some form of prescribed outdoor exercise, twice per 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 specified time, and report back to the department for verification.

8. That a physical examination be required of each student in the University Farm School next year, and in following years of each student of the incoming class (see last year's report for explanation).

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 overworked 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 submit herewith my report for the year 1913-1914.

The department has worked for the same general aim as last year—to promote the health of the women students. It has broadened the scope of its activities by the addition of two new courses in Hygiene, one new course in Physical Training, and by various devices for keeping in closer touch with the health and habits of the students.

Physical examinations and consultations.—1. During registration week 377 newly-entering students were examined; these together with 34 late entrants made a total of 411 entrance examinations.

2. One hundred thirteen newly-entering women students at the School of Agriculture were examined shortly after entrance and notes of their physical condition were left with the gymnasium instructor. Two half days were given to this work.

3. Examination of all the women students at the Schools of Agriculture at Morris and Crookston were made in November. In addition, four Hygiene talks were given at Morris and three at Crookston.

4. Re-examinations of weight and lung capacity were made in the spring for all students in the Physical Training classes.

5. All applicants for a reduction of program on the basis of ill-health were examined or interviewed.

6. Three hundred thirty-six sophomores and juniors were called in during the year for interviews. The task of interviewing *all* upper class students has proved too large for the present staff. This is to be regretted, since the personal consultation has proved an important means of finding the student who needs advice.

7. The number of voluntary consultations at regular office hours has gradually increased.

8. A system of keeping daily record of health habits has been installed this year in the Physical Training classes and has served a valuable purpose in bringing to light unhygienic tendencies which would otherwise have been undiscovered. In personal consultation these tendencies have been discussed and their correction attempted. Five hundred nine such consultations have been had, reaching 227 girls.

9. The nurse at Sanford Hall has proved a valuable aid in caring for the health of the girls. She treated an average of 100 cases a month during the first semester. She also assisted this department in making physical examinations in the autumn and spring and in carrying on sanitary inspection of the boarding houses. In general the boarding houses have proved satisfactory as to the essentials of light, air, plumbing, and heating.

10. I would call attention to the fact that this department is unable to keep informed concerning cases of illness among students in boarding houses. A student who thinks she needs medical attention is likely to manage the matter without any preliminary call on the department, and the physician whom she visits is very unlikely to report the case. An effort was made this year to induce the boarding house keepers to report such cases. They were given blank forms and were asked to fill one in and mail it to me in case of illness so serious that a physician had to be called; and they were told that this action would bring to their aid the service of the nurse at Sanford Hall; but the result was practically nothing. The situation emphasizes the need of establishing some better system of supervision than we now have. In my judgment such a system, in order to arouse the coöperation of the students, should include medical treatment if desired, so as to afford an incentive to them for reporting ill-health.

Courses in Hygiene.—A course of twelve lectures on the most essential aspects of Personal Hygiene was given to all freshmen, divided into three sections; it was followed by examination. In view of the protest of many people against public instruction which takes into consideration the reproductive function it is interesting to note that in answer to the question appended to the examination, "Which of the subjects in this course have you found the most helpful?" more than half the girls mentioned some phase of the subject of reproduction. (Two lectures on this subject were given out of a course of twelve lectures.)

2. A credit-course in Personal Hygiene was offered for the first time in the autumn semester, and had an enrollment of nine students.

3. A credit course in the Hygiene of the Family was offered for the first time in the spring semester, and had an enrollment of 14 students.

4. Five special lectures were given to the senior women at the request of the College of Education, and three to the School of Nurses at the request of its superintendent.

Exercise.—1. Required work. Work was nominally required of all freshman girls, but on account of our limited space exemptions were made on the same basis as last year, i.e., all girls who were found to be in first-class condition were excused. One hundred seventy-two girls were held for work at the Armory and Northrop Field, and 29 at the Agricultural College. The Assignment Committee made gymnasium class assignments this year at the same time that assignment to other classes was made; in this way was prevented the exclusion of a large number of girls from gymnasium work on account of program conflicts.

2. Elective work. Elective classes were organized in gymnastics, dancing, basket ball, tennis, horseback riding, and skating.

A new class in Advanced Physical Training was offered and had an enrollment of 38 students. This class received one and one-half credits per semester; it met three times a week and, in addition, each member was required to pass in careful notes on selected reading. When the new gymnasium is finished a modern equipment will permit an orderly progression in gymnastic work from year to year.

The course in Social Dancing was an attempt to help solve the problem of the student who comes to the University without social connections and finds herself left out of the general social life because she does not know how to dance. At this time when the forms of social dancing are so unstable and often in bad taste it is hoped that this training will help the student to standardize her judgment as to what is in best taste.

The enrollment in Basket Ball increased from 48 last year to 77 this year. In Swimming the enrollment increased from 93 last year to 136 this year, but the regularity of attendance fell off from an average of 28 each Thursday last year to 24 this year. The reason for this decrease in regularity may lie in the fact that a group of enthusiastic swimmers who were with us last year were graduated in the spring.

The total enrollment in elective work increased from approximately 200 last year to 350 this year.

3. Contests. The Women's Athletic Association, working in close coöperation with this department, has conducted two tennis tournaments, a basket-ball tournament, and a swimming meet. In addition the department has conducted a gymnastic contest for the four freshman gymnastic classes. Some particulars of these contests are published in the report of the Committee on Intramural Sports.

The trophies in all cases were symbolic and without commercial value: numerals, trophy cups, and tiny pins. In the spring the Women's Athletic Association presented for the first time its new trophy, the University seal on felt. The association has adopted this for its highest emblem, and has decided that it shall stand for all-round interest in physical ability, good sportsmanship, good posture, and good health.

Statistics. The number of observations on which these figures are based is small, but the results are suggestive.

Lung Capacity

A. Girls who have had physical training during the winter.

159 gained an average of 20 cubic inches

14 lost an average of 5 cubic inches

B. Girls who have *not* had this work

34 gained an average of 10 cubic inches

19 lost an average of 5 cubic inches

Comparative health in autumn and spring

(These records are taken from the reports which the girls made out in the spring, and show their own estimate of their condition.)

Freshman class, spring 1914

Health the same as in the autumn..... 190

Health better than in the autumn..... 68

Health less good than in the autumn..... 14

Sophomore class, spring 1914

Health the same as in the autumn..... 76

Health better than in the autumn..... 46

Health less good than in the autumn..... 24

Officers employed.—The staff of this department has consisted of a director, one instructor, a secretary and pianist, an assistant who gave six hours a week in teaching, and an auxiliary staff of three women physicians who assisted in the physical examinations of newly-entering students.

Building and equipment.—During the year the department has coöperated with the State Architect in planning a new gymnasium. The plans provide for two large rooms for class exercise, a smaller room for small groups doing special corrective work, a natatorium, a lecture room to seat 150 students for instruction in Hygiene, two large dressing rooms, each containing 80 dressing booths, a shower room containing 60 shower baths, all operated from a central operating room, fourteen additional showers in connection with the natatorium, a rest room, a room for the Women's Athletic Association, and offices and examination rooms.

Recommendations.—1. An identical requirement in physical training for the women of all colleges which shall comprise, after the completion of the new gymnasium, one year of gymnasium work satisfactorily completed and the ability to swim at the end of the sophomore year.

2. That with the opening of the new gymnasium three additional instructors be employed, and that, if possible, one of them be a graduate in medicine in order that the scope of individual health consultations may be broadened so as to include all upper class women. This person should also be thoroughly trained in physical training, and would presumably take charge of the special corrective work. With a staff of this size a large range of electives could be offered, and it is anticipated that a very large proportion of the women students can be interested to participate in some form of healthful exercise.

3. That the work in health supervision for women for the University High School and the School of Agriculture, including physical examination and follow-up work and organized physical activity be placed under the direction of this department. At present the University High School is neglected and the School of Agriculture is isolated. A unification of all the work in physical education for the young women of the University would make it possible to utilize the staff and the gymnasium equipment on both campuses to the best advantage. This recommendation has the hearty support of the Dean of the Department of Agriculture and the Principal of the University High School.

4. That the land contiguous to the new gymnasium be graded and devoted to a playground, and be walled in so as to protect the classes from the gaze of the passer-by. I would recommend that this enclosure should extend to within 20 feet of the Library, the Pathology Building, and the Observatory, and should border on the automobile drive.

5. As a result of my observation made during visits at Morris and Crookston I would recommend the appointment of a trained nurse at each school to assist the present staff in carrying out the work of caring for the health of both the young women and the young men.

6. Inquiries are received each year in regard to our facilities for training teachers in physical education. At present it is necessary to

recommend schools outside the state for that purpose. I would like to call your attention to the opportunity which we shall have with the completion of the new gymnasium for organizing a normal-training department, carrying on the basic scientific and educational training in the departments which are equipped for giving these courses, and using the equipment and staff of the new gymnasium for the theoretical and practical courses in exercise and the supervision of practice teaching. After the satisfactory completion of the work of organizing the new gymnasium in its relation to the general student body, I believe that the next step may well be the organizing of a normal course in physical education.

Respectfully submitted,

J. ANNA NORRIS, *Director*

COMMITTEE ON PHYSICAL EDUCATION AND INTRAMURAL SPORTS

To the President of the University:

SIR: I have the honor to submit a report on the work of the Committee on Physical Education and Intramural Sports. Reports on Physical Education for Men and Women will be submitted separately by Doctors Cooke and Norris. This report will deal only with intramural sports. The time involved is from February 4, 1914, at which time I was appointed chairman of the committee.

Basket ball.—More than 200 students participated. A series of games was played first to determine the class championship of each college. From these class teams, college teams were selected for an inter-college series. This developed into a fine contest which resulted in a tie, with three teams, the Agricultural College, the Engineers and the Laws, each having lost but one game. In the play-off, the Laws defeated the Agricultural team by a small margin and then won from the Engineers in a very well contested game. The championship game was played April 2 before a large crowd. Interest was added by the presence of the President, Dean Woods, Dean Vance, and members of the Faculty; and the enjoyment of the evening was increased by music by the University band. Jerseys in University colors were presented to the members of the winning Law team.

Swimming.—Forty men competed in an Inter-College meet. A special effort was made to increase interest in swimming. Probably the largest factor toward this result was the donation of a beautiful silver cup by the University Deans. This cup is to be held for one year by the college winning it and is to become the permanent property of the college winning it three times in succession. The cup was won at the meet May 2 by the team representing the College of Engineering. In this meet, three new records were established—the record for the plunge for distance, held by Drake, was increased from 46 to 49 feet by H. E. Harbo of the College of Science, Literature, and the Arts; the record for the quarter-mile swim, held by Tussler, was reduced from 7 minutes 48 $\frac{3}{4}$ seconds to 7 minutes and 43 seconds, by T. F. Ellerbe; a new record for the 60-foot under-water swim for time was set by T. F. Ellerbe at 12 seconds. The college relay race, four men on a team each swimming 20 yards, was won by Science, Literature, and the Arts, in 1:51 $\frac{1}{2}$; Engineers second in 1:55; Laws third in 2:05 $\frac{3}{4}$. The individual-point winner was T. F. Ellerbe, of the School of Mines, swimming with the Engineering team.

Handball.—Competition in handball was held on the All-University plan, with forty men entered. The doubles championship was won by Sam Aronson and L. R. Peterson. Singles championship by Sam Aronson. A challenge game in doubles was played by the champions against

E. B. Pierce and Jay Poucher, the game being won by the challenging team. The plan of conducting the handball tournament for the coming season will probably be changed from All-University to Inter-College.

Baseball.—Inter-Class baseball was a failure, as not more than five or six games were played of the entire series. It is evident that there is far more college than class enthusiasm and loyalty on the campus. Twenty fraternities competed in basket ball and baseball, under the supervision of Dr. Cooke.

Tennis.—Tennis at the University has not as yet come under the supervision of the committee. A tournament is played in the spring and fall to determine the "singles" and "doubles" champions. In the tournament now in progress, there are 64 men entered in singles and 27 pairs in doubles. These tournaments are under the supervision of the University Tennis Association. The committee has recently provided \$70 for back stops for four new courts at the Agricultural College.

Soccer football.—The Department of Physical Education for Men has introduced "soccer" football. Permanent iron goals are in place on the Parade Grounds. Games are played frequently by teams from gymnasium classes. Two or three games have been played with teams from outside colleges. The first inter-collegiate game in the State was played against St. Olaf College, November 8, 1913.

The Department of Physical Education for Women reports as follows on Intramural Sports:

Tennis tournaments.—The Women's Athletic Association managed two tournaments, one in the autumn with 30 girls participating, and one in the spring with 30 to 40 girls participating. In the present autumn tournament, between 50 and 60 girls are competing.

Basketball tournament.—The Women's Athletic Association conducted the annual basketball tournament. The final game was preceded by six preliminary games covering a period of six weeks, in which each class team played every other class team.

Swimming meet.—A girls' swimming meet was held under the auspices of the Women's Athletic Association on May 7, 1914. In this meet the unusual record of three strokes was made in the contest for the fewest strokes for the entire length of the tank.

Gymnastic contest.—This contest was held under the management of the Department of Physical Education for Women on April 7, 1914. Four classes of freshmen who had been taking required work during the winter participated.

Work of the Committee in promoting intramural sports.—Meetings which have been attended by students and faculty members have been held to discuss the needs of the student body. The consensus of opinion is that we need more room for tennis, better care of the courts we already have, outdoor courts for handball, ice rinks for those who wish to skate, and supervision of all grounds to prevent their use by people not members of the University, and unreasonable use by members of the University. To be enabled to act more wisely in these matters, members of the committee have met with experts in the game of tennis and

experts in the conditioning and maintenance of courts. The findings have been that tennis has advanced to such importance here that the services of a thoroly competent man in the care of courts is necessary.

In baseball the committee has provided permanent back stops—laid out on two good diamonds on the parade ground—provided baseballs, etc. To facilitate the handling of class and college games, all classes have been requested to elect an athletic manager. An effort has also been made to establish official colors for each college, but so many complications have arisen that the idea seems impracticable for the present.

Respectfully submitted,

OTTO S. ZELNER,

Chairman Committee on Intramural Sports

THE MILITARY DEPARTMENT

To the President of the University:

SIR: I herewith submit by report for the University year, 1913-14.

Enrollment.—The number of cadets under instruction during the year was as follows:

College of Science, Literature, and the Arts.....	330
College of Engineering	173
College of Chemistry	29
College of Agriculture	130
School of Agriculture	410
Total	1,072

Encampment.—The annual encampment of the University was held at Fort Snelling, Minnesota, from September 9 to 16, 1913. The attendance was 238. The School of Agriculture encampment, from October 1 to 6, was attended by 120 cadets. Field firing by companies was added to the course followed in previous years. The usual instruction in guard duty, advance and rear guards, outposts, rifle firing, and minor tactics was also given.

School year.—An attempt was made to relieve the overcrowding of the Armory during the indoor season by dividing the afternoon between the two battalions. This resulted in an actual loss of one hour per week for each battalion, but was undoubtedly better than attempting to have drill for the full period under impossible conditions. The sophomores were also organized into separate companies and their instruction was confined almost entirely to lectures on advanced military subjects, followed by a written examination. The results were very satisfactory.

Target practice.—Much attention was given to this subject as in former years. During the year 20 qualified as expert riflemen, 35 as sharpshooters, and 75 as marksmen. These totals are again greater than those of all other colleges in the United States taken collectively.

Inspection.—The annual inspection for the War Department was made by Captain Laubauch, General Staff U. S. Army, on May 11. The weather was ideal and the Cadet Corps made a fine showing. Service and inspection on the campus in the morning were followed by a tactical exercise at Fort Snelling in the afternoon. Of this exercise the inspector said in his report:

“A problem was participated in by the corps of both the College of St. Thomas and of the University of Minnesota. The former took up a defensive position, supported by two field pieces, under the conditions

of the problem, and covered the front properly by numerous and well-conducted patrols and advanced posts. The Minnesota regiment, knowing nothing of the position, advanced towards it from a point some two miles distant, with proper advance guard and necessary patrols. The position was reconnoitered thoroly and well developed before a general attack was made. This consisted of a frontal attack with a strong enveloping movement on St. Thomas' right flank. The whole exercise was carried out in a consistent and orderly manner. The cadet colonel handled his regiment well, considering his opportunities. Some of his movements could be criticised, but the conduct of the whole was a remarkably efficient college display. The work of the battalions and several companies was very creditable, showing that all have a good understanding of the matter, and as subalterns, these students would be efficient and desirable officers. It is not deemed necessary to enter upon a criticism of the exercises, beyond saying that while the action of this regiment from the standpoint of trained troops left much to be desired, from the standpoint of what may be expected from a student regiment, it was very commendable, and much better than the average seen in our summer militia camps."

Classification and honor graduate.—As a result of the inspector's excellent report the University of Minnesota, for the first time in its history has achieved the highest military honor that can come to it, being named by the War Department as one of the ten Distinguished Colleges of the country and so announced in the official bulletins. This classification entitles the University to name one member of its graduating class as Honor Graduate who is entitled to a commission in the regular army without examination should a vacancy occur during the year. Mr. Theron G. Methven, Academic, '14, a cadet captain, has been reported to the War Department as Honor Graduate.

National Guard battery.—During the year, by special arrangement with the State authorities, a National Guard battery has been organized on the campus, the enlisted personnel being composed exclusively of students. The Board of Regents has authorized the use of the Armory under the supervision of the Commandant and the granting of military credits for service in this organization. The organization is well under way and promises to become the finest National Guard battery in the United States.

Recommendations.—The need of an adequate armory is so great as completely to overshadow all other issues. Other universities throughout the country are building fine modern armories and Minnesota can not hope to remain in the Distinguished class unless some steps are taken in this matter before long. We are having a demonstration at present of the fact that military service is one of the obligations of citizenship that may have to be required by any country wishing to preserve its institutions and ideals. No other country relies so much upon schools

THE GEOLOGICAL SURVEY

To the President of the University:

SIR: I herewith submit my report as Director for 1913-1914.

Organization and coöperation.—The Minnesota Geological Survey was allotted \$13,000 for the biennial period begun August 1, 1913. The arrangement for coöperation with the United States Geological Survey, as outlined in the report of the Director for 1911-1912, and published in the President's report of the University of Minnesota for that year, was renewed for the year ended August 1, 1914. Arrangements have been made also for coöperation during the year ending August 1, 1915. According to this plan each organization shares equally the cost of field work and the publication of reports. The responsibility and credit for these reports are shared equally by the two bureaus and the joint reports are so announced on their title pages. Parts of editions are announced as Minnesota publications in coöperation with the Federal Survey, and parts are announced as United States Geological Survey publications in coöperation with the University. This plan has many advantages, for the fund available is increased, and moreover, the State Geological Survey has the advantage of the criticism of specialists and map and manuscript editors of the Federal Survey. The arrangement is to be terminated when unsatisfactory to either bureau, and when desirable publications may be issued independently by the State.

The Minnesota Geological Survey is coöperating also with the Bureau of Mines, Washington, D. C., in the investigation of peats in Minnesota, and coöperation has been continued with the School of Mines Experiment Station and with the School of Chemistry of the University of Minnesota in the matter of burning tests of clay and other tests. Valuable assistance has been given this Survey, also, by Professor F. J. Alway and other members of the Division of Soils of the Department of Agriculture, and duplicate samples of peats collected by the Survey have been supplied to the Bureau of Soils. Mr. U. G. Purssell, Section Director of the United States Weather Bureau at Minneapolis, assisted by Mr. C. J. Posey, has generously prepared for the Survey a paper on the weather of Minnesota, showing temperature, rainfall, dates of early and killing frosts, etc.

Topographic work.—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. With few exceptions Minnesota has a smaller percentage of its area topographically surveyed than other states in the Union. It is vitally important that the appropriation for this work be restored.

Field work.—During the past field season, from about June 15 to

October 15, 1914, the following work was carried on in coöperation with the United States Geological Survey: (1) An investigation of the surface formations of Minnesota with special reference to the soils. If the weather is favorable, permitting a long season's work without snow, this work will be completed in 1914. (2) An investigation of the occurrence and uses of the clays of Minnesota; preliminary bulletin in press; final bulletin transmitted to the editor. (3) An investigation of the building and ornamental stones of Minnesota; final bulletin transmitted to the editor. (4) An investigation of the geology and ore deposits of the Cuyuna Range; field work in progress. (5) The geology of the area in the vicinity of Duluth was investigated and portions of the area between Duluth and Pigeon Point, particularly those portions that contain magnetic iron ores. (6) An investigation of the peat and marl resources of Minnesota, in coöperation with the United States Geological Survey and the United States Bureau of Mines; field work begun July 14, 1914. (7) A report on soils and weather conditions of Minnesota (not published in coöperation with the United States Geological Survey); in press. (8) A relief model of an area including the Twin Cities (in preparation).

Other services of the Survey.—In addition to the more comprehensive investigations outlined above, many inquiries were received concerning the geological structure in various places by those who contemplated drilling for water or ore, and numerous materials forwarded from various localities within the State were examined to determine their availability for various economic purposes. It is gratifying to note that requests for information of this kind are increasing. It is hoped that the people of the State will make the fullest use of this service of the State Geological Survey.

Delays in issuing reports.—It is a matter of regret that, owing to conditions not all of which we can control, the Survey has not been able to issue more reports and to issue them more promptly. Comprehensive investigations require time, and the study and assimilation of data and the writing of a full report is a slow and tedious process. These reports, besides the text, generally include many text figures and other illustrations, besides colored maps. The editing, assembling, and particularly the engraving of colored maps involves much slow and painstaking work. Moreover, some of the final reports of certain investigations will doubtless have to await their turn with editors, map critics, and engravers. To prevent loss by delaying the use of information of economic value, we have undertaken to issue fairly comprehensive preliminary reports independent of other bureaus coöperating. At present there are in press a preliminary bulletin treating the occurrence and uses of clays in Minnesota, and a colored map of the northwestern quarter of the State, showing its surface formations with special reference to soils.

Detailed report of surveys.—1. The investigation of the surface formations of Minnesota with special reference to soils has been continued with Mr. Frank Leverett of the United States Geological Survey in charge. In this work he has been assisted in the field by Dr. F. W. Sarde-son. The results of his investigation for the northwestern quarter of the

State are now in press and the field work for the remainder of the State should be completed this year unless an early snow falls or conditions are otherwise unfavorable. This investigation will without doubt be of great aid to farmers and particularly to colonists, and the results will be available to the Division of Soils for their more detailed investigations. Mr. Leverett prepared also, to accompany the map of the northwest quarter of Minnesota, a bulletin on the surface formations with special reference to the soils of Minnesota. Mr. U. G. Purssell has generously prepared, without cost to the State, a chapter for this bulletin on the climate and weather conditions of Minnesota.

2. Mr. F. F. Grout completed a final report on the occurrence and uses of clays in Minnesota. His field season was spent principally in a study of the geology of the Duluth quadrangle. A region (about 50 square miles) has been mapped on a large scale, including some areas west of the quadrangle. The investigation has resulted in several discoveries having important bearing on fundamental stratigraphic problems. The petrographic and economic interests in the area lie mainly in the great mass of gabbro, the southwest point of which is Duluth. The gabbro is used as building stone and crushed stone and as an abrasive. Near its lower side magnetite is concentrated in places. To gain an idea of the broader relations of this gabbro mass, a field trip was made to the other end of its outcrop, about one hundred miles away, north of Grand Marais. Three weeks were spent on the geology of Twp. 64 N., Range 1 W., and Ranges 1 and 2, E. A side trip was made also to Pigeon Point.

3. Mr. Oliver Bowles completed his report on the investigation of the building and ornamental stones of Minnesota. In the spring of 1914 he received an appointment from the United States Bureau of Mines as quarry technologist, and to accept this position he resigned his position here at the University. In him the Survey loses an efficient member of its staff.

4. Mr. A. W. Johnston was engaged from July 13 to September 11 in the examination of mine records and underground workings of the Cuyuna Range and in the mapping of its surface geology. During the latter part of the season Mr. E. C. Hardner of the United States Geological Survey coöperated in this work. The investigations in this important field are being pushed vigorously, but the quantity of data obtained is enormous and the work on this district will not be finished this year.

5. Mr. E. K. Soper was engaged from July 6 to September 16 investigating the peat and marl deposits of Minnesota. In this work he was associated with Mr. C. A. Davis of the United States Bureau of Mines. From July 6 to 14 was spent in preliminary work in the office preparatory to beginning the field work. From July 14 to September 10 he was engaged in field work in the northeastern counties of the State and in the study of materials collected. Detailed investigations of peat and marl deposits were made in St. Louis, Itasca, Aitkin, Clearwater, Koochiching, Carlton, Crow Wing, Beltrami, and Sherburne counties. Over 250 test

holes were put down in peat beds and 54 samples of peat were collected and sent to the United States Bureau of Mines, Washington, D. C., for analysis. During the last week in the field a number of marl deposits were located and nine samples were collected and sent in to the office of the Survey in Minneapolis for analysis. From September 10 to 16 he was engaged in studying the peat plant at Alfred, Ontario, and marl and cement factories in Michigan and Wisconsin, in order to furnish a basis of comparison of the Minnesota peats and marls with these deposits which are being successfully utilized at these localities. Samples of the raw and unfinished products of these factories were collected and sent to Minneapolis.

7. Mr. C. J. Posey spent the month of July assisting Mr. U. G. Fursell in preparing climatic charts to accompany the report of Mr. Frank Leverett on the soils and weather conditions of Minnesota. This work involved the inspection of data from about one hundred fifty Volunteer Weather Observers' Stations in the State, some of the records extending back to 1886.

Respectfully submitted,

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 during the year 1913-1914.

Field work.—The field seasons of 1913 and 1914 were spent in detailed study of the swamps of the State, in pursuance of the plan laid down by the reconnaissance work of 1911 and 1912. With the view of obtaining a wide range of evidence as to swamp development, and the methods of reclamation and utilization, the summer of 1913 was spent by Professor Bergman and Messrs. Stallard and Folsom in typical swamp regions of the State. These were Ellsworth township in Meeker County; Star Lake and Dead Lake townships in Otter Tail 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. As a result of this work, a representative area of the peat-bog region was chosen for more intensive investigation in 1914. This was the region west and north of Leech Lake in Hubbard and Cass counties, in the survey of which Professor Bergman and Mr. Stallard spent the entire field season.

The primary objects of the survey of the swamp regions have been to discover the general principles which underlie the origin and formation of the various kinds of peat, and to formulate a rapid method for the accurate classification of the swamp lands with reference to their readiest utilization. For this purpose, detailed quadrat charts have been plotted for all the plant societies which make up the life history of a given swamp. These have been correlated with the controlling factors of water, humidity, temperature, light and acid content, all of which have been measured by means of instruments. The result has been to establish the existence of "indicator" plants and societies which serve as an exact index of the varying degrees of soil acidity, and hence make it possible to classify swamps readily on the basis of optimum reclamation and utilization. In addition, all the areas studied have been mapped on a large scale, section by section. These maps serve as a graphic guide to the conditions of the swamp and the plant societies present, and in consequence furnish an indispensable basis for reclamation projects.

From the standpoint of agriculture and forestry, the problem of the extensive peat bogs is one of soil acidity and aeration. The precise physiological action of these factors and their relative importance is not yet understood. Accordingly quantitative control experiments are now being carried on in the botanical greenhouses in the hope of throwing light upon this matter, and of enabling us to improve existing methods of reclamation. Apart from the more practical aspects of the work of the Survey are the fundamental scientific questions which have to do with the origin of peat bogs, their relation to the ice age, their value

as a record of past and present changes of climate, their natural reclamation by grassland or forest, etc. Furthermore, the Survey renders a service of much value by adding to our knowledge of native useful and harmful plants, and by increasing the efficiency of the University Herbarium.

Publications.—The publications of the Survey for 1913-14 are: (1) *Guide to Spring Flowers*, third edition, enlarged and illustrated; (2) *Guide to Autumn Flowers, Field and Garden*, illustrated; (3) *Minnesota Botanical Studies*, Vol. 4, Part 4. During this period, the editions of *Minnesota Mushrooms*, *Guide to Trees and Shrubs*, and *Guide to Ferns and Fern Allies* have been exhausted. The editions of *Minnesota Trees and Shrubs* and of the guides to *Spring Flowers* and *Autumn Flowers* will likewise be exhausted during the present year as a consequence of the current demand. The manuscripts for *Minnesota Plant Galls* and for Vol. 4, Part 5, of *Minnesota Botanical Studies* are awaiting funds for publication, and *Minnesota Honey Plants* and the *Guide to School Gardens and Greenhouses* will be ready for printing during the year. The practical results of the mapping of the plant covering of twelve townships are available, and should be published for popular distribution during the year. It is believed that this will stimulate general interest in the utilization of the lands of northern Minnesota upon a rational and permanent basis.

Recommendations.—In view of the fundamental importance of the study of plant growth and of growing conditions in peat bogs to problems of reclamation, and forestation, as well as the great need of a classification survey based upon "indicator" plants, it is recommended that an appropriation of \$5,000 a year for the coming biennium be provided for in the budget.

Respectfully submitted,

FREDERIC E. CLEMENTS, *Director*

THE UNIVERSITY LIBRARY

To the President of the University:

SIR: The record of the year just passed has been one of constant progress in the library but of no very striking changes. The physical limitations of the building are such as to make impossible many developments necessary to the efficient conduct of the Library, and until we can secure relief from this constricted condition, the work of the University, as related to the Library, will be seriously hampered.

With a reading room scarcely half the necessary size, ill-lighted and worse ventilated; with a loan desk cramped into so narrow space that congestion and delay are unavoidable; with no provision for the work of graduate students other than that furnished in the reading room and three small seminary rooms; with no place available where debating teams can study the books which we gather for their use; with a stack room again crowded to capacity; with no adequate space for handling our document collection and the University exchanges, the situation is trying alike to the administration of the Library, the faculty and the students.

The present building can never be adapted or altered so as to make it a satisfactory University library, but until a new building is erected, and this, at the best, is several years ahead of us, we must remain where we are and the building be so remodeled as to make it possible to house our books and to render them more available for use.

Within a short time I shall present for your approval a plan for the re-assignment of a considerable portion of the space in the building and of the changes in construction consequent upon it. These plans will involve the removal of the Department of History to another building and the provision of another assembly room for the students.

It must be distinctly understood, however, that the remodeling of the present building does not even postpone the necessity for a building campaign. As I have insisted in previous reports, the present building is not fireproof and the University is incurring a grave responsibility if it continues to house our progressively valuable collection of books in such a structure. At the rate of purchase which we shall undoubtedly maintain, the ultimate book capacity of the building will be reached in about five years. At no time during that period will it be possible to make even fairly adequate provision for graduate study or to give the whole collection efficient and economical administration.

The next session of the Legislature should be asked to appropriate at least \$750,000 for a new Library building. The sum may seem large, but it must be remembered that the building must be planned to accommodate from 750,000 to 1,000,000 volumes. Not all of the stacks finally necessary need be erected at once but the space for reading and administration must be almost as large, for our present library of nearly 200,000

volumes, as for one of four times the size. The probable position of the building, closing the main vista in the new building plan, will necessitate a more or less elaborate, and therefore relatively expensive, architectural treatment.

After the appropriation is made, at least two years will be necessary for a study of the problem and the preparation of the plans. Two or three further years will be consumed in building, so that, at the best, it will be five years from the date of this report before we can occupy such a building. By that time, as I have already pointed out, we shall have reached the limit of capacity of the remodeled building. A delay of even two years in securing the appropriation will seriously handicap the work of the University a few years hence.

Reading room and loan desk.—The number of books issued in the reading room continues to increase, notwithstanding the fact that every year the reading for an increasing number of courses must be done outside. The amount of time that the student must spend in securing a desired book is much too large. This is due principally to the very limited space about the catalog, rendering consultation difficult, the constricted size of the loan desk counter, and to the inadequate force of pages on duty. The call for books fluctuates. During the first fifteen minutes of every hour it is very large and during the remainder of the period fairly steady but at a lower level. We are able to handle the demand of all except the first quarter very adequately, but the available force is not sufficient to give satisfactory service at the time of maximum demand.

The evening service, now in the hands of a student, should be carried by a trained assistant, and an assistant reference librarian should be appointed so that some one may be on duty at the reference desk during the late afternoon hours and in the evening.

The catalog.—In February, the Library was so unfortunate as to lose, by resignation, Miss Minnie E. Sears, who for several years has had charge of the catalog. Miss Sears left us to take charge of the reference cataloging of the New York Public Library. Her place with us was filled by the promotion of Miss Goss, who joined the staff in November, 1913, coming from the University of California Library. This change, and the fact that the first assistant's position was vacant during September and October and again from February to April, and that two other members of the staff were obliged to be absent for some time on account of illness, has reduced the output of the department to a point lower than that of last year.

The following table gives the record of the year:

	Central catalog	Departmental catalogs
Titles cataloged.....	6776	2641
Volumes cataloged.....	15343	8165
Printed cards added.....	23001	8163
Typewritten cards added.....	9741	3631
Printed shelf list cards.....	3745	1352
Type written shelf cards.....	3031	1671
Total volumes recorded.....	146402	.....

The accessions of the year have been completely cataloged and some progress has been made in the recataloging of the older portion of the Library, notably in Italian and Spanish literature and in Science. The cataloging of the libraries of Law, Engineering, Mines, and Pharmacy is almost complete and some progress has been made in Medicine.

Nothing has as yet been done toward the inclusion in the main catalog of the record of the books in the Department of Agriculture. The heavy pressure of the work with the students in the School of Agriculture and the small amount of assistance employed in the Library has compelled a very simple form of cataloging. A considerable revision of this work will be necessary before it may be copied in the main catalog. This, however, should be done at the earliest opportunity.

Provision should be made in our next legislative budget for such an increase in the cataloging staff as will bring the catalog up to date within two years.

Order Department.—The budget for the year 1913-14 carried a total provision for the University Library (including Law and Agriculture) as follows:

Salaries	\$29,875.00
Books	43,629.00
Supplies	500.00
	<hr/>
	\$74,004.00

The sum available for supplies was obviously too small and such as were necessary above the \$500 allowed were paid for out of the book budget.

The actual expenditures for books, periodicals and binding for the year were \$42,981.22. Of this sum \$3,853.32 was paid out of Agricultural budgets and \$3,738.92 out of Law School budgets. With this sum 21,264 volumes have been added to the Library.

We reported last year that we had in our Library approximately 177,500 volumes. A closer estimate made during the last few weeks, somewhat reduces this figure and a more accurate statement of our resources on August 1, is 185,000 volumes.

Serials.—The University is subscribing for 1,074 periodicals. This is exclusive of those received in exchange. This number should be largely increased at once. In some lines we have a very excellent representation of the most important journals, but in others our record of the progress of research is very insufficient. Nothing is more essential to the upbuilding of a useful university library than a generous policy in the matter of subscriptions. Without access to the results of the work of others, investigation is impossible. The student must be a constant reader of the special journals related to his subject, if he does not wish to be hopelessly distanced by his fellows.

This year we have been able to make daily deliveries from the main library to the departments. So far as possible all periodicals reaching the

Library in the morning are checked, cut, and delivered the same afternoon.

Binding.—During the year 5,044 books have been bound at a total cost of \$3,929.85. Of these 206 were bound for the Law Library and 400 for the Agricultural Library.

The distribution as to material is as follows:

Material	Number	Cost
Cloth, buckram, etc.....	2933	\$2066.10
Morocco.....	934	108.60
Cowhide, pigskin, etc.....	756	739.85
Boards.....	421	42.30

The time has arrived when we are, I believe, justified in establishing a bindery. The general experience of libraries undertaking their own binding is that the resulting saving in money is not great but that the books are bound more satisfactorily and more quickly than under the contract system. Under our present contract, the binder makes monthly collections and deliveries and he is allowed thirty days to complete each shipment. The result is that volumes of periodicals are removed from circulation for a period from thirty to sixty days, during the period of maximum demand. In our bindery a rush order could be filled within one week.

A bindery can be equipped at a cost running from \$700 to \$1,000. The pay roll would be not far from \$40 to \$50 per week.

Documents.—The collection of documents, national, state and city, has never been systematically and satisfactorily handled by our Library. The Librarian has attempted, in so far as his other duties have admitted, to obtain the more important publications, and several thousand very valuable works have been secured during the last seven or eight years, but the departments most directly interested in these collections are as dissatisfied as the Librarian with the raggedness of the collections.

There is available for the asking a very large body of documents which form the basic material for the study of economic, social, and political questions. To gather such material one must know, not only what specifically has been and is to be issued, but the best avenues through which to secure the gift. It is work which can not be entrusted to an inexperienced assistant and can only be accomplished adequately by one acquainted with social and political questions.

Such an assistant would be of great service in training our students in the use and interpretation of the documents. He could be of large service to several departments of the University and to citizens of the state in furnishing on demand abstracts of statistics and information as to what is being done in various lines of social or political activity. He would act for the University in coöperation with the Public Affairs Information Service.

An experiment in such a coöperation was made during the past year but the results were inconclusive and unsatisfactory. Dr. Orfield, of the

Department of Political Science, was released from a portion of his teaching during the second semester, and the Law School and the Library united in bearing the cost of the experiment. Dr. Orfield was not able to devote enough time to the work to accomplish considerable results and the experiment was not continued long enough to be a test.

There is general agreement, however, that the University should join in the Public Affairs Information Service and I believe that this can best be accomplished by having the documents work done by a member of the staff of the Library.

Exchanges.—During the past year the Library has distributed to exchanging institutions the following publications:

- Studies in Physical Sciences and Mathematics*, No. 2
- Studies in Public Health*, No. 1
- Current Problems*, No. 1
- Minnesota Botanical Studies*, Vol. 4, No. 3
- Minnesota Plant Studies*, Nos. 1 and 5
- Contributions from the Department of Anatomy*, Vols. 1 and 2
- Bulletins of the Agricultural Experiment Station*,
Nos. 132, 134-137, 139
- Bulletin of the State Mining Experiment Station*, No. 2
- Proceedings of the League of Minnesota Municipalities*, 1913
- Folwell, *University Addresses*.

A large number of very valuable publications has been received and an effort has been made to complete broken sets and to add new institutions to our exchange list. Unfortunately there has been no member of the staff who could be detailed to do this work and it has been necessary to do whatever has been done in the Librarian's office.

The exchange work has already reached a point where it demands the whole time of a competent assistant. The University would be compensated many fold by the value of the publications which could be secured by this means.

Inter-Library loans.—We have been materially aided during the year by the courtesy of several institutions which have from time to time loaned to us books needed for research work. These institutions and the number of volumes borrowed is as follows:

Surgeon General's Library.....	44
University of Wisconsin.....	34
University of Chicago.....	29
Harvard University.....	18
U. S. Department of Agriculture.....	11
Columbia University.....	8
Library of Congress.....	5
Cornell University.....	1
Massachusetts Historical Society.....	1
Yale University.....	1

College and Departmental Libraries.—The most notable change in the status of the college collections is the definite adoption by the Medical

School of the principle of central, as opposed to departmental organization. The matter was under debate for several years and was finally determined by the action of the Administrative Board on December 4, 1913.

Departmental collections are to be limited to "small collections of reference books and periodicals, the actual size and character of which shall be determined by conference between the Librarian, the Dean, the Chairman of the Committee on Library and the head of the department concerned."

All other books have been transferred to the central medical library and are rapidly being cataloged.

The library of the School of Chemistry has been transferred to the new Chemistry building but as yet no permanent provision has been made for its installation.

The Winchell Library of Geology has been further enriched by a large number of books belonging to the late Professor Winchell's library. The collection is one of the most valuable on the campus and is a permanent memorial of a very busy and useful life.

Books purchased in Europe.—During the months of May, June and July, I was in England and France, on leave of absence, engaged in purchasing books for another university. The experience gained has convinced me of the great advantage of this method of purchase to an institution such as ours. Provision must be made for cash payments and a considerable amount of discretion must be allowed to the agent. If this can be arranged, the resulting saving is large.

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 Inter-Fraternity Council for the year ending July 31, 1914.

Summary of important results.—The most important measures inaugurated by the Inter-Fraternity Council during the year 1913-1914 may be classified as follows: (1) the revision and amending of by-laws to the constitution, including (2) the postponement of initiation to the second semester of the freshman year; (3) inauguration of a system designed to secure the reporting of fraternity social functions and to insure the proper chaperoning of such functions; (4) ... admission of the local chapter of Acacia to the Council.

General tendencies.—In addition to the above classes of work which the Council has undertaken during the past year, it has pursued many other lines less conspicuous, but in some cases perhaps more fundamental and significant. The continuous altho gradual rise of the scholarship standing of the fraternities is treated fully in the two paragraphs dealing with scholarship and supervision of studies. The attitude of the fraternities toward their problems and toward the problems of the University is increasingly encouraging. This has been evidenced in many ways: (1) The Council met without hesitation the request to supply the University Finance Committee with audits of all inter-fraternity functions in which finances formed an important part; (2) All the fraternities except one entered into the agreement to report all social functions at which women were present to a social director together with the names of the chaperones; (3) The cordial manner in which the fraternities opened their houses at the time of the High School Athletic Meet in order that the high-school students coming from all over the state might be properly housed and fed during their stay in Minneapolis; (4) The willingness of the fraternities to consider the question of abolishing high-school pledging and their earnest tho ineffectual endeavor to devise plans to bring this about; (5) The appointment of a committee on students' interests, the purpose of which is to support movements within the University affecting the student body at large. This committee has already undertaken one or two most important measures of this sort. All of these things go to show that the fraternities are coöperating with a readiness and spirit which surpasses anything in the history of fraternities at Minnesota.

Scholarship.—A number of years ago the standing of the academic fraternity group was far below that of the student body at large. During the past three years it has risen continuously, tho gradually, until it is now only one per cent below that of the entire academic student body, being upon the basis adopted by the Administrative Board in estimating scholarship standing 1.37, while that of the student body at large is 1.38.

	1911-12	1912-13	1913-14
Total average.....	1.399	1.41	1.38
Non-fraternity average.....	1.502	1.43	1.38
Fraternity average.....	1.096	1.34	1.37

Owing to the fact that a different system of estimating scholarship averages was formerly employed, it is impossible to extend the charts back of the year 1911-12. The graphs are based upon the relative scholastic standings of the members of the twenty academic fraternities and that of the student body of the College of Science, Literature, and the Arts, arranged in five different groups: (1) the average of the individual chapters of the twenty academic fraternities, including students registered in the professional schools and in the graduate school as well as those in the College of Science, Literature, and the Arts; (2) the average of the entire student body of the College of Science, Literature, and the Arts; (3) the average of the non-fraternity group of this same college; (4) the average of the fraternity men of the College of Science, Literature, and the Arts; (5) the average of the entire fraternity group including students registered in the College of Science, Literature, and the Arts, the professional schools, and the graduate school. This last average is, of course, the only one completely comparable with the averages of the individual fraternities. The chart, altho showing the relative standings of the individual fraternities and of the averages for the larger groups for three years, presents the tendencies for only two years. During the first of these two years the average of the entire student body of the College of Science, Literature, and the Arts rose 1.1 per cent, being 1.41 at the close of the college year 1912-1913, whereas at the close of the preceding year it was 1.399. In the following year it fell 3 per cent. The academic fraternity group, including students registered in all colleges, fell from 1.34 to 1.26 during the year 1912-13; during the next year it rose from 1.26 to 1.37.

The group representing only those members of the academic fraternities who are in the College of Science, Literature, and the Arts rose from 1.096 to 1.34 in the year 1912-1913; and in the following year rose 3 per cent higher. This shows conclusively that the average of the academic fraternities, far from being raised, is distinctly lowered by including in it the standings of members registered in the professional and graduate schools. It does not necessarily follow from this that the students in the College of Science, Literature, and the Arts do better work. It may be that the standards in the professional and graduate schools are higher and that it is more difficult to get a high grade in one of these schools than it is in the academic college. Another interesting thing brought out by the chart is that, whereas the average of the entire student body of the College of Science, Literature, and the Arts, has a slight downward tendency, the average of the fraternity group within this same college has had a marked upward tendency. The downward tendency of

the entire student body, it is believed, is due not to poorer work, but to the raising of scholarship standards throughout that college. It is all the more significant then, that the trend of the scholarship of the fraternity men should be so decidedly upward.

During the year 1912-1913 the scholarship of seven academic fraternities rose; that of twelve fell; one remained at a level. During the following year the condition is reversed; the scholarship of twelve rising, that of seven falling, and one remaining at a level. These facts are shown by the following table.

TABLE I—SHOWING THE GENERAL TREND OF ACADEMIC FRATERNITIES
1912-1913

Upward	Downward	Level
Alpha Delta Phi Chi Psi Delta Tau Delta Psi Upsilon Sigma Nu Theta Delta Chi Zeta Psi	Acacia Beta Theta Pi Delta Chi Delta Kappa Epsilon Delta Upsilon Kappa Sigma Phi Delta Theta Phi Gamma Delta Phi Kappa Psi Phi Sigma Kappa Sigma Alpha Epsilon Sigma Chi	Alpha Tau Omega

1913-1914

Upward	Downward	Level
Acacia Alpha Tau Omega Chi Psi Delta Kappa Epsilon Delta Tau Delta Delta Upsilon Kappa Sigma Phi Delta Theta Phi Gamma Delta Sigma Chi Sigma Nu Theta Delta Chi	Alpha Delta Phi Beta Theta Pi Delta Chi Phi Kappa Psi Phi Sigma Kappa Psi Upsilon Sigma Alpha Epsilon	Zeta Psi

The significance of the various features of the above scholarship chart are so evident that they require little explanation. Nevertheless, attention should be called to the wide separation of the extremes of scholastic standing in the year 1911-1912; the sudden rise of the three fraternities of lowest scholastic rank; and the general tendency for greater evenness of work, shown by the narrowing of the distance between the extremes. At the close of the year 1911-1912 the extremes of several individual chapters are far below that of any one of the four larger groups. At the close of 1913-1914, generally speaking, the extremes remain close

together, the one exception being Acacia which has risen to a relative position far above that of all other fraternities. The distance between the extremes of the year 1913-1914 are not due, however, as they were during the year 1911-1912, to poor scholarship. On the contrary, they are due to one fraternity having done surpassingly good work. The fraternities which at the close of the year 1911-1912 were far below the average have, in the majority of cases, risen to positions much higher than that which they occupied at the close of the year 1911-1912.

The full value of a comparison such as is brought out by the averages and by the graphs is not to be had except by the analysis of the causes underlying the trend of the individual fraternities. The results of numerous attempts to secure the data necessary were so partial as to show that any satisfactory or complete analysis would be impossible. In the case of some fraternities the causes seem to be fortuitous. In other cases the upward trend is clearly due to the fraternities having realized the importance of doing scholarly work and having devised some method for supervising the work of their men. Most important of all, perhaps, is the general realization by the fraternities more than ever before of the importance of good scholarship. The Inter-Fraternity Council may justly claim a large degree of the credit for whatever good results have been reached. Beginning when men might be initiated at any time and without regard to their scholastic standing, it set up definite scholastic standards, including both a minimum of rank and a minimum number of credit hours. More than this, it has gradually moved the time of initiation farther and farther along in the college year, postponing it successively until after the first six weeks, until after the first eight weeks, until after the close of the first semester. As grades cannot be secured until the last of February, few initiations will be held before the first of March. The desire to become a fraternity man and the knowledge that he cannot unless he maintains the necessary scholarship, is the most effective stimulus to study of which many a freshman is ever conscious. Added to this are the continuous and persistent efforts of the members of the chapter to which he belongs.

Men who are now in the chapters, as well as alumni, assert that a few years ago any attempt to place the emphasis which is now being put upon scholarship would have been greeted with ridicule. At the present time the question of scholarship is recognized by every academic fraternity to be an important problem. In many chapters, what was once a sadly neglected topic has now come to be a regular topic for report and discussion.

Systems for supervising studies.—Many of the fraternities have stringent rules to compel first-year men to give their first attention to their studies. There is not to my knowledge an academic fraternity 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 rules which forbid freshmen to be out more than two nights a week, and then only upon the approval of an upperclassman who acts as

a supervisor of the freshman. If a freshman is below grade in his studies, he is denied the right to be out even these two nights. Most of the fraternities have systems by which standings are secured from the different instructors each month and reported to the chapter. In case a pledgeman is below in his work, the fraternity takes action to compel him to attend to his studies. Most fraternities make no attempt to extend their systems for supervision of studies beyond the first semester of the freshman year. The general position seems to be that after this time a man must stand on his own responsibility. There is in one fraternity a marked and interesting exception to this general rule. In case an upperclassman falls below in his work, he is put under the supervision and rules ordinarily designed for freshmen, which compel him, among other things, to be in his room and at his studies every night except Saturday and Sunday. In extreme cases a number of the fraternities communicate directly with the parents. Many of the fraternities state that their greatest difficulty comes with pledgemen who live at home and whom they can not, consequently, put under their ordinary house rules. The only pledgeman in one fraternity not up to the grade of scholarship required for initiation was one who did not live in the chapter house. This is typical and is something of a reflection on certain types of American homes as well as an indication of some of the things with which the chapters have to contend.

Scholarship blanks.—One of the fraternities is using a system of sufficient interest to entitle it to a place in the present report. This system requires every pledgeman to fill out each week a blank similar to that on the opposite page. After the first few weeks the pledgeman is no longer required to fill out columns 2-6 which deal with the instructor and the periods when the course is given.

It will be seen that this blank when filled out gives the fraternity a complete record of how the pledgeman has spent his time during the previous week. The character and number of social gatherings he has attended, at which girls were present, the character and number of social gatherings at which men only were present, the number of theatrical performances he has attended, the time spent in college activities, in athletics, and in outside work. It also shows whether the pledgeman has been absent from any of his classes and also whether he has been late, the number of quizzes missed and the amount of work late or not yet handed in. In addition to this he is required to estimate his own grade in each subject. This last point is especially significant, as freshmen in a large number of cases have no conception of university standards or how to work, and imagine they are doing excellent work, whereas the reports of their instructors show that the contrary is the case. There is no way of convincing a freshman that he has overestimated the quality of his work so effective as requiring him to estimate his own grade in advance, and then showing him the real grade secured from the instructor through the registrar's office.

These blanks after being filled out are placed in the hands of a scholarship committee composed of three upperclassmen. If the blanks

PLEDGEMAN'S WEEKLY REPORT BLANK

Every pledgeman is required to fill out this blank each week and hand it in to the Committee on Scholarship

Subject	Hr.	Days	Instructor	Office hours	Office	Late	Absent	Quizzes, etc., missed—work late or not in	Estimated grade	Real grade

Name social gatherings attended at which girls were present—
 Name social gatherings attended at which men only were present—
 Name theatres attended, and state afternoon, evening, etc.—
 Estimate total time spent in studying—
 Time spent in outside work—

Practically all difficulty and failure in studies is the result of loafing and lack of application. Note that this is so.	Time spent in college activities	Time spent in athletics (except gym.)	
			Live at home—in fraternity house—rooming
			Report No. Week ending 19
			Name

(Keep other side clean and do not fold)

THE ACADEMIC FRATERNITIES

indicate that the pledgeman is not doing satisfactory work the pledgeman is called before the committee. Such a conference frequently shows that not only was the pledgeman ignorant of the manner in which his instructor regarded his work, but quite as often that the instructor is ignorant of the real conditions. In many cases where instructors have reported that freshmen were not working, a conference with the freshman by the fraternity committee on scholarship and a checking up of his weekly blanks shows that the freshman is working faithfully and that the real difficulty lies elsewhere.

New system for securing grades.—In times past the fraternities have found it very difficult to secure from certain members of the University faculty reports of the standings of their members. The president of the Inter-Fraternity Council presented the situation to the University Senate February 5. Following this presentation the Senate adopted the following recommendation:

"It is hereby recommended that the heads of departments be requested to present to the members of their departments a statement of the efforts and a description of the general plan and principles which the academic fraternities of the University of Minnesota are using in their efforts to stimulate scholarship, and request the said members of their departments to cooperate with the fraternities; and to this end, to furnish through the Registrar, committees on scholarship of the respective fraternities the monthly standings of fraternity members."

Acacia admitted to the council.—During the year 1913-1914 Acacia was admitted into the Inter-Fraternity Council on the basis that it was (1) a national, (2) an academic fraternity. The question of its eligibility in this case as in one or two previous cases was based upon its representation in the National Academic Fraternity Conference.

New and important by-laws.—During the past year the by-laws were amended in such a way as to postpone initiation until the second semester. Article II, Section 1, as amended May, 1914, reads: "No fraternity shall initiate any man who has not completed one semester's work in the University, and then only if at the close of such semester he shall have obtained a grade of 'passing' in 75 per cent of the total number of credit hours for which he was registered (except gymnasium and drill)." This postponement marks a most significant advance in the fraternity situation. The beneficial effects of this by-law are beginning to be felt by all the fraternities on the campus, even those who opposed it because they thought it would work a financial hardship to them.

New penalties.—Heretofore there was not a sufficient gradation in the penalties provided for the infringement upon the by-laws of the Council. There was practically nothing between publication of the offense and forbidding a fraternity ever to initiate a man illegally pledged. Article IV of the by-laws as amended May, 1914, provides two intermediate penalties, (1) barring the pledging of such man until after he has registered for his second year in the University, (2) barring the pledging of such man until after he has registered for his third year in

the University. The old penalty barring the fraternity from ever initiating such pledge is still kept for extreme cases.

High-school pledging.—As the result of a succession of meetings held on April 25, May 14, and May 22 to discuss the question of abolition of high-school pledging, a mass meeting of all members of the academic fraternities was called. The outcome of this meeting was the passing of a resolution to the effect that the academic fraternities at the University of Minnesota are opposed to high-school pledging and desire to abolish it, but the difficulties in the way of such abolition and the evident chances that such abolition would produce conditions less desirable than those which at present prevail resulted in giving up any further attempts. The judgment of the fraternities as a whole was that the plan would not be feasible at Minnesota.

High-school principals gratified by present pledging system.—At the time the problem was being discussed a number of the high-school principals of the Twin Cities were consulted. They expressed themselves as on the whole satisfied with present conditions which, they stated, were a vast improvement over what had previously existed. One of them stated definitely that if the result of doing away with high-school pledging would be to bring about a condition similar to that existing within the sororities, he believed the fraternities might much better continue their present system.

Fraternities and the Minneapolis Symphony.—Twenty-one season tickets for the Minneapolis Symphony concerts were purchased by the alumni and placed at the disposal of the following fraternities: Alpha Delta Phi, Delta Kappa Epsilon, Delta Tau Delta, Delta Upsilon, Phi Kappa Psi, Phi Gamma Delta, Psi Upsilon, Theta Delta Chi. This system offered an opportunity for hearing fine music and tended to foster and encourage a kind of culture and development which is too frequently omitted from the college curriculum.

Monthly luncheons.—Many of the difficulties which arise among fraternities at other universities are absent at Minnesota. There is, of course, a degree of healthy rivalry and in some cases the conduct of individual fraternities has been far from commendable. Nevertheless, generally speaking, in place of the suspicion and jealousy which are too common among fraternities and which are said to have existed at Minnesota years ago, there has now developed a general spirit of sympathy and coöperation. This spirit has had a gradual growth and has resulted from the fraternities working together at common problems and thus coming to know one another. It has been greatly aided during the past year by a series of monthly luncheons held at the various fraternity houses.

Improvement in methods of handling cases.—Up to last year much criticism had been made of the Council for its method of handling cases of violation of the pledging rules. Last year marked a significant advance in this respect. Three cases of violation were reported to the Council and the maximum penalty inflicted in each case. For the first time in the history of the Council the student representatives discussed

the thing in a fair-minded fashion, refusing to line up on the basis of any personal friendships or affiliations. The manner in which these cases were conducted seems to have established the Council in the respect of the fraternity and university community at large to a degree which it had never before enjoyed.

Chaperone agreement.—The charge has been made from time to time that fraternities have given evening social functions at which no chaperones were present. The Inter-Fraternity Council has devised a plan to meet this situation. The agreement adopted provides the weekly reporting of academic fraternity social functions at which women are present to a student social director. These reports include a statement of the place and the date of the function, together with the name, address, and telephone number of the chaperones. These reports have to be in the hands of the social director not later than five days previous to the date of the function. The social director ascertains on the date set for the function whether the chaperones will be in attendance. If not, he coöperates with the fraternity in securing chaperones. The social director makes a weekly report to the president of the Council. The results of this agreement were seen at the annual Pan-Hellenic dance, which was said by those members of the faculty and their wives who were present to have been conducted in a manner superior to that of anything which they had ever seen at Minnesota.

Needs.—1. There are a number of channels through which the fraternity situation at Minnesota might be greatly improved. Several of these channels, however, are outside of the control of the active chapters of the fraternities. There is need of greater interest on the part of the alumni in a number of fraternities. In many of the fraternities the alumni take an active part. Committees of alumni inspect weekly the scholarship records of the entire chapter. In other fraternities an alumnus audits the accounts from time to time and looks into the financial standing of the fraternity. There are some fraternities, however, where no such ideal relation exists. The local representative of the alumni is indifferent to his duties or carries them through in a superficial fashion. The chapter is allowed to run in debt, thereby discrediting not only itself but the fraternity group as a whole. A number of such instances have been called to the attention of the president of the Inter-Fraternity Council.

2. The principals of the Twin City High Schools as a whole have aided the president of the Council in a most generous and considerate fashion in the matter of furnishing him lists of their high-school boys who are seniors in full standing upon the twenty-four credit basis adopted 1912-1913. There are, however, one or two high schools from which such lists are secured with great difficulty and only as the result of most persistent effort on the part of the president. Without such lists the hands of the president are practically tied in the matter of passing upon the eligibility of seniors. Where such information can not be easily secured some fraternities will accept the high-school student's own statement of his credits, being willing to risk the chance of making a mistake.

Professional fraternities should organize a Council.—For the sake of

the reputation of the academic fraternities as well as for the good of the professional fraternities themselves some means should be devised for bringing the professional fraternities into a relation of responsibility similar to that now existing between the academic fraternities and the university. Efforts to establish an Inter-Fraternity Council of the professional fraternities have thus far failed. There are a number of reasons for such failure. It takes not merely persistence, but time, to establish and develop an effective council. The most serious men studying for the professions insist that they have no time to give to such an organization as an inter-fraternity council. Moreover they have not the same community of interests as the academic fraternities. With these facts in mind, the Committee on Student Affairs, in its classification of Minnesota student organizations last year placed the professional fraternities under their respective colleges. The purpose of this was to make each faculty responsible for the quality of the standards of the professional fraternities existing within its college. Whether this will result in bringing about conditions which are not merely desirable but necessary remains to be seen. If it does not, then in justice to the academic fraternities, who in the minds of the public at large are not distinguished from the professional fraternities, further action respecting the professional fraternities should be taken.

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, 1914.

Publications.—Since the last previous report, the Weekly has been issued regularly and a special University Dictionary number was published early in November. This is undoubtedly the most useful single issue of the Weekly ever printed. It will be of permanent value to anyone who is interested in the University.

The preparation of the material for a football number occupied a considerable portion of the past summer and the number will be issued early in November of this year.

Association of Alumni Secretaries.—The Association of Alumni Secretaries, the organization of which was mentioned in my last previous report, held a meeting in November, 1913, at which sixty institutions were represented. The meeting was held in Chicago and proved to be an exceedingly interesting and valuable conference. The Secretary of the Minnesota Association was re-elected president for the current year.

Endowment fund.—On the date of the annual meeting of last year, the Association launched a movement to secure a substantial increase in its endowment fund. Fifty alumni offered to contribute one hundred dollars each, creating a fund of five thousand dollars, to be available for the endowment of the Association whenever one thousand other alumni should become life members and pay the life membership fee of ten dollars.

In spite of the fact that the year has been an unusually bad one for such a project, the response has been most generous and at the present writing, July 31, eight hundred fifty have either paid for or pledged themselves to take out life memberships. The final success of the campaign is absolutely assured.

The Association has in mind certain changes in the Weekly which it is hoped will make it of greater service to the University and the alumni.

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, 1914.

Entrance requirements.—On April 8, 1914, the University Senate adopted the following regulations which abrogate the scholarship requirement for admission:

"1. High schools shall continue to certify the records of their graduates in accordance with the present practice; save that all reference to numerical percentages be omitted from the official statement of the University.

"2. All graduates of accredited high schools who satisfy the subject requirements of the various colleges shall be admitted without examination.

"3. Upon the receipt of applications for admission, the parents or guardians of such students as have not maintained an average standing of 'pass with credit' during their high-school course shall be notified that in the experience of the University very few students having such high-school records find themselves prepared to carry successfully their University work.

"4. Finally, it is recommended to the Senate that a comparative record be compiled by the Registrar for each freshman student, showing the college record of such student as well as his high-school record, and that a transcript of this record for each of the graduates of any accredited school be sent to the superintendent or principal of that school at the close of the school year.

"The reports to be sent to the superintendents and principals shall separate the students into two groups: (a) Those who entered the University satisfying the qualitative entrance requirements; and (b) those who did not satisfy the qualitative entrance requirement."

In accordance with item 3 the following letter has been sent to parent and student in all cases where the applicant's scholarship record would not have entitled him to admission under the old "pass with credit" rule:

"The high-school report of your son, as submitted for entrance to the University, shows a kind of scholarship which is lower than the average grade of those who succeed in their University courses. We therefore ask you to consider carefully the advisability of your allowing him to enter upon a University course.

"While some students under similar conditions succeed, we deem it not only a wise policy, but the duty of the University to warn you of the danger of failure as based on the past experience of many students.

"If you still think it advisable that your son attempt to carry a University course, he will be given, without discrimination, all of the privi-

leges of any student, but he will be required to maintain the standard which is set for all of the students of his class."

It is to be expected that this change will insure a decided increase in the freshman classes altho the results can not safely be predicted at this time.

The College of Dentistry announces that beginning with September, 1916, the course will cover four years, the first to be largely academic, corresponding closely with the freshman requirements in the College of Science, Literature, and the Arts. In effect this adds one year of general college training to the four years of high-school study formerly required for entrance.

The College of Pharmacy is to be congratulated upon its attainment of full collegiate standing. While practically all of its students have been high-school graduates, beginning with September, 1915, graduation from an accredited high school, or an equivalent training, will be required for entrance.

Uniform marking system.—Prior to May 7, 1914, there were five systems of grading students within the University. The resulting confusion has been very annoying, especially in the recording department. This office is exceedingly grateful to the Senate for the following regulations which now apply to all departments of the University:

"There shall be four passing grades, designated by the symbols *A*, *B*, *C*, *D*, and two non-passing grades, designated by the symbols *E*, *F*. There shall be a mark which represents neither a passing nor a non-passing grade, designated by the symbol *I*. There shall be a mark which represents a transfer of credit from another institution, designated by the symbol *T*.

Significance of Symbols

"The four letters *A*, *B*, *C*, and *D*, shall represent varying degrees of merit, *A* representing the highest passing grade and *D* the lowest.

"*E* (condition) shall represent a deficiency which may be removed by an examination and such supplementary work (if any) as the department concerned may impose.

"*F* (failure) shall represent such a serious deficiency as to require that the course be repeated in order to obtain credit therein.

"*I* (incomplete) shall represent that the student has not had opportunity to complete all of the required work and that the final mark has not yet been determined.

"*T* (transfer) shall represent that credit has been received for the work in another college or university.

"To interpret percentages in terms of the above symbols, the following is suggested: The interval from 100 to the passing grade should be divided into four equal sub-intervals, and percentages falling within these sub-intervals shall be designated by *A*, *B*, *C*, and *D*, respectively."

Auditors.—Certain of the colleges have made provision for the admission of a limited number of class visitors or auditors. Such persons shall be of mature years, must register and pay fees, but have no claim

for credit, and are not held strictly to the classroom requirements.

Needs of the Office.—(1) Statistical clerk. The necessity for carefully compiled statistics of all kinds is so urgent and the time that the regular staff can give to this kind of work so little and so intermittent that provision must be made for having this work done by one individual who can give his entire time to it. The expense for the first year would not exceed \$600 and the ultimate salary need not exceed \$1,200 per year. (2) Editorial Division. With the increased activity of the Graduate School, the Agricultural Department and the Extension Division the number of research and other publications has grown beyond the capacity of the present staff. An assistant editor competent to take manuscript and put it into final form, consistent with University style, for the printer, should be secured at a salary from \$1,200 to \$1,500 per year.

Respectfully submitted,

E. B. PIERCE, *Registrar*

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, 1914.

In accordance with your instructions, the tables 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.

TABLE I

RECAPITULATION OF ALL FUNDS

Balance August 1, 1913, Maintenance Funds.	\$196,165.34	
Receipts (not including transfers, etc.).....	1,895,577.24	
Balance August 1, 1913, Building and Equipment Funds	774,434.88	
Receipts, Building and Equipment Funds....	977,829.58	
Dining-Halls, etc.	163,625.22	
Total		\$4,007,632.26
Maintenance Expenditures	\$1,872,555.82	
Building and Equipment Expenditures.....	941,384.06	
Balance Maintenance Funds.....	213,000.14	
Balance Building and Equipment Funds....	798,164.16	
Dining-Hall receipts, etc., treated as expenditures, as the Dining-Halls and Dormitories are not operated for profit. Charges for use of building, heat, light, etc., would more than absorb balances	163,625.22	
Adjustments: Deduction debits in excess of deduction credits, to and from Maintenance Fund	6,186.62	
Building and Equipment Fund.....	12,716.24	
Total		\$4,007,632.26

TABLE II

CLASSIFICATION BY COMMODITY

	1912-1913	1913-1914	Increase	Decrease
Salaries	\$919,588.97	\$1,082,349.67	\$162,760.70	.....
Wages	151,527.93	221,239.57	69,711.64	.....
Miscellaneous Labor...	49,499.12	49,624.31	125.19	.....
Postage	8,878.57	11,899.94	3,021.37	.....
Office Supplies.....	6,565.56	4,654.02	.....	\$1,911.54
Stationery and Printing	20,452.74	19,261.03	.....	1,191.71
Publications and Ad- vertising	17,217.63	18,012.40	794.77	.....
Freight and Express..	10,958.34	9,142.64	.....	1,815.70
Traveling Expenses...	31,473.42	50,298.55	18,825.13	.....
Telegraph and Tele- phone	6,047.91	6,710.52	662.61	.....
Provisions	85,983.26	94,081.48	8,098.22	.....
Supplies for Instruction	77,163.46	93,382.58	16,219.12	.....
Seeds and Plants.....	4,244.32	2,637.00	.....	1,607.32
Feeding Stuffs.....	19,351.29	27,096.30	7,745.01	.....
Laundry	12,629.31	13,819.63	1,190.32	.....
Miscellaneous Supplies.	8,872.92	24,323.22	15,450.30	.....
Gas	6,092.94	6,095.72	2.78	.....
Electricity	7,495.72	9,330.13	1,834.41	.....
Water and Ice.....	5,431.99	6,631.66	1,199.67	.....
Fuel	78,886.37	90,499.40	11,613.03	.....
Repairs	72,871.86	58,635.25	.....	14,236.61
Rents and Assessments	3,296.27	2,396.74	.....	899.53
Books	37,318.90	44,811.75	7,492.85	.....
Apparatus and Instru- ments, Glassware....	64,666.12	74,299.56	9,633.44	.....
Furniture and Furnish- ings	93,963.56	70,668.72	.....	23,294.84
Tools, Implements and Machinery	18,915.61	36,301.86	17,386.25	.....
Typewriters and Add- ing Machines.....	3,830.19	3,125.00	.....	705.19
Book-Binding	3,700.54	3,753.45	52.91	.....
Dining-Hall Equipment	3,362.93	2,024.02	.....	1,338.91
Kitchen Utensils.....	1,955.62	2,491.42	535.80	.....
Live Stock.....	12,239.40	14,820.70	2,581.30	.....
Land Purchases.....	52,137.20	.....	.....	52,137.20
New Construction....	750,167.55	762,588.43	12,420.88	.....
Interest on Certificates	2,925.00	66,462.50	63,537.50	.....
Premiums	2,267.50	276.12	.....	1,991.38
Sundry Trust Funds..	14,115.69	11,209.69	.....	2,906.00
Bookstore	10,808.12	13,555.15	2,747.03	.....
Refund of Fees and Deposits	26,658.71	34,940.03	8,281.32	.....
Total	<u>\$2,703,562.54</u>	<u>\$3,043,450.16</u>	<u>\$443,923.55</u>	<u>\$104,035.93</u>

TABLE III

MAINTENANCE

1913-1914

Income

FROM STATE: Balance August 1, 1913		\$196,165.34
<i>Standing Appropriations—</i>		
23/100 Mill Tax.....	\$324,806.03	
School of Mines Support.....	19,500.00	
General Investigations.....	49,500.00	
	<hr/>	\$393,806.03
<i>Annual Appropriations—</i>		
General Support	\$483,000.00	
Sundry Special Support.....	525,500.00	
	<hr/>	1,008,500.00
<i>Interest on Investments—</i>		
Swamp Land Interest.....	\$24,313.84	
Land Investments.....	12,848.41	
Interest on Bonds and Invest- ments	48,995.78	
	<hr/>	86,158.03
FROM FEDERAL GOVERNMENT:		
Nelson Fund.....	\$25,000.00	
Morrill Fund.....	25,000.00	
Hatch Fund.....	15,000.00	
Adams Fund.....	15,000.00	
	<hr/>	80,000.00
STUDENTS' FEES, SALES, etc.:		
Tuition and Incidental Fees (net)	\$206,680.08	
Sales from Farm Products...	66,874.40	
Rents from Campus Houses..	10,199.38	
Miscellaneous Income (net).. <hr/>	43,359.32	
		327,113.18
Total Income.....		<hr/> 1,895,577.24
Total Available.....		<hr/> \$2,091,742.58

TABLE III—Continued

MAINTENANCE

Expenses

1913-1914

General University (administration, business management, care of buildings, heat and light)	\$213,870.71	
Science, Literature, and the Arts.....	279,447.60	
Agriculture (including Substations).....	647,975.85	
Engineering	95,457.79	
Law	35,033.21	
Medical School	140,119.20	
Elliot Hospital	87,347.18	
Dentistry (Dental Infirmary \$21,303.47).....	52,130.99	
Pharmacy	19,631.15	
Mines	46,357.82	
Chemistry	43,461.42	
Education	19,179.94	
Extension	63,857.11	
Summer Session	8,903.33	
Graduate School	6,958.73	
		<hr/>
		\$1,759,732.03
Purchases from Maintenance Fund of items chargeable to Inventory.....		112,823.79
		<hr/>
Maintenance as per summary.....		\$1,872,555.82
Difference between adjustments of debits and credits as shown in summary.....		6,186.62
Refund of 23/100 Mill Tax Advance.....	\$100,000.00	
Bills outstanding July 31, 1914.....	18,159.70	
Orders outstanding July 31, 1914.....	35,237.96	
Unexpended balances	59,602.48	
		<hr/>
		213,000.14
		<hr/>
		\$2,091,742.58

TABLE IV
SUMMARY OF MAINTENANCE FUNDS

	1913-1914				
	Balance August 1, 1913	Credits to Support Fund	Total	Debits to Support Fund	Balance July 31, 1914
1. Support Fund.....	\$89,587.10*	\$1,472,543.05	\$1,562,130.15	\$1,438,031.19	\$124,098.96
2. Special University Support.....	40,725.50	329,024.50	369,750.00	333,733.83	36,016.17
3. Special University Repairs.....	2,635.67	41,399.45	44,035.12	29,053.30	14,981.82
4. Special Agriculture Support.....	21,071.54†	207,403.78	228,475.32	213,250.08	15,225.24
5. Special Agriculture Repairs.....	1,508.18	37,447.43	38,955.61	31,136.58	7,819.03
6. Substation Support.....	40,637.35†	140,929.29	181,566.64	166,707.72	14,858.92
Totals.....	\$196,165.34	\$2,228,747.50	\$2,424,912.84	\$2,211,912.70	\$213,000.14
Transfers and entries other than receipts, credited to accounts, Table XX.....	.....	333,170.26	.....	.....	.....
Transfers and entries other than expense charged to accounts, Table XXII.....	.....	.....	.....	339,356.88	.....
Net Receipts.....	.....	\$1,895,577.24	.....	.....	.....
Net Expenditures.....	.....	.....	.....	\$1,872,555.82	.....

* Bookstore included, \$6,228.43.

† This increase of balances over the previous year is due to reimbursement of contingent funds transferred to the new year.

TABLE V

SUMMARY OF BUILDING AND EQUIPMENT FUNDS

1913-1914

	Balance August 1, 1913	Credits to Funds	Total	Debits to Funds	Balance July 31, 1914
7. University Buildings.....	\$589,517.86	\$524,633.29	\$1,114,151.15	\$575,469.53	\$538,681.62
8. University Equipment.....	73,294.47	93,927.14	167,221.61	115,750.09	51,471.52
9. Agricultural Buildings.....	107,654.22	174,856.00	282,510.22	136,009.61	146,500.61
10. Agricultural Equipment.....	2,519.61	35,539.97	38,059.58	11,469.68	26,589.90
11. Crookston Buildings and Improvements.....	709.71	118,850.00	119,559.71	93,640.21	25,919.50
12. Grand Rapids Buildings and Improvements..	458.54	.....	458.54	458.54	.....
13. Morris Buildings and Improvements.....	280.47	9,000.00	9,280.47	9,233.50	46.97
14. Waseca Buildings and Improvements.....	.....	16,023.18	16,023.18	9,649.99	6,373.19
15. Duluth Buildings and Improvements.....	.....	5,000.00	5,000.00	2,419.15	2,580.85
	<u>\$774,434.88</u>	<u>\$977,829.58</u>	<u>\$1,752,264.46</u>	<u>\$954,100.30</u>	<u>\$798,164.16</u>
Items other than expense charged to accounts	.....	.....	.....	12,716.24	.....
	<u>\$774,434.88</u>	<u>\$977,829.58</u>	<u>\$1,752,264.46</u>	<u>941,384.06</u>	<u>\$798,164.16</u>

TABLE VI
DISTRIBUTION OF NET FEES

	1913-1913	1913-1914
College of Science, Literature, and the Arts...	\$47,716.82	\$47,072.65
College of Engineering.....	18,200.58	18,955.93
Medical School	22,682.32	23,972.29
School of Chemistry.....	4,899.30	3,625.55
School of Mines.....	4,861.96	5,597.34
College of Dentistry.....	35,952.16	37,545.52
Law School	12,529.19	9,918.16
College of Pharmacy.....	5,078.35	5,959.29
College of Education.....	2,306.32	2,810.93
Graduate School	1,592.87	2,203.23
General Deposits	7,508.14	7,846.50
Extension Division	7,314.53	*14,467.85
Summer Session	7,466.22	8,676.62
Post-office Boxes, Summer School.....	51.40	65.40
Lockers, Summer School.....	10.15	37.13
Medical Summer School.....	352.50	1,626.00
Dentistry Summer School.....	40.00	781.00
College of Agriculture.....	20,152.32	23,646.51
Substations	2,167.00	3,538.65
	<hr/>	<hr/>
	\$200,882.13	\$218,346.55

* Law Extension fees were included through a confusion as to the conducting of Night Law Courses which were included in the 1913-1914 budget under General Support Fund,—later transferred back to Reserve.

Respectfully submitted,

G. H. HAYES, *Comptroller*

PUBLICATIONS OF THE FACULTIES, 1913-14

COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS

ANIMAL BIOLOGY

HAL DOWNEY, Ph.D., Associate Professor of Animal Biology

Heteroblastic Development of Eosinophil Leucocytes and of Haematogenous Mast Cells in Bone Marrow of Guinea Pig. *Anatomical Record*, 8(1914):135-137.

Eosinophil Leucocytes and Haematogenous Mast Cells in the Bone Marrow of Guinea Pig. *Anatomical Record*, 8(1914):144-145.

On the Development of Lymphocytes in Lymph Nodes and Spleen. *Transactions of the Minnesota Pathological Society*, 1(1914):91-101.

Reviews and Abstracts of all American haematological literature. *Folia Haematologica* (1913-14).

ANTHROPOLOGY

ALBERT ERNEST JENKS, Ph.D., Professor of Anthropology

Science of Anthropology in the Western Hemisphere and the Pacific Islands. Washington, D. C., The Carnegie Institution 1913, *Reports upon the Present Conditions and Future Needs of the Science of Anthropology*: 25-29.

Ethnic Census in Minneapolis, *American Journal Sociology*, 17(1912):776-782.

Assimilation in the Philippines, as Interpreted in Terms of Assimilation in America, *Publications of the American Sociological Society*, 8(1913):140-158.

A Piebald Family of White Americans, *American Anthropologist* (new ser.), 16(1914): 221-237.

ASTRONOMY

WILLIAM OTIS BEAL, M.A., M.S., Assistant Astronomer

Photographic Positions of Comet 1911c (Brooks). *Astronomical Journal*. 28 (1914): 172.

BOTANY

JOSEPHINE E. TILDEN, M.S., Professor of Botany

Exsiccatae, South Pacific Algae, collected during the years 1909-14 in Tahiti, New Zealand, and Australia—500 species.

Exsiccatae, South Pacific Plants, collected during the years 1909-14 in Tahiti, New Zealand, and Australia—1,200 species.

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

Experiments on Forcing Native Plants to Blossom During the Winter Months, *Plant World*, 17 (1914): December, 9 pages.

COMPARATIVE ANATOMY

CHARLES EUGENE JOHNSON, Ph.D., Instructor of Comparative Anatomy of Vertebrates

- Pelvic and Horseshoe Kidneys in the Domestic Cat. *Anatomischer Anzeiger*, 46, no. 34 (1914):69-78.
 An Additional Case of Pancreatic Bladder in the Domestic Cat. *Anatomical Record*, 8, no. 5 (1914):267-270.

COMPARATIVE PHILOLOGY

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

- Notizen zur Juengeren Genesis. *Anglia*, 37 (1913): 539-542.
 A Word-List from Minnesota. *Dialect Notes*, 4 (1913):9-12.
 Das Grändelsmoor, eine Frage. *Archiv für das Studium der neuen Sprachen*, 31 (1913):427.
Reviews of
 Knut Stjerna's Essays on Questions Connected with the Old English Poem of Beowulf, *Journal of English and Germanic Philology*, 13(1914):167-173.
 F. von der Leyen, Das Studium der deutschen Philologie, *Beiblatt zur Anglia*, 25 (1914):161-163.
 W. J. Sedgefield, Beowulf, second edition. *Beiblatt zur Anglia*, 25(1914):166-168.
 E. Classen, On Vowel Alliteration in the Old Germanic Languages, *Beiblatt zur Anglia* 25(1914):164-166.

ECONOMICS AND POLITICAL SCIENCE

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

- Commission on Regulation of Public Utilities, being Complete Compilation and Analysis American Statutes on Regulation. National Civic Federation, joint work under sole directorship of John H. Gray. October(1913):1284 pages.
 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). Also reprinted in *Gas Record*, 2, no. 2, January(1913).
 "Explanation" of Sections for a Model Utility Bill (first revised draft) Department on Regulation of Interstate and Municipal Utilities of the National Civic Federation. 35 pages, pamphlet form, December(1912).
 Historical Introduction to Report of Department of Interstate and Municipal Utilities of the National Civic Federation on Regulation of Public Utilities. 7 pages, pamphlet form (1913).
 Government Regulation of Prices. *American Economic Review*, Supplement, March (1913):135-137.
 The Control of Public Service: The Vagaries of Valuation. *American Economic Review*, Supplement, March(1914):18-45. Also reprinted in pamphlet form.
 Economic Knowledge and International Peace. *Proceedings Lake Mohonk Conference on International Arbitration, Eighteenth Annual Meeting*. Pamphlet form, May (1912).
 The Control of Public Utilities, with Special Reference to Current Theories of Valuation. *Proceedings Economic Club of San Francisco* (1914), 33 pages. Also printed in pamphlet form.
 Address before National Conference on Training for Public Service. *Proceedings of Conference*. May(1914):about 10 pages.

Three Lectures on Vocational Education: (1) The Past and Future of Education; (2) The High School the Hope of Democracy; (3) Democracy and Education. Delivered before the California State Teachers' Association, Southern Section, December (1913). Published by School Board of Santa Monica, California. 47 pages.

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

The Development of Agriculture in Minnesota with a Preliminary Survey of Geographical and Early Economic Conditions. *Research Publications of the University of Minnesota*, Studies in Social Sciences, no.3. In press.

Commercial Geography of the United States. *Haun-Bellows Encyclopaedia*.

Changes in the Tax Laws of Minnesota. *National Municipal Review*(1913:14).

Notes on Economic Geography. *Journal of Geography*. 11(1912-13):16-18; 57-59.

Editorial, Commercial Geography. *Journal of Geography*, 11(1912):203-206.

E. DANA DURAND, Ph.D., Professor of Economics

The Trust Problem. *Quarterly Journal of Economics*, 28(1914):381-416; 664-700.

Census Methods of the Future. *Quarterly Publication American Statistical Association*, 13(1913):565-582.

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

Editor, *Proceedings of the Minnesota Academy of Social Sciences*, 7(1914):181.

The Civic Value of History. Paper prepared for the 1914 meeting of the Mississippi Valley Historical Association. *Proceedings Mississippi Valley Historical Association*, 7(1914):20.

The State and the Government. To be published early in 1915 by A. C. McClurg & Co., Chicago.

WILLIAM A. SCHAPER, Ph.D., Professor of Political Science

The Place of the Public Library in the Administration of a City. *National Municipal Review*, 8(1914):672-681.

The Charter Situation. *Proceedings of the League of Minnesota Municipalities*, 2(1914).

Reviews of

Gettell's Problems in Political Evolution, *The American Political Science Review*, 8(1914):509-510.

CEPHAS DANIEL ALLIN, Ph.D., Associate Professor of Political Science

The Position of Parliament, *Political Science Quarterly*. 29(1914):214-243.

Reviews of

The Britannic Question, *The American Political Science Review*, 8(1914):120-121.

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

Cattle Loan Banks, *The Journal of Political Economy*, 22(1914):577-580.

ENGLISH

RICHARD BURTON, Ph.D., Head of the Department of English

How to See a Play. Macmillan, November, 1914.

HARDIN CRAIG, Ph.D., Professor of English

Effectual Culture. *Library Notes and News*, Minnesota Public Library Commission, 4(1913):57-61.

Miracle Plays in Lincoln. *Lincoln Diocesan Magazine*, 30(1914):135-139.

Corpous Christi Procession. *Journal of English and Germanic Philology*, 13(1914):1-14.

Home of Ludus Coventriae. *Research Publications of the University of Minnesota*, Studies in Language and Literature, no. 1(1914):72-83.

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

The Testing of Phaëton (poem). *Poet-Lore*, 24(1913):361-364.

Point Royal (poem). *Forum*, 50(1913):755-756.

Parisian Drypoints: Café D'Harcourt, Café Steinbach (poems). *The Atlantic Monthly*, 113(1914):38-39.

The White Flag (poem). *The Bellman*, 16(1914):553.

Parisian Drypoints: Quar D'Orsay (poem). *The Atlantic Monthly*, 113(1914):784-786.

Power (poem). *Survey*, 32(1914):317.

The Chimneys (poem). *Survey*, 32(1914):440.

The Stones of Paris. *The Bellman*, 17(1914):273-278.

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

The Better Part in Conversation. *North American Review*, September (1913).

The Theater: Sothorn and Marlowe, An Estimate. *North American Review*, October (1913).

The Honor System. *The Nation*, May (1914).

The Cult of the Passing Hour. *The Atlantic Monthly*, May (1914).

The Modernist Cause: *The Atlantic Monthly*, August (1914).

Recent Verse. *The Nation*, August (1914).

GERMAN

OSCAR BURKHARD, M.A., Assistant Professor of German

Reviews of

German for Beginners, E. Prokosch, *School Review* (1914):2.

HISTORY

Dean GUY S. FORD, Ph.D., Professor of History, Chairman of the Department of History

The Library and the Graduate School. *Educational Review*, May(1914):444-456.

The Library and the Graduate School. *Proceedings of Association of American Universities*.

Reviews of

Auerbach's la France et le Saint Empire Romain Germanique, *American Historical Review*, 18(1913):622-624.

Fournier's Die Geheimpolizei auf dem Wiener Kongress, *American Historical Review*, 19(1914):685-686.

Pflugk-Hartung's Das Befreiungsjahr, 1813. *American Historical Review*, 19(1914):926-927.

ALBERT BEEBE WHITE, Ph.D., Professor of History

Early Uses of "Parliamentum." *Modern Language Review*, 19(1914):92-93.

Some Early Instances of Concentration of Representatives in England. *American Historical Review*, 19(1914):735-750.

Reviews of

I. Hatschek Englische Verfassungsgeschichte, *American Historical Review*, 19(1914):339-342.

J. F. Baldwin, The King's Council in England during the Middle Ages. *American Historical Review*, 19(1914):867-869.

WALLACE NOTESTEIN, Ph.D., Associate Professor of History

Reviews of

Aydelotte's Elizabethan Rogues and Vagabonds, *American Historical Review*, 19(1914):886-887.

WILLIAM STEARNS DAVIS, Ph.D., Professor of History

A Mediaeval and Modern History for Secondary Schools. Houghton, Mifflin & Co., Boston (1914): 550 pages.

LATIN

JOHN EVENSON GRANRUD, Ph.D., Professor of Latin

Roman National Characteristics. *Education*, 34(1914):241-253.

A Preliminary List of Cicero's Orations. *Proceedings of American Philological Association*, 44(1913):xxvii-xxx.

MATHEMATICS

GEORGE N. BAUER, Ph.D., Professor of Mathematics

Reviews of

Montz' Memorabilia Mathematica, *American Mathematical Monthly*, 21(1914):6.

ROYAL RUSS SHUMWAY, B.A., Assistant Professor of Mathematics

Review of

First Course in Algebra by Edith Long and W. C. Brenke, *American Mathematical Monthly*, 21(1914):17.

HERMON LESTER SLOBIN, Ph.D., Instructor in Mathematics

Note on Certain Algebraic Equations. *The American Mathematical Monthly*, 21(1914): 113-115.

Solutions of Problems in Series. *The American Mathematical Monthly*, 21(1914): 124-125.

ANTHONY LISPENARD UNDERHILL, Ph.D., Assistant Professor of Mathematics

The Minimum of a Definite Integral for Unilateral Variations in Space. *Transactions of the American Mathematical Society*, 15(1914):291-311.

Reviews of

Longley's Tables and Formulas for Solving Numerical Problems in Analytical Geometry, Calculus and Applied Mathematics, *American Mathematical Monthly*, 21(1914):52-53.

PHYSICAL EDUCATION

JULIA ANNA NORRIS, M.D., Director of Physical Education for Women

Medical and Physical Examination for Women. *American Physical Education Review*, 19(1914).

PHILOSOPHY AND PSYCHOLOGY

JAMES BURT MINER, Ph.D., Assistant Professor of Psychology

The Scientific Study of Child Development. *Popular Science Monthly*, 83(1913): 506-513.

Correlation—Annual summary for 1912-13, *Psychological Bulletin*, 10(1913):425-433; also for 1913-14, 11(1914):177-185.

The Scientific Study of Juvenile Delinquents in Minneapolis. *Journal of Criminal Law and Criminology*, 3(1913):781-783.

Reviews of

Benjamin R. Simpson's Correlations of Mental Abilities, *The School Review*, 21(1913): 712-713.

Hans W. Gruhle's Die Ursachen der jugendlichen Verwahrlosung und Kriminalität, *Journal of Criminal Law and Criminology*, 3(1913):956-960.

PHYSICS

JOHN ZELENY, Ph.D., Professor of Physics, Head of the Department of Physics

The Electrical Discharge from Liquid Points, and a Hydrostatic Method of Measuring the Electric Intensity at their Surfaces. *Physical Review*, 3, second series (1914):69-91.

HENRY A. ERIKSON, Ph.D., Assistant Professor of Physics

The Mobility of Ions at Different Temperatures and Constant Gas Density. *Physical Review*, 3(1914):151-152.

ALOIS FRANCIS KOVARIK, Ph.D., Assistant Professor of Physics

Messung der Absorption und Reflexion der B. Teilchen durch direkte Zählung. *Physical Review*, 15(1914):434-440.

Parcours des particules dans l'air a differentes temperatures. *La Radium*, 11(1914):69-71.

Absorption of B. Particles in Gases. *Physical Review*, 3(1914):150-151.

Counting Transmitted and Reflected B. Particles. *Physical Review*, 3(1914):149-150.

Range of A. Particles in Air at Different Temperatures. *Physical Review*, 3(1914):148-149.

PAUL E. KLOPSTEG, B.S., Instructor in Physics

Calculation of a Damping Rectangle to Produce Critical Damping in a Moving Coil Galvanometer. *Physical Review*, 3(1914):121-125; *Beiblatt zu den Annalen der Physik*, 38(1914):1102; *Science Abstracts*, 17(1914):387.

An Absolute Method for Determining the Ballistic Constant of a Moving-Coil Galvanometer. *Physical Review*, 3(1914):147-148; *Beiblatt zu den Annalen der Physik*, 38(1914):1102; *Electrical World*, 63(1914):665.

Measurement of Magnetic Fields. *Science Abstracts*, 17(1914):189; *Beiblatt zu den Annalen der Physik*, 38(1914):900.

RHETORIC

DANIEL FORD, M.A., Assistant Professor of Rhetoric

Paper on "The Presence of Thomas Heywood in Four of Shakespeare's Plays" read before the Modern Language Association of America at Cincinnati. December 30, 1913.

HALDOR B. GISLASON, B.A., LL.B., Instructor in Rhetoric

Effective Debating. *Bulletin of the University of Minnesota* General Series, no. 14, University (1914):55 pages.

Popular Debating in Minnesota. *Public Speaking Review*, 3(1914):182-184.

SOCIOLOGY AND ANTHROPOLOGY

SAMUEL GEORGE SMITH, Ph.D., LL.D., Head of the Department of Sociology and Anthropology

Social Results of Modern Christianity. *Christian World*, London (1914).

Bergson and the Idea of God. *The Commonwealth*, London (1914).

The New America. *The Advance* (1914).

The New View of the Criminal. *The Unpopular Review*, January (1915).

State Control of Conduct. President's address, 1914, *American Prison Association Proceedings*.

ALBERT N. GILBERTSON, Ph.D., Instructor in Anthropology

Some Ethical Phases of Eskimo Culture. *Journal of Religious Psychology*, 6(1913): 321-374; 7(1914):45-74; also Reprint—86.

In Memoriam. Alexander Frances Chamberlain. *American Anthropologist*, 16(1914): 337-348.

Contribution to Chamberlain Memorial Volume. *Publications of Clark University Library*, 4(1914).

Negro-Ute Metis. *Journal of Heredity*, 5(1914):463.

Reviews of

C. S. Bluemel's Stammering and Cognate Defects of Speech, *Pedagogical Seminary*, 21(1914):293-295.

J. G. Frazer's The Belief in Immortality and the Worship of the Dead, *Journal of Religious Psychology*, 7(1914):268-269.

ZOOLOGY

CHARLES P. SIGERFOOS, Ph.D., Professor of Zoology

Laboratory Directions in General Zoology. Northwestern School Supply Co. (1914): 137 pages.

COLLEGE OF ENGINEERING AND THE MECHANIC ARTS

FRANCIS CLINTON SHENEHON, C.E., Dean, and Professor of Civil Engineering.

Discussions of the Hydrography, Hydrology, Hydraulics, and Navigation of the Great Lakes System in Testimony as Engineering Expert for the United States in the case of The United States of America vs. the Sanitary District of Chicago. 300 pages of text, 29 plates, and 6 tables. United States Department of Justice: 283-397 incl. and 420-427 incl.; 5, 3112-3386 incl. The printed Record in the District Court Tables 6, of the United States C. C. no. 29019 and Equity no. 114.

The Development of Engineering as a Profession in the Past Twenty Years. *Minneapolis Journal*, January (1914).

Engineering Extension Work. *Proceedings of the Second Meeting of the Land Grant College Engineering Association*. November 11-14 (1913):65-68.

Miscellaneous Minor Publications.

FREDERIC H. BASS, B.S., Professor of Municipal and Sanitary Engineering

Biennial Report of Engineering Division Minnesota State Board of Health. St. Paul, State of Minnesota (1913): 50 pages.

An Experiment in School Ventilation. Transactions Fourth International Congress in School Hygiene, 2(1913):259-287.

Health and Wealth. *Northwestern National News*, April (1914):6.

Stream Pollution and Sewage Disposal in Minnesota. *Journal American Public Health Association*, 4, 870-873.

Sewage Disposal in Unsewered Districts. *Bulletin for Minnesota State Board of Health*, 1913.

HENRY T. EDDY, C.E., Ph.D., LL.D., D.Sc., Professor of Mathematics and Mechanics Emeritus

The Theory of the Flexure and Strength of Rectangular Flat Plates Applied to Reinforced Concrete Floor Slabs. Rogers & Company, Minneapolis (1913):7 pages.

Concrete Steel Construction. Part I, Buildings, with C. A. P. Turner, Minneapolis (1914). Published by the Authors.

A Comparative Test of Two Full-sized Reinforced Concrete Flat Slab Panels. *Engineering News*, 69, March (1913):624-628.

Steel Stresses in Flat Slabs. *Transactions American Society of Civil Engineers*, 77, 1338-1382 inclusive, and 1423-1453 inclusive (1914): no. 1305.

Reviews of

Discussion of Bending Moments in Flat Slabs, by V. J. Elmont. *The Canadian Engineer*, 25, November 6, 1913, 682 and 683.

Discussion of Statical Limitations upon the Steel Requirements in Reinforced Concrete Flat Slab Floors, by John R. Nichols. *Transactions American Society of Civil Engineers*, 77 (1914):1705-1718; paper no. 1309.

WILLIAM H. KAVANAUGH, M.E., Professor of Experimental Engineering
Report of Tests to Determine the Physical Properties of Concretes made of Various Kinds of Stone. The Kettle River Co., Minneapolis, May (1914):28 pages.

ADOLPH FREDERICK MEYER, C.E., Associate Professor of Hydraulics
 Power Development at the High Dam between Minneapolis and St. Paul. *Journal of the American Society of Mechanical Engineers*, 36 (1914): 305-315.

EDWARD P. BURCH, E.E., Professorial Lecturer in Electric Railway Engineering.

Electric Traction for Railway Trains, Revised Edition. McGraw-Hill, New York, May (1914): 589 pages.

Railroad Electrification. *Electric Railway Journal*, 43 (1914).

Power House Loads. *Electric Traction*, 9 (1914).

BURT L. NEWKIRK, Ph.D., Assistant Professor of Mathematics and Mechanics

Tables for the Reduction of Photographic Measures. *Publications of the Lick Observatory*, 7 (1913): 47-134.

Investigation of the Repsold Measuring Apparatus. *Publications of the Lick Observatory*, 7 (1913):135-157.

Reviews of

A. A. Capito's Mathematics and Mechanics. *American Mathematical Monthly*, 21 (1914): 223-226.

WILLIAM T. RYAN, E.E., Assistant Professor of Electrical Engineering
 Methods of Charging for Electrical Energy. *Proceedings Minnesota Electrical Association* (1914).

Report of official delegate of the Minnesota Section of the American Institute of Electrical Engineers. Printed in special publication of the Institute (1914):24-27.

J. PAUL J. WILLIAMS, C.E., Assistant Professor of Structural Engineering

Computing Maximum Bridge Stresses by a Maximum-Moment Table. *Engineering News*, 72(1914):674-678.

The Error in Design of Columns for Bending. *Engineering News*, 72 (1914): 453.

Reviews of

D. B. Steinman, Translation of Melan's Arches and Suspension Bridges, *Engineering News*, 72 (1914):802-804.

FRANKLIN R. McMILLAN, C.E., Instructor Experimental Engineering
 Extracts from Report of Test of the Northwestern Glass Co. Building. *Proceedings of the American Society of Civil Engineers*, 77 (1914) 1383-1388.

DEPARTMENT OF AGRICULTURE

ALBERT FREDERICK WOODS, M.A., Dean and Director of the Department of Agriculture

- Twenty-first Annual Report Agricultural Experiment Station, University of Minnesota, University (1914): 91 pages.
- Special Report Agricultural Experiment Station, University of Minnesota. *Annual Report Office Experiment Station, United States Department of Agriculture* (1912): 140-144.
- Coöperation of State and Nation in Industrial Education. *Minnesota Educational Association Journal of Proceedings of Fifty-first Annual meeting in Minneapolis* (1913): 247-251.
- Rural Credit Conditions. *Minnesota Farmers' Institute Annual*, 26 (1913): 215-216.
- The Station Mailing List. *Proceedings Twenty-sixth Annual Convention American Agricultural College and Experiment Station* (1912): 198-200.

DEXTER D. MAYNE, Professor of Agricultural Pedagogics, Principal School of Agriculture

- Domestic Science Book I*. Lyons & Carnahan (1914):187 pages.
- Domestic Science Book II*. Lyons & Carnahan (1914):239 pages.
- Domestic Science Book III*. Lyons & Carnahan (1914).
- Farm Shop Work and Manual Training*. American Book Co.

AGRICULTURE

ANDREW BOSS, Professor of Agriculture, Chief of the Division of Agronomy and Farm Management

- Farm Meats and Meat Products in Preparation*. Webb Publishing Company (1915): 350 pages.
- Pork for the Farmer's Family. *Nebraska Farmer* (1913).
- Advantages and Disadvantages of Crop Rotations. *Hoard's Dairyman*, 46 (1913): 654 and 659.

AGRICULTURAL CHEMISTRY AND SOILS

ROSCOE WILFRED THATCHER, M.A., Professor of Agricultural Chemistry, Chief of the Division of Agricultural Chemistry

- The Progressive Development of the Wheat Kernel. *Journal American Society of Agronomy*, 5(1913):203-212.
- The Quantitative Extraction from Plant Tissues of Diastases. *Journal American Chemical Society*, 36(1914):759-770.
- Influence of Soil Composition upon Quality of Wheat. *American Miller*, 41(1914): 882-883.
- Influence of Moisture Supply upon Quality of Wheat. *American Miller*, 42(1914):125.
- Influence of Sunlight and Shade upon Quality of Wheat. *American Miller*, 42(1914): 125.
- What Is Good Flour? *Farm and Fireside* (1914):20.
- Influence of Length of Growing Season and of Period of Kernel Formation upon Composition of Wheat. *American Miller*, 42(1914):762-763 and 846.

CLYDE H. BAILEY, Instructor in Agricultural Chemistry

- Relation of the Composition of Flour to Baking Quality. *Canadian Miller and Cerealists*, 5(1913):208-209.
- The Invisible Loss in Milling. *Canadian Miller and Cerealists* (1914):74-75.
- How Wheat Grows. *The Operative Miller* (1913):454-455.

The Composition and Quality of Mexican Wheats and Wheat Flours. *Journal American Society Agronomy*, 6(1914):57-64.

AGRICULTURAL ENGINEERING

JOHN T. STEWART, C.E., Professor of Agricultural Engineering, Chief of the Division of Agricultural Engineering

Minnesota Drainage Commission. *Proceedings of the Tenth Annual Meeting Iowa State Drainage Association* (1914): 52-59.

J. B. FREAR, M.E., Assistant in Mechanics

Rope and Its Uses on the Farm. *Agricultural Experiment Station Bulletin*, no. 136 (1914):76 pages.

C. L. LEWIS, Assistant

Selection and Preparation of Land for Cranberry Culture. *Agricultural Experiment Station Bulletin*, no. 102, 46 pages.

AGRICULTURAL EXTENSION

MARY L. BULL, Extension Division Lecturer

Warm Lunches for Rural Schools. *Bulletin of the University of Minnesota* (1914): 7 pages.

The Efficient Bedroom. *Institute Annual* (1914).

GEORGE F. HOWARD, Lecturer Agricultural Extension

Outlines in Civil Government for Wisconsin and the United States (1914):56 pages.

DAIRY AND ANIMAL HUSBANDRY

THEOPHILUS LEOPOLD HAECKER, Professor of Dairy and Animal Husbandry

Feeding Dairy Cows. *Agricultural Experiment Station Bulletin*, no. 130(1914):65 pages.

Investigations in Milk Production. *Agricultural Experiment Station Bulletin*, no. 140 (1914):79 pages.

The Relation of Food to Product in Milk Production. *The Guernsey Breeder's Journal*, 6(1914):63-70.

ROBERT MANN WASHBURN, M.S.A., Associate Professor of Dairy Husbandry

Function of Colloids in Ice Cream. *Ice Cream Trade Journal*, 9(1913).

Export Butter Trade. *New York Produce Review*, 39(1914).

The Eastern Markets. *Dairy Record*, 16(1914).

Internal Cooperation. *Dairy Record*, 16(1914).

JOSEPH S. MONTGOMERY, B.S., Assistant Professor Animal Husbandry

State and Local Associations. *American Hereford Journal*, 5(1914): 56 pages.

Fall Colt Production. *Department University Farm*.

Choosing the Stallion. *University Farm Press Notes*.

The Value of Stallion Registry Laws. *Annual Report Michigan Horse Breeding Association*.

Preparing the Horse for the Spring Work. *The Agricultural Magazine* (1914).

Report Hereford Breeders' Meeting. *Minnesota Stockman*, 5(1914):5 page.

Winter Care of Weanlings. *Minnesota Stockman*, 5(1914):7-8.

Gleanings from Fall Colt Shows, etc. *Minnesota Stockman*, 5(1914):4-7.

DOMESTIC SCIENCE

JUNIATA L. SHEPPERD, M.A., Assistant Professor of Domestic Science

Tables Linens, General Discussions. *The Rural Educator*, 3(1914):10-11.

Table Linens, Definition of Terms. *The Rural Educator*, 3(1914):30-31.

Table Linens, Choosing. *The Rural Educator*, 3(1914):50-51.

Preservation of Food. Used as loan papers in University of Minnesota extension work.

Canning of Food. Included in *Extension Bulletin Loan Papers*.

Jelly Making. Included in *Extension Bulletin Loan Papers*.

Efficiency and the Kitchen. In *Institute Annual* (1914).

ENTOMOLOGY AND ZOOLOGY

FREDERIC LEONARD WASHBURN, M.A., Professor of Entomology, Chief of the Division of Entomology

Report of the State Entomologist to the Government of 1913-14 (1914): 160 pages.

Heads of Departments. *Science*, 39(1914):646-648.

Inspection of Minnesota Nurseries and Imported Stock, 1913-14. *State Entomologist's Circular*, no. 31, 20 pages.

Useful Birds Found in Minnesota. *State Entomologist's Circular*, no. 32, 20 pages.

Some Four-footed Farm Pests. *Minnesota Farmers' Library*, Extension Bulletin, no. 54.

HORTICULTURE AND FORESTRY

LEROY CADY, B.S. in Agriculture, Associate Professor of Horticulture

Revision of *Vegetable Gardening*, by Green. Webb Publishing Co. (1914):335 pages.

Garden Page, *Minneapolis Journal* (14 weeks, 1914).

R. WELLINGTON, M.A., Assistant Professor of Pomology

The Seed-Potato Plot, by C. E. Stakman and R. Wellington. *Minnesota Farmers' Extension Bulletin*, no. 50(1914):1-4.

Raspberry Breeding. *Proceedings Society Horticultural Science* (1913):155-159.

MAXWELL J. DORSEY, M.S.A., Instructor in Horticulture

Pollen Development in the Grape with Special Reference to Sterility. *Minnesota Experiment Station Bulletin*, no. 144 (1914).

ELVIN C. STAKMAN, M.A., Instructor in Plant Pathology

A Fruit Spot of the Weathery Apple. *Phytopathology*, 4(1914):333-336.

Fire Blight: the Epidemic of the Past Year. *The Minnesota Horticulturist*, 42(1914):309-311.

The Relation between Puccinia Graminis and Plants Highly Resistant to its Attack. *Phytopathology* (1914).

A Preliminary Report on the Relation of Grass Rusts to the Cereal Rust Problem. *Phytopathology* (1914).

ROBERT WILSON, Instructor in Forestry

The Direct Influence of Trees on Agriculture. *The West Central Community*, 1 (1914):4.

BOTANY

EDWARD MONROE FREEMAN, Ph.D., Professor of Botany and Plant Pathology

Good Seed Education by Law. *Agricultural Magazine*, March (1914):3, 14.

Fire Blight, Some Facts of History. *Minnesota Horticulturist*. September (1914):338-351.

Tree Diseases of Minnesota. *State Forester's Report*, 1914.

VETERINARY SCIENCE

H. PRESTON HOSKINS, V.M.D., Instructor in Veterinary Science

Ten Interesting Cases. *American Veterinary Review*, 43(1913):528-532.

The Practical Application of Hog Cholera Serum. *Proceedings Minnesota State Veterinarians' Medical Association* for 1914.

Federal Government Joins with the State in Waging War upon Dreaded Hog Cholera. *Minneapolis Sunday Tribune*, April 26(1914).

The Veterinarian and His Work. *Agricultural Magazine*, January (1913):18.

Our Meat Inspection. *Agricultural Magazine*, May (1913):10-11.

Preventing Hog Cholera. *Agricultural Magazine*, July (1913):7-8.

Diseases Mistaken for Hog Cholera. *Agricultural Magazine*, August (1913):7.

Hog Cholera in Minnesota. *Agricultural Magazine*, November (1913):7.

Veterinary Equipment for the Farm. *Agricultural Magazine*, December 11 (1913):9-14.

THE LAW SCHOOL

WILLIAM REYNOLDS VANCE, Ph.D., LL.B., Dean and Professor of Law

Some Modern Lessons from an Ancient Court. *Reports South Dakota Bar Association*, 13(1913):113-130.

The Function of the Law School. *American Law School Review*, 3(1914):409-416.

The Function of the State-supported Law School. *Proceedings of Minnesota State Bar Association* (1913):40-53.

The Man Behind the Education. *Case and Comment*, 20(1914):895-896.

Legal Reform in Perspective. *Proceedings Missouri State Bar Association* (1913):239-253.

ROME G. BROWN, B.A., Lecturer on Water Rights

The Minimum Wage. With Particular Reference to the Legislative Minimum Wage under the Minnesota Statute of 1913. Review Publishing Co., Minneapolis (1914): 115 pages.

Improvement of Navigable Rivers. *United States Senate Document* no. 332, Sixty-third Congress, Second Session.

The Water Power Problem in the United States. *Yale Law Journal* (1914).

The Election of Judicial Judgments. *Annual Proceedings Denver Bar Association* (1914).

Muckraking the Constitution. *Annual Proceedings State Bar Association of North Carolina*; also by American Bar Association (1914).

The Dilemma of the Judicial Recall Advocate. American Bar Association (1914).

Report of the Committee of the American Bar Association to Oppose Judicial Recall. American Bar Association (1913).

Report of the Committee of the American Bar Association to Oppose Judicial Recall. American Bar Association (1914).

HUGH VICTOR MERCER, LL.M., D.C.L., Special Lecturer

Some Practical Problems in the Administration of Justice. *Minnesota State Bar Association* (1914):8-23.

CHARLES W. BUNN, B.S., Special Lecturer

Jurisdiction and Practice of the Courts of the United States. West Publishing Company (1914):129 pages.

THE MEDICAL SCHOOL

ANATOMY

CLARENCE M. JACKSON, M.S., M.D., Professor of Anatomy and Director of the Department

Postnatal Growth and Variability of the Body and of the Various Organs in the Albino Rat. *American Journal of Anatomy*, 15(1913):1-68.

Textbook of Human Anatomy. Blakiston, Philadelphia (1914): 1550 pages. (This text is by Morris but the fifth edition was edited by Jackson and the sections on Morphogenesis and Digestive System were written by him.)

JOHN BLACK JOHNSTON, Ph.D., Professor of Comparative Neurology

University Organization. *Science*, 38(1913):908-918.

The Nervous Terminals in Man and Mammals. *Anatomical Record*, 8(1914):185-198.

THOMAS G. LEE, B.S., M.D., Professor of Comparative Anatomy

The Passage of the Ovum through the Uterine Epithelium in *Geomys Bursarius*. *Anatomical Record*, 8(1914):126-127.

An Improved Electric Microscope Lamp. *Anatomical Record* 8(1914):127-128.

EDWIN A. BAUMGARTNER, B.A., M.A., Instructor in Histology and Embryology

The Development of the Gall Bladder and Hepatic Ducts in *Amblystoma*. *Anatomical Record*, 8(1914).

PHYSIOLOGY AND PHARMACOLOGY

ELIAS POTTER LYON, Ph.D., M.D., Director of the Department of Physiology, Dean

The Problems of Teaching General Medicine. *Journal American Medical Association*, 60(1913):1044-1054.

The Road to Rational Medicine: A Comparison of Medicine and Engineering. *Illinois Medical Journal* (1913):14.

Equipment and Instruction in the Laboratory Years. A chapter in "Medical Research and Education" by various authors. *Science Press* (1913).

Principles of Curriculum Making. *Science* (1914):661-672.

The Migration of Students: A Plea for the Individual in Education. *Science* (1913):533-543.

Why Have We Doctors? *Proceedings of the Twenty-second Annual State Conference of Charities and Corrections* (1913):140-148.

ARTHUR DOUGLASS HIRSCHFELDER, M.D., Professor of Pharmacology and Director of the Department

Diseases of the Heart and Aorta. Lippincott, Philadelphia (1913): 738 pages.

Clinical Studies in the CO₂ Content of the Alveolar Air. *Journal Experimental Medicine*, 11(1913):551-563.

Studies in Experimental Pneumonia. *Journal Experimental Medicine*, 17(1913):657-678.

Giebt es besondere fluoreszierende Substanzen im Serum bei Pellagra. *Centralblatt für Bakteriologie*, 16(1912).

Simple Methods in the Diagnosis of Cardiac Diseases. *Virginia Medical Semi-monthly and Transactions International Medical Congress* (1914).

Reviews of

Diuretics in Cardiac Disease. *Journal American Medical Association*, 11(1913):340-344.

Relations of Pharmacology to the Practising Physician. *St. Paul Medical Journal* (1914).

RICHARD OLDING BEARD, M.D., Associate Professor of Pharmacology

Chapter on Fever. Wood's Reference Handbook of Medical Sciences. Wm. Woods & Co. (1914):392-398.

The Mayo Clinic Building at Rochester. *Journal-Lancet*, 34(1914):425-434.

The Functions of a Modern Hospital. *Modern Hospital*, 2(1914):4.

J. F. McCLENDON, M.S., Ph.D., Instructor in Physiology

Laws of Surface Tension and their Application to Living Cells and Cell Division, *Archiv für Entwicklungsmechanik der Organismen*, 37(1913):233-247.

On the Nature and Formation of the Fertilization Membrane of the Echinoderm Egg. *Internationale Zeitschrift für physikalisch-chemische Biologie*, 1(1914):163-168.

The Relation between Abnormal Permeability and Abnormal Development of Fundulus Eggs. *Science*, 38(1913):280.

Antagonistic Action of Salts and Anesthetics in Increasing Permeability of Fish Eggs. *Science*, 40(1914):28-34.

Electric Charges of the Protoplasm and other Substances in Living Cells. *Internationale Zeitschrift für physikalisch-chemische Biologie*, 1(1914):159-162.

Experiments in Permeability of the Frog's Egg. *Publication no. 183 Carnegie Institution*, 183(1914):123-130.

Absorption of Water Through Skin of the Frog. *Internationale Zeitschrift für physikalisch-chemische Biologie*, 1(1914):169-172.

Increase in Permeability of the Frog's Egg at Beginning of Development and Preservation of the Life of the Egg. *Science*, 40(1914):70-72.

Preparation of Material for Histology and Embryology. *Anatomical Record*, 7(1913):51-61.

Review of

J. Playfair McMurich, The Development of the Human Body, *Anatomical Record*, 7(1913):102-103.

PATHOLOGY AND BACTERIOLOGY

ROBERT H. MULLIN, B.A., M.B., Associate Professor of Public Health

Report of Laboratory Division Minnesota State Board of Health. *New Series Fourth Report Biennial Report to Legislature* (1912):295-401.

Railroad Water Supplies in Minnesota. *United States Public Health Reports*, 29(1914):1222-1245.

Report of Laboratory Division Minnesota State Board of Health. *New Series Fifth Report Biennial Report of Board to Legislature* (1914).

E. THOMPSON BELL, B.S., M.D., Assistant Professor of Pathology

Functional Tests in Experimental Tartrate Nephritis (with Potter). *American Journal of Medical Science* (1915).

The Synthesis of Hippuric Acid in Nephrectomized Rabbits (with Kingsbury) *Journal of Biological Chemistry* (1915).

The Lesions produced by the Bacillus Proteus (with Larson).

ARTHUR T. HENRICI, M.D., Instructor Pathology and Bacteriology

The Staining of Yeasts by Grain's Method. *The Journal of Medical Research*, 30(1914):409-415.

MEDICINE

ARTHUR S. HAMILTON, M.D., Associate Professor Nervous and Mental Diseases

Cervical Ribs as a Cause of Brachial Neuritis. *Journal-Lancet* (1914):26.
Associated Lesions of Brain Tumors. *Journal-Lancet* (1914):1-15.

JULIUS PARKER SEDGWICK, B.S., M.D., Assistant Research Professor in Physiologic Chemistry and Clinical Instructor in Pediatrics

Spasmophilia with Especial Reference to Familial Reactions and Repeated Absences. *American Journal of Diseases of Children*, 7(1914):140-148.
Roentgenography in the Diagnosis of the Diseases of Children. *Illinois Medical Journal*, 25(1914):363-371.

EDGAR J. HUENEKENS, B.A., M.D., Instructor in Medicine

Die Acidität des Mageninhalts im Säuglings- und Kindesalter bei Milch- und Fleisch-haltiger Probenahrung. *Zeitschrift für Kinderheilkunde*, 11(1914):297-304.

FREDERIC W. SCHULTZ, B.A., M.D., Instructor in Pediatrics

The Dangers of Overfeeding with Carbohydrates, especially the Starches; with report of a case. *Journal-Lancet*, 24(1914):178-180.
Recent Views on the Diagnosis and Treatment of Febrile Convulsions in Infancy and Childhood. *Journal-Lancet*, 34(1914):5
Infant Feeding in Theory and Practice. *Journal-Lancet*, 33(1913):371-376.
The Fat Metabolism of the Actively Tuberculous Child. *American Journal Diseases of Children*, 8(1914):235-244.
A Study of the Ammonia Coefficient in Chronic Alimentary Disturbance due to Over-feeding with Cow's Milk. Thesis presented before the Minnesota Academy of Medicine. 10 pages.

SURGERY

ARTHUR J. GILLETTE, M.D., Professor of Orthopedics, in charge of the Division

Injurious Effects of Forcible Passive Motion in Diseased and Traumatic Joints. *Journal of the American Medical Association*, 63(1914):1383-1385.

FRANK C. TODD, M.D., Professor of Diseases of the Eye, Ear, Nose, and Throat

The Newer and More Successful Operation for Glaucoma. *St. Paul Medical Journal*, May (1914).
Research in Ophthalmology and the Training of Ophthalmologists. *Journal of American Medical Association*, July (1914).
A Cataract Incision Leaving Undetached Conjunctival Flap with Bridge of Con-junctiva on Temporal Side.

J. FRANK CORBETT, M.D., Associate Professor of Experimental Surgery

The Shock of Anesthesia. *American Journal of Medical Science* (1914).
The Changes in the Adrenal in Shock. *Transactions Western Surgery* (1914).
A Substitute for the Syringe in the Doud and Curtiss Equipment. *St. Paul Medical Journal*, 16(1915):594.
The Pathology of Osteomyelitis.

ARTHUR AYER LAW, M.D., Associate Professor of Surgery

Membrane Pericolicitis. *Journal-Lancet* (1913):9-20.

Neutral Tumors of the Sacrum. *Surgery, Gynecology, and Obstetrics* (1913):340-346.
 The Surgical Aspect of Cervical Ribs. *Journal-Lancet*, June (1914):1-15.
 Avulsion of the Scalp. *Surgery, Gynecology, and Obstetrics*, August (1914):229-232.
 Primary Inflammatory Tumors of the Cecum. *Journal-Lancet*, October (1913):1-12.

ARCHIBALD MACLAREN, B.S., M.D., Associate Professor of Surgery

A Study of Three Hundred Cases of Appendicitis with Special Reference to Pelvic Complications. *Journal American Medical Association*. 8 pages.

ARTHUR T. MANN, B.S., M.D., Assistant Professor of Surgery

The Free Transplantation of Fascia Lata. *Annals of Surgery*, 60(1914):481-484.

SAMUEL EDWARD SWEITZER, M.D., Assistant Professor of Dermatology

Sacroïd of Boeck. *Journal American Medical Association*, 63(1914):991-996.

JAMES E. MOORE, M.D., Professor of Surgery and Chief of the Department

Importance of Orthopedic Treatment of Tubercular Joint Disease. *Journal-Lancet*, January (1914).

Fracture of the Neck of the Femur. *Old Dominion Journal*, March (1914).

Studies in the Functions of the Periosteum. *Surgery, Gynecology, and Obstetrics*, July (1914).

Has the Last Word Been Spoken Concerning Appendicitis? *Journal American Medical Association*, August (1914).

HORACE NEWHART, M.D., Assistant in Diseases of the Eye, Ear, Nose, and Throat

A Clinical Study of the Serous and Purulent Diseases of the Labyrinth by Dr. Erich Ruttin, translated by Horace Newhart, Rebman Co., New York (1914):222 pages.

OBSTETRICS

FRED LYMAN ADAIR, B.S., M.D., Assistant Professor of Obstetrics

Obstetric Diagnosis. *Post Graduate*, 28(1913):1096-1103.

Sero-Diagnosis of Pregnancy. *St. Paul Medical Journal*, 16(1914):408-412.

Syphilis and Pregnancy. *Post-Graduate*, 27(1912):1109-1115.

FRED E. LEAVITT, M.D., Assistant Professor of Obstetrics

Ectopic Gestation. *St. Paul Medical Journal*, May (1914):292-299.

The Sero-Diagnosis of Pregnancy. *St. Paul Medical Journal*, June (1914):371-376.

UNIVERSITY HOSPITAL

LOUIS B. BALDWIN, M.D., Superintendent of University Hospitals

A Review of Current Hospital Topics. *Journal American Medical Association*, 63(1914):1744-1746.

COLLEGE OF DENTISTRY

ALFRED OWRE, B.A., M.D., C.M., D.M.D., Dean, Professor of Operative Dentistry and Dental Metallurgy

Dental Education. *Japanese Dental Journal* (1914).

THOMAS B. HARTZELL, D.M.D., M.D., Professor of Oral Surgery, Therapeutics, and Clinical Pathology

The Report of the Mouth Infection Research Corps of the National Dental Association, for the year ending July 1, 1914. *Bulletin of the National Association* (1914).

Gas and Oxygen Anaesthesia for Conservative Operations. *Proceedings of the Sixth International Dental Congress*, London (1914).

Oral Infection in Relation to Constitutional Infection. *Journal-Lancet* (1913).

Pyorrhoea up to Date. *The Dental Summary*, 34(1914):305-319.

The Operative and Post-operative Treatment of Pyorrhoea. *The Dental Cosmos*, 55(1913):1094-1107.

The Responsibility of the Physician in Regard to Mouth Infections and their Relation to Constitutional Effects. *Journal of the American Medical Association*, October (1913).

The Surgical Relations of Mouth Infections. Read before the Academy of Medicine, New York City, February (1914).

Arthritis Deformans associated with Dental Abscess of two case histories. *Bulletin of the National Dental Association*, March (1914).

A Discussion of the Etiology of Pyorrhoea Alveolaris and a Review of One Thousand Cases. *Items of Interest* (1914).

Secondary Infections having their Primary Origin in the Oral Cavity. *Journal of the Allied Societies*, June (1914).

FORREST H. ORTON, D.D.S., Professor of Crown and Bridge Work

Fundamental Principles of Crown and Bridge Work. *Svensk Tandläkare Tidskrift*, 6(1913):121-137.

The Importance of the Anatomy of the Tooth in Relation to Crown Work. *Norske Tandlaegeforenings*, 23(1914):361-370.

Fundamental Principles Involved in Preparation of Roots for the Reception of Banded Crowns. *Dental Cosmos*, 25(1913):909-915.

A Yearning for the Solution of the Color Problem. *Dominion Dental Journal*, November (1914).

COLLEGE OF PHARMACY

EDWIN LEIGH NEWCOMB, P.D., Associate Professor Pharmaceutical Botany

Thirtieth Annual Convention of the Minnesota State Pharmaceutical Association (edited and arranged with the assistance of Dean F. J. Wulling) Colwell Press (1914):264 pages.

Vegetable Drugs of the Future. *St. Paul Medical Journal*, August (1914).

Rumex, Pulsatilla, Federal Drug Standards. *Proceedings of the Committee on Unofficials, American Pharmaceutical Association* (1914).

Illustrative Material as follows:

Brassica, Fruiting Specimens, *Applied and Economic Botany, Kraemer*. Figure 310, page 552.

Datura fastuosa flava, *Applied and Economic Botany, Kraemer*. Figure, 375, page 682.

Hyoscyamus niger annuus. *Applied and Economic Botany, Kraemer*. Figure 377, page 685.

Matricaria -Chamomilla, *Applied and Economic Botany, Kraemer*. Figure 394, page 715.

Brauneria angustifolia, *Applied and Economic Botany, Kraemer*. Figure 399, page 724.

Reports on the Winter Meetings of the Northwestern Branch of the American Pharmaceutical Association. *Journal American Pharmaceutical Association*, 2 (1913):1596-1598.

GUSTAV BACHMAN, Ph.M., Ph.D., Assistant Professor of Pharmacy

Suggestions for the Improvement of Some U. S. P. Formulas. *Proceedings of the Minnesota State Pharmaceutical Association* (1913):92-94.

An Apparatus for the Manufacture of Lime Water. *Proceedings of the Minnesota State Pharmaceutical Association* (1914):130-132.

CHARLES H. ROGERS, Ph.B., Ph.C., B.S. in Pharmacy

The Standardization of Ergot Preparations Demonstrated by the Cock's-Comb Test. *Journal of the American Pharmaceutical Association*, March (1914).

SCHOOL OF MINES

PETER CHRISTIANSON, B.S., E.M., Professor of Metallurgy

Peat in Iron Ore Industry. *The Iron Age*, 94(1914):490-491.

EDWARD P. McCARTY, E.M., Professor of Mining

Chapter on Mines and Minerals in *Fourth Biennial Report of the Minnesota Tax Commission*, (1914):106-149 inclusive.

Manganiferous Iron Ores of the Cuyuna Range.

GEORGE J. YOUNG, B.S., Professor of Mining Engineering

Potash Salts and other Salines in the Great Basin Region. *Bulletin no. 61 Professional Paper Bureau of Soils, Department of Agriculture, United States Government*. June (1914).

FREDERICK W. SARDESON, Ph.D., Assistant Professor of Paleontology

Characteristics of a Corrosion Conglomerate. *Bulletin of the Geological Society of America*, 25(1914):265-276.

SAMUEL L. HOYT, E.M., Ph.D., Assistant Professor of Metallography

The Copper-rich Kalchoids. *Journal of the Institute of Metals*, 10(1913):235-274.

On the Copper-rich Kalchoids. *International Journal Metallography*, 6(1914):129-167.

The Copper, Tin, Zinc Alloys. *Journal American Institute Metals* (1914):32 pages.

ERWIN W. McCULLOUGH, E.M., Instructor in Mining

Metal Mining. *Journal of the Association of Engineering Societies*, 51(1913):130-136.

JOHN F. MURPHY, C.E., Instructor in Mining

Chapter on Mines and Minerals in *Fourth Biennial Report of the Minnesota Tax Commission* (1914):70.

Efficient Signal System for Underground Mine during Stock Piling Season. *Engineering and Mining Journal*.

SCHOOL OF CHEMISTRY

GEORGE B. FRANKFORTER, M.A., Ph.D., Dean and Professor of Chemistry

Equilibria in the Systems, Water, Acetone and Inorganic Salts. (With Miss Cohen) *American Chemical Society*, 36(1914):1104-1134.

The Action of Chloral, Chloral Hydrate and Bromal on Certain Organic Compounds in the Presence of Aluminum Chloride. (With Mr. Kritchevsky) *American Chemical Society*, 36(1914):1512-1529.

New Apparatus for Determination of Hydrogen Sulfide in Water. Part I, *American Chemical Society*, 6(1914):1-4.

The Action of Trioxymethylene on the Various Hydrocarbons in the Presence of Aluminum Chloride. (With Mr. Kokatnur.) *American Chemical Society*, 36 (1914):1530-1537.

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

A Method for the Determination of Phosphorus in Vanadium Steel and Ferro-Vanadium. (With Mr. P. M. Skartvedt.) *Journal of Industrial and Engineering Chemistry*, 5(1913):838-839.

FRANCIS C. FRARY, M.S., Ph.D., Assistant Professor of Chemistry

Laboratory Manual of Glass-Blowing. McGraw-Hill Book Company (1914):60 pages.
The Determination of Zinc in Treated Ties. *Journal of Industrial and Engineering Chemistry*, 5(1913):738-9.

LILLIAN COHEN, M.S., Instructor in Chemistry

Equilibria in the Systems, Water, Acetone and Inorganic Salts. Eschenbach Printing Company (1914):42 pages.

WOLF KRITCHEVSKY, D.Sc., Research Assistant in Chemistry

See Frankforter.

EARLE KENNETH STRACHAN, M.S., Ph.D., Instructor in Chemistry

The Transference Number, Ionization and Conductance of Hydriodic Acid at 25 degrees. *Journal of the American Chemical Society*, 34(1914):810-819.

COLLEGE OF EDUCATION

FLETCHER HARPER SWIFT, Ph.D., Professor of Education

History and Principles of Religious Education.

BENJAMIN FLOYD PITTINGER, M.A., Instructor in Education

Rural Teachers' Training Departments in Minnesota High Schools. University of Minnesota *Current Problems*, no. 2 (1914):30 pages.

EXTENSION DIVISION

RICHARD R. PRICE, M.A., Director of University Extension

Proceedings of the First Annual Convention, League of Minnesota Municipalities. (With G. A. Gesell) Farnham Printing Co., (1913):166 pages.

The Scope and Proper Limitations of Leagues of Municipalities. *The American City*, 10(1914):29-31

Planning a Model Town. *The American City*, Town and Country Edition, 11(1914):198-201.

GERHARD A. GESELL, B.A., Assistant Professor of Economics

Minnesota Public Utility Rates. University of Minnesota *Current Problems*, no. 3 (1914):254 pages.

MAC MARTIN, Professorial Lecturer in Advertising

"Sticking to the Subject," *System*, 25(1914):352-360.

Advertising Exhibit and Its Lessons. *Printer's Ink*, 88(1914):3-10

Munsingwear's Successful Cultivation of Dealer-Agents. *Printer's Ink*, 88(1914):3-9.

- RAYMOND VINCENT PHELAN, Ph.D., Instructor in Social Economics
- State Regulation of Price. *Proceedings Minnesota Academy of Social Sciences*, 6 (1912):52-56
- Her Wages. *Westminster Review*, 180(1913):267-71.
- Minnesota Compensation Law. *American Economic Review*, 3(1913):987-989.
- Minnesota Minimum Wage Law. *American Economic Review*, 3(1913):989-990.
- To Work, to Live, and to Govern, or Vocation and Democracy. *Labor Digest* (1913): 3-5
- Taxation of Money and Credits in Minnesota. *Indiana University Bulletin*, 12(1914): 44-47
- Review of*
- E. H. Downing. History of Accident Indemnity, *American Economic Review*, 3(1913): 935-937.

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