

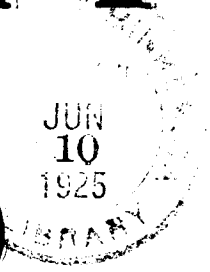
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Vol. 5 No. 79

June, 1925

MINNESOTA CHATS

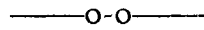


For a Better Minnesota



Published Weekly by the University of Minnesota Press, Minneapolis. Entered as second class matter at the Minneapolis, Minn., post-office. Acceptance for mailing at special rate of postage provided for in section 1103, Act of Oct. 3, 1917, authorized May 26, 1923.

Foreword



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The first issue is not typical of those that are to follow, but is an attempt to sketch concisely major steps in the development of the University and its Colleges and Schools that have been taken during the first quarter of the twentieth century.

THE EDITOR

Among Campus Views and Notables

Right

At the Center of
University Farm
Administration
and
Engineering Building



Left

Dean E. P. Lyon
Medical School



Right

Dean E. M. Freeman
College of Agriculture
Forestry and Home
Economics



Left

Medical School
Institute
of
Anatomy



Between 1915 and 1920 all medical activities of the University were transferred to the new campus and established either in Millard Hall or the Institute of Anatomy.

Because of limited laboratory facilities, the Medical School has found it necessary to limit the entering class to approximately 100 members, and the selection of those who shall be admitted has been a task requiring the strictest fairness and no little diplomatic delicacy. Applicants are admitted on a basis of scholarship and character, a "C" average in pre-medical work being one of the unwavering requisites. As a consequence of this rather strict selection few of the men who gain admission to the first medical year drop out and the graduating class has often been about as large as it was in its first year. To fill the vacancies of those who do drop out, Minnesota has at all times had a long list of applicants with advanced standing, many of them men from universities which give but the first two years of medicine.

An improvement of outstanding importance to the state was the creation in 1922 of the Department of Preventive Medicine and Public Health, with which was allied the Students' Health Service. The latter organization conducts physical examinations of all entering students, treats students who become ill, follows up the health records of those who are shown by preliminary examinations to need further care, and takes charge of the examination and health supervision of students who are to engage in athletics. It also maintains student hospitals on both the Main Campus and the campus of University Farm. More recent innovations have been the offering of courses in medical technology for the training of clinical and laboratory technicians, which work is given jointly by the College of Science, Literature, and the Arts and the Medical School, and courses in occupational therapy, which are conducted in the College of Education with the advisory assistance of a medical representative.

During the World War the Medical School performed services of high merit. Forty per cent of the faculty entered military service and United States Base Hospital No. 26 was organized and to a large degree staffed at the University.

Dr. R. O. Beard, to whom "Minnesota Chats" is indebted for most of the material in this sketch and in that on the School of Nursing, retires in the spring of 1925 as the last remaining member of the original Medical School faculty. He has been given the rank of professor emeritus by the Board of Regents.

The School of Nursing

THE University of Minnesota has a right to be proud of the progressive spirit of the Medical School, which has led the way to three important innovations in medical education, two of which have already been widely copied, while the third, the Mayo Foundation, would be copied if other institutions were given a like opportunity. Minnesota was the first to require a year of active internship in a hospital, following completion of class and laboratory work in medicine, before the M.D. degree was actually granted. Furthermore, it was at the University of Minnesota in 1909 that the first University School of Nursing was established. Eight seniors were graduated with the first class in 1912, and the present enrollment in the School of Nursing, a division of the Medical School, is above 200.

Both a three years course, leading to a certificate as "Graduate in Nursing" and a five years course, including two years in the Academic College and leading to the college degree, Bachelor of Science in Nursing, are now offered. About one-fourth of the students work for the college degree.

The growth of the School of Nursing was healthy but not great until in 1921 the Central School of Nursing was established, under which four major hospitals of the Twin Cities now offer their facilities to the young women in training. In that year arrangements were made whereby the Miller and Northern Pacific hospitals in St. Paul and the Minneapolis General Hospital were thrown open to student nurses together with the Elliot Hospital on the University campus. Now known as the University of Minnesota Hospitals, the group which started with the Elliot now includes also the George Chase Christian Memorial Cancer Institute and

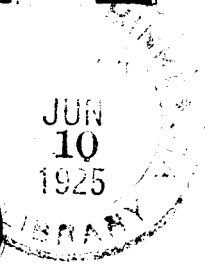
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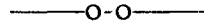


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THE EDITOR

A Sketch of the University of Minnesota During a Quarter Century 1900-1925

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TWENTY-FIVE years ago William McKinley was president of the United States, with Roosevelt reasonably obscure in the vice-presidency; the Russo-Japanese war was still in the future; football teams won first downs by advancing the ball five yards in three plays, and the University of Minnesota was a relatively small western institution with an enrollment of 3236 students.

In 1900, a quarter of a century ago, when the bicycle was in its heyday, the automobile a queer "contraption", and the steel and concrete skyscraper was unheard of, the University of Minnesota conducted no extension work, had no organized system of graduate study, no separate college of education, no courses of study looking particularly to training for business, not even a hospital in connection with its Medical School.

History is dealt with most conveniently by centuries, and events seem to have an accommodating way of so arranging themselves that this division is also logical. If the story of the University of Minnesota's growth and development were to be told from the beginning, it would run the risk of becoming merely chronological. The first 31 years, from 1869 to 1900, are taken for granted here as covering the period of necessary beginnings. These were vitally important, but they may be allowed to rest, secure under their laurels for honorable achievement.

In industry, in science, in social thought, in educational method and point of view the America of 1925 is a twentieth century America, just as it is in world outlook and in its mode of living. The problems it must face are twentieth century problems and its universities, which concentrate and typify the various phases of the working world, must reflect that world, for which they prepare young men and women. This shall be the story of the Univer-

sity of Minnesota during the first quarter of the twentieth century.

Growth in enrollment is important, because of the increasing drain it imposes on an institution's resources, but this review of a quarter century is not intended to be a matter of prating over mere physical expansion. That is something that has been brought about by social forces not altogether foreseen. Student bodies everywhere have increased from two to fourfold in relatively a few years. Much of the growth had taken place before educators awakened fully to the situation. The academic calm of college yards has not been fully restored following this inrush, which set the leaves of every campus bush aflutter.

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It was as if a pool of water, which had been chemically tested and found adapted to man's uses, were to be inundated suddenly by a new torrent, one that entirely changed its nature and made new tests necessary.

This pronounced change was coincident with the end of the world war rather than the beginning of the new century, its importance here being that it wiped out forever the meandered limits of the nineteenth century university, eradicated its shore line, and irreverently left some of the oldest and most safely stranded ideas about universities afloat in a strange element.

The story of the University of Minnesota since 1900 must be set down as one of facts, not theories. The facts of its development in those 25 years make up a story of much achievement, but probably of even greater struggle to keep pace with the astonishing progress of the state of Minnesota and the nation.

Growth is most clearly pictured by the statistician's graphic chart, showing where peaks are pushed up and outlines changed as the growing process goes on. The chart for the University of Minnesota shows some tremendous peaks for 1925 that were not even started in 1900, also some relative declines during the quarter century (see pages 4 and 5).

More clearly than anything else, the chart shows the trend to specialized or professional courses. In 1900 more than half of the total registration in the College of Science, Literature, and the Arts was in the advanced years. In 1924, out of 4059 students in that college, only 675 were pursuing cultural work beyond the sophomore year with a bachelor of arts degree in mind.

The remainder of the students had chosen to specialize in definite fields such as Education, Business, and the like. Medicine, requiring two years of pre-medical work, had drawn an increasing number, as had Dentistry and Chemistry. The most striking comparison is that Education, drawing its students from Science, Literature, and the Arts at the end of the sophomore year, had grown from nothing to an enrollment of 1411, while the upper years of the academic college itself had increased only from 537 to 675. At the same time one

must remember that many registered as College of Education students still take most of their work in the Arts College, making the change partly one of bookkeeping, partly of actual fact.

Similar growth is apparent in varying degrees in the professional schools that one enters as a freshman, Engineering, Pharmacy, and Agriculture, Forestry, and Home Economics.

Graduate Study Grows Swiftly

In the field of graduate study the figures show one of the most substantial and encouraging developments of all. When the new century began, a mere handful of students, 177 in all, were pursuing graduate work. A few years later graduate study was organized and centralized in a University-wide graduate school, which by 1924 was drawing students from every continent into its courses of unusual merit, especially in the field of agriculture, including plant sciences, bio-chemistry and entomology; in medicine, including the courses at the Mayo Foundation; in mining and geology, dentistry, education, engineering, history, English, sociology, economics, and the like.

Some of the major facts of the past quarter century have been these:

The re-organization of the Medical School, incident to the national movement for better medical teaching that followed the Carnegie Foundation report of 1909.

The organization of the University-wide Graduate School in 1905 and its reorganization in 1913 by Dean Guy Stanton Ford.

The establishment in 1909 of the first University School of Nursing in the world.

The organization in 1913 of the General Extension Division, offering afternoon and night classes on and off the campus, as well as study by correspondence and in short courses, reaching in all about 7000 Minnesota people each year, through direct instruction, and thousands more through entertainments and motion pictures.

Enjoyment, successively, of the fresh stimulus and breadth of outlook of four such presidents as Cyrus Northrop, George Edgar Vincent, Marion Leroy Burton, and Lotus Delta Coffman.

The organization in 1904 of the General Alumni Association, which has served and befriended the University of Minnesota so loyally for two decades.

The creation in 1905 of the College of Education; through which the University has been

able to render broad service to the public school system of the state and to the general field of scientific education.

The receipt of such splendid gifts for medical education as that from the A. F. Elliot estate, making the Elliot hospital possible; the Mayo Foundation of more than \$2,000,000; the George Chase Christian Memorial Cancer Institute; The Todd Eye, Ear, Nose and Throat Pavilion; the W. H. Eustis gifts of over \$1,500,000 for the Minnesota Hospital and Home for Crippled Children, and the \$1,250,000 offer of the General Education Board in the interest of better buildings for hospital and medical instruction purposes.

Institution in 1900 of strictly collegiate courses in Home Economics and the establishment of that branch in the College of Agriculture in 1913.

The reorganization in 1912-13 of the department of physical education for women, and in 1921-22 of that for men.

Establishment of the University-wide Students' Health Service in 1920-21, and the subsequent development of courses in public health nursing and the like.

Administrative changes in the College of Science, Literature, and the Arts due to the rapid growth of its student body and the need for better guidance of students, especially of those who attend for only two years, neither entering a professional school nor going on into the academic senior college for the bachelor of arts degree.

The development of the Agricultural Experiment Station, the Agricultural Extension Division, with its multiform fine services, and the expansion and improvement of both collegiate and post-graduate work in the Department of Agriculture.

The upbuilding on the campus of a Mines Experiment Station, now called the finest in the world, devoted to problems arising in the mining and treatment of iron and manganese ores.

The Library Made Efficient

Reorganization of the University Library has been a step in advance that out-distances in educational importance the addition to physical plant of the fine, new building in which the centralized library is housed. Most of the departmental libraries that were scattered about the campus in different buildings have been brought together under a single roof, and more important still, ample space has been provided for all students who wish to work in the library. This had not been possible for a num-

ber of years in the old and cramped library building that has now been devoted to classroom purposes.

Improvement in Physical Plant

Changes in the physical plant during the first quarter of the century are described more easily in terms of what was standing in 1900 than of what has been built since. A complete list of campus buildings, with dates of their erection, printed in the 1924 report of Comptroller A. J. Lobb, lists nine buildings standing on the Main Campus that were there in 1900. These are the Armory, Dentistry, Law, and School of Business buildings, the Old Library, Old Music building, Observatory, Minnesota Union, and Pillsbury Hall.

Buildings erected since 1900, many of the later ones put up with funds of the Comprehensive Building Program, include the entire Medical group on the south side of Washington avenue, the Engineering group, Chemistry, Mines, Mines Experiment Station, Library, Music building, Women's Gymnasium, Education building, Shevlin Hall, Physics, Folwell Hall, Sanford Hall, and the Storehouse and Shops. The Administration building is now being completed.

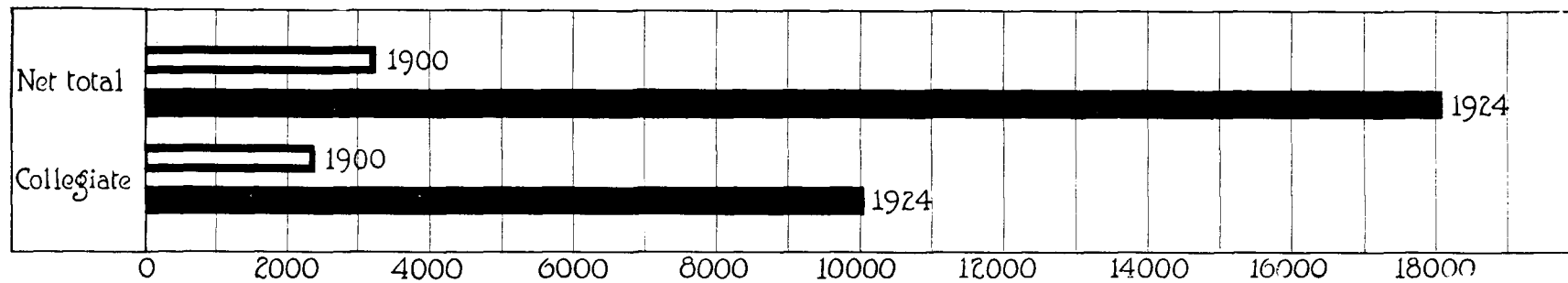
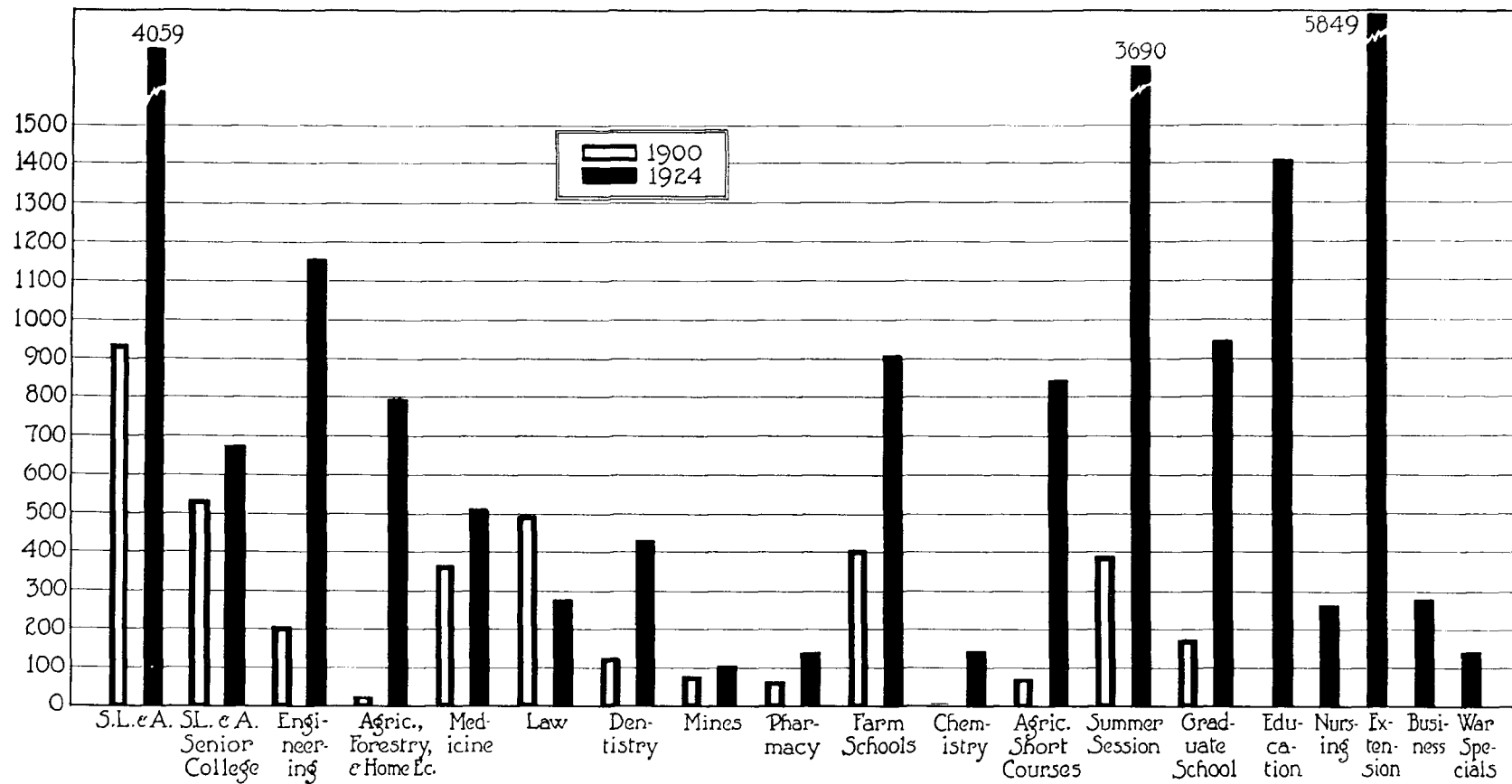
At University Farm the past quarter-century has produced, among others, the Administration building, Haecker Hall, Agricultural Engineering building, dormitories, gymnasium, home managements houses, many barns, service buildings and sheds, the Chemistry building, Home Economics building, and other structures.

It must not be deduced, however, that all of these are splendid new buildings. Many of them were put up soon after 1900, when the University of Minnesota was still a small institution. Some are outgrown and others have been abandoned to new uses as the department for which they were originally built outgrew them. An example of this is found in the Department of Electrical Engineering. The old building for this department, erected in 1900, had been outgrown years before a new one was finally completed in 1924. Medicine outgrew its quarters on the old campus, was moved to the new tract on the riverbank south of Washington avenue, and is now so cramped

The University of Minnesota

University Enrollment

College or Division	1900	1924
Science, Literature, and the Arts, total	936	4095
Senior college	537	675
Engineering	209	1157
Agriculture, Forestry, and Home Economics	23	798
Schools of Agriculture	407 (one)	910 (three)
Dentistry	125	430
Mines	77	103
Medicine	368	514
Graduate School	177	947
Pharmacy	63	141
Nursing		268
General Extension (including Correspondence)		5849
Agricultural short courses	73	840
Education		1411
Business		284
Law	498	280
Chemistry	5	143
Summer Sessions	389	3690
War specials		143
Duplicates	(27)	(3,466)
Net total	3236	18,093
Collegiate	2367	10,034



in those quarters that additional buildings are imperatively needed. This was recognized by the General Education Board when it made its tentative offer of a \$1,250,000 gift.

The College of Education has been relieved in part by expansion into the Old Library building, as have the departments of political science and history. But Education needs still more space. Biology has outgrown its building near the Medical Group and will be relieved by the erection of a new Botany building. Physics and Law are in need of enlarged quarters.

Practically all of the Physical plant development at the Northwest and West Central Schools of Agriculture and at the Experiment stations at Waseca, Grand Rapids and Duluth, has come since 1900.

Prior to 1922 the University had experienced three times the pleasure of receiving gifts to cover the cost of new buildings. One of these was for Pillsbury Hall, a gift from John S. Pillsbury, one-time governor of Minnesota. Another was a sum from the A. F. Elliot estate which served as a nucleus in financing the Elliot Memorial Hospital, while a third was the gift of Shevlin Hall, presented by Thos. Shevlin, Sr. as a memorial to Alice Shevlin, his wife.

Minnesota Spirit Blossoms

Then in 1922, came the finest recorded outburst of Minnesota spirit, when alumni, undergraduates, faculty members and other individuals interested in the University pledged \$1,800,000 from which the Stadium has been built and which will eventually yield something like \$1,000,000 for the proposed Northrop Memorial Auditorium. With these gifts have come those for the Todd Memorial Eye, Ear, Nose and Throat hospital, the George Chase Christian Memorial Cancer Institute given by the Citizens Aid Society, and the Minnesota Hospital and Home for Crippled Children, given by William Henry Eustis. Mrs. F. C. Todd, Mrs. E. C. Gale and Mrs. Emory Mapes gave substantial sums toward the Todd Memorial Hospital, the Board of Regents voting additional necessary money.

Another outstanding gift to the University of Minnesota was that of \$350,000 from the

estate of W. J. Murphy for establishment of the W. J. Murphy School of Journalism. Plans for the establishment of an enlarged journalism curriculum under the terms of this gift are now progressing under the direction of President Coffman and Dean J. B. Johnston of the College of Science, Literature, and the Arts.

The Growth of a Statewide Campus

It is years since the University of Minnesota was solely a Minneapolis and St. Paul institution. It includes today two Schools of Agriculture, four Experiment Farms and Stations, a fruit breeding farm, a Forest Experiment Station and a forestry field station, all outside the twin cities. The Northwest School and Station is at Crookston; the West Central School and Station at Morris; the North Central Station at Grand Rapids, the Northeast Farm and Station at Duluth, and the Southeast at Waseca. The Experimental Fruit Breeding Farm is at Zumbra Heights, the Forest Experiment Station, at Cloquet, and the Forestry Field Station in Itasca State Park. The third School of Agriculture, the Central School, is at University Farm, where also the Central Experiment Station is situated.

College of Science, Literature, and the Arts

ALTHOUGH the academic college has always been predominant at the University of Minnesota in numbers enrolled and variety of courses offered, the College of Science, Literature, and the Arts in its present form came into being less as the result of a purposeful organization than as the reorganization and unification of departments remaining after the professional schools, one after another, split off and effected faculty organizations of their own. Until about 1900 there was a general University faculty whose members met together. Gradually such faculties as Medicine, Dentistry, Law and the like began to meet separately, with the result that Science, Literature, and the Arts adopted a like separate organization and John F. Downey, head of the department of mathematics, became its first dean.

This established a natural basis for the development of the combined courses which have come to play so prominent a part in the organization of studies, such as the combined course in arts and medicine, in which the first two years are in the College of Science, Literature, and the Arts, and the other four in the Medical School. Similar courses now combine work in arts and dentistry, arts and law, arts and chemistry, arts and architecture, arts and nursing and arts and interior decoration. The first of these, that in arts and medicine, was established in 1906.

As a result of these developments and of the greatly increased enrollment in its departments, this college has come to have at least a triple function, the parts of which are to give such training as they can best receive to the very large number of students who remain in the University one or two years but no longer: to give the necessary preparatory work to students who plan to complete a course of four or more years, either wholly in the arts college or with one or two years in that college and the remainder in a professional school, and, third, to provide senior college training in arts courses to the many students who neither drop out nor transfer from the academic courses to a professional school. Coupled with the last phase, senior college teaching, it performs the function of advising and preparing many specially fitted students to enter the graduate school for advanced work, preparatory to teaching or research.

In the fall of 1914 Dean J. B. Johnston, who had been at Minnesota in the Medical School since 1907, succeeded Dean Downey as administrator of the college, a position which he has held since that time.

Dean Johnston's policy has been from the first to make the college as fully serviceable as possible to all who attend it and to test and guide students in such a manner as to lead them into those studies from which they can derive the greatest benefit.

Introduce Special Courses

In line with this policy the college has introduced in the past 10 years, a number of special courses designed to give technical and vocational

training. Among them are courses in training for social and civic work, for state and federal administration, for municipal administration and engineering, for the diplomatic and consular services, or to train students as medical technicians or hospital librarians. More recently a course has been introduced in which the major study is military science and tactics. There is also the course in music, which leads to the bachelor of arts degree. Vocational courses lead to the degree, bachelor of science.

The trend toward providing various lines of special training to meet the needs of different students has led the faculty to propose special modifications of organization and teaching in the first two collegiate years so that students who do not wish to take four full years of work may pursue special courses arranged with an eye to their usefulness in after life. Within the past year the arts college faculty has begun considering some plan under which recognition in the form of a certificate or other emblem may be given to students who remain in that college for two years, taking specified courses, but who do not continue into the senior college.

Throughout the years of the first quarter-century the College of Science, Literature, and the Arts has grown steadily. Its enrollment in 1900 was 936; in 1913-14 it was 1592, while in 1923-24, despite the fact that the School of Business had drained off several hundred juniors and seniors and the College of Education had required its student, numbering more than 1,000, to register in education rather than the arts college, enrollment in the latter unit reached 4059. One result of this growth has been that the ratio of instructors to students has grown in 10 years from 1 to 14, to 1 to 20, a relationship which the institution has not yet succeeded in decreasing. In considering the amount of instruction done in senior college courses in the College of Science, Literature, and the Arts it must be borne in mind that students shown in the table as members of the senior academic college are taught in classes with at least an equal number of students of agriculture, business, chemistry, education, engineering, medicine, and mining. So all of these receive part of their instruction from the academic faculty.

Important Recent Innovations

In an article prepared for the "1926 Gopher" surveying the past 10 years of the college, Dean Johnston has made the following statements relative to progressive steps in the college:

"Honors Course: A special arrangement of senior college studies was made in 1915-16 for students who distinguished themselves in their work. This plan introduced the element of independent study for a part of the course, the results of such study to be presented in a graduating thesis. After a period during which this plan attracted the attention of increasing numbers of gifted students, it lost favor during the convulsions of the war and has since been replaced by the graduation honors at present in use. At the present moment there is great need for a re-examination of this matter and the provision of much better and more stimulating opportunities for gifted students.

"Quality credits: In recognition of the fact that the student who wins high grades in his classes, does so not only because of the finer quality of his mind but also because he actually does more work than his fellows, the faculty provided in 1921-22 the system by which students receive additional credit toward graduation in proportion to the honor points which they acquire in excess of the number required for graduation. This enables the more gifted student to graduate in less than four years and proceed earlier to graduate work, or to reduce his schedule of studies because of outside work for earning expenses, or enables him to devote part of his time to general or special reading and other cultural pursuits which would not be possible in regular classes.

"The orientation course: This introductory course for freshmen has been organized with a view to giving the college student at the beginning of his course a broad survey of the fields of knowledge and to stimulating his intellectual curiosity, opening his mind to different points of view regarding the problems of life and leading him to think for himself and assume responsibility for his thoughts and his actions. It is hoped that the course may be expanded in time so that all freshmen may take it.

"Other introductory and survey courses: Aside from the question whether the prevailing

type of elementary course gives the best introduction to the subject or department, there are strong reasons for offering more general informational or survey courses in various fields. The most immediate demand for such courses is based on the fact that at least twenty per cent of the capable freshmen will not proceed beyond the sophomore year in college work. Other students also who are now struggling through liberal arts or professional courses may well consider the fitness for their needs of more general informational and practically useful courses.

"Personnel studies and advice for students: Since 1915 attention has been given to the problem of discovering what students have the ability to do college work and discovering what special aptitudes and abilities are possessed by individual students. In 1917 the army intelligence tests were given to all our freshmen, and since 1919 special tests of college ability devised by our department of psychology have been given to freshmen at the time of registration. Painstaking studies of the results of the tests together with the high school scholarship and other sources of information, and comparison of these with college scholarship through several years, have furnished us with the means of predicting with remarkable accuracy ability to do college work and with less certainty the ability to do distinguished work or to achieve success in special fields. The results of these studies are now made available to students and their parents for their information and guidance.

Personal Adjustment Studied

The many problems of personal adjustment of students to the conditions of college life require more detailed and individual study. For this purpose a body of special advisers for students has been organized. As far as their time will go these advisers offer their help as friends of various classes of students, to discover their difficulties and handicaps, their special abilities or aptitudes, and to advise them or put them in touch with persons who can give expert advice."

The Animal Biology building was occupied in 1914-15. The building formerly occupied

Pillsbury Hall Tower and Entrance Arch



by the department of pathology and bacteriology has been converted into a laboratory for psychology. The Music Building was first used in 1922-23. The erection of the new Library has made the greatest single contribution to the material facilities of the college. Indirectly also the library and the administration building have released the old library building for instruction in college work.

Since 1914 the department of Anthropology has been separated from Sociology, the department of Psychology from Philosophy, and the department of Geography from Geology; a separate chair of Comparative Literature has been established, work in Journalism has been begun and the departments of English and of Rhetoric and Public Speaking have been united into a single department."

The College of Engineering and Architecture

IN 1900, the College of Engineering and Mechanic Arts, as it was then called, was located in the Mechanic Arts Building, now known as the School of Business, together with a small shop building just south of it, which has since been removed. However, the Department of Electrical Engineering, recently removed from its quarters in the east end of the present Men's Union, which was then the Chemistry Building, was occupying small spaces in several buildings, including the Armory.

The present Mechanical Engineering Building was constructed in 1900 as one wing of a proposed engineering building, and the mechanical shops were moved into it. Temporarily, the electrical laboratory occupied a portion of this building. The next year, the adjacent Electrical Building was constructed as another wing of the proposed General Engineering Building. This electrical Building included the University Power and Lighting Plant, which has since become the Power Plant Laboratory of the college. The Electrical Department continued to occupy this building until 1924, when the new Electrical Engineering Building was completed.

In 1911 and 1912, in connection with the expansion of the campus south of the Northern

Pacific Railway tracks, a new Experimental Engineering Laboratories Building was constructed and, also, the Main Engineering Building, at a cost of \$100,000 and \$225,000, respectively.

Except for a small addition to the Mechanical Engineering Shops to relieve the congestion caused by increasing numbers of students, and a fourth floor of the Main Engineering Building, which was constructed during the war to accommodate the Students' Army Training Corps, no additional buildings were provided for this college until 1923-24, when the new Electrical Engineering Building was constructed at a cost of \$375,000, including equipment. This new building is planned to be a part of a quadrangular unit, which will include a new Mechanical Engineering Building, with shops and power plant laboratory, to connect to the Experimental Laboratories Building. With the occupation of the new building by the Electrical Engineering Department, the old Electrical Engineering Building has been given over to the Department of Mechanical Engineering, and is known as the Power Plant Laboratory Building. A connecting passage has been constructed between this building and the Mechanical Engineering Shops. Some relief has thus been secured from the crowded conditions in the shops.

At this time (1925) plans are being drawn for the construction of an extension on the south end of the Experimental Laboratories Building, to accommodate the Highway Laboratory, and some space which will be rented to the Minnesota Highway Department. For some years the laboratory testing work of the Highway Department has been conducted in the University laboratories, under the direction of our professor of highway engineering, who is also a part-time employee of the State Highway Department.

There were about 240 students in this college in 1900. In 1916-17, the enrollment had increased to 530 students. In 1920-21, there were 1085 students. In 1924-25, there are about 1150 enrollments.

In 1910, the Board of Regents authorized the establishment of courses in Architecture and Architectural Engineering. In 1916, the name

of the college was changed to the College of Engineering and Architecture. In 1919, the administration of the College of Engineering and Architecture was correlated with that of the School of Chemistry, under one dean.

Between the years 1897 and 1902, the administration of the College of Engineering and the Mechanic Arts was in the hands of the President of the University, and there was no actual dean. In 1902, Professor Frederick S. Jones, of the Department of Physics, was made dean of the college and served until 1909, when he resigned to become dean of Yale College. In 1909, Mr. Francis C. Shenehon, a graduate of this college, was named dean. He resigned in 1917, and was succeeded by Professor John R. Allen, of the University of Michigan. Dean Allen resigned two years later, and, in accordance with the new policy then established by the Board of Regents, Dean Lauder W. Jones, of the School of Chemistry, was designated to be dean also of the College of Engineering and Architecture. He resigned in 1920 to go to Princeton University, and was succeeded by Professor O. M. Leland, of Cornell University, as dean of the College of Engineering and Architecture and the School of Chemistry.

Upon the recommendation of Dean Lauder W. Jones, in 1920, a reorganization of the Department of Experimental Engineering was approved by the Board of Regents. According to this plan, this department, as a department of instruction, was abolished. The various teachers were distributed among the other departments of the college in which their work logically belonged. The laboratory was divided into three groups, namely, Mechanical Engineering, Civil Engineering, Mechanics and Mathematics. The Mechanical Engineering group was further divided into the Divisions of Steam Engineering and Gas Engines. The Civil Engineering group included Structural Engineering and Highway Engineering. The Mechanics group included materials testing and hydraulics. The laboratory administration was placed in the hands of a director, and Professor F. B. Rowley was designated to fill this position. According to this plan, the laboratory work belonging to a certain department comes under the jurisdiction of that department, in-

stead of an independent department organized solely to teach laboratory courses. An improvement in administration and the correlation of instruction was the direct result.

By act of the Board of Regents in 1921, the Engineering Experiment Station and Bureau of Technological Research was established, with the dean of the College of Engineering and Architecture as its director ex-officio. The purpose of this action was to correlate and stimulate research work in this college and the School of Chemistry, and to provide an organization for receiving and administering funds given to the University for the furtherance of engineering research.

In 1921, upon the recommendation of the faculty of the College of Engineering and Architecture, the professional degrees Civil Engineer, Mechanical Engineer, etc., were transferred to the Graduate School, under requirements specified by this college. These requirements were made more advanced than they had been, and consist of a Bachelor's degree in the field represented by the professional degree, one year's graduate study, at least four years of responsible professional experience, and a professional thesis. These correspond to the most advanced requirements in the United States for these degrees.

For several years this college has co-operated with various departments of the state government. The fact that the laboratory testing work of the State Highway Department has been performed in the laboratories of this college has been mentioned above, as well as the fact that a new addition to the Experimental Laboratories Building is to be constructed this year (1925), which will provide additional and improved facilities for the conduct of this work. Associate Professor F. C. Lang, who has charge of the instruction in Highway Engineering is also Engineer of Tests and Inspection for the State Highway Department, being engaged on a part-time basis by the University and by the Highway Department.

Since 1921, the engineering appraisal work of the State Tax Commission has been performed under the supervision of the dean of this college, represented by Professor W. T.

Ryan, of the Department of Electrical Engineering. A special valuation engineer, Mr. R. B. Sleight, is employed full time upon this work, and an office is provided in this college as the headquarters for this service. The work embraces the appraisal of public utilities thruout the state, in particular, electric light and power properties.

Among the activities developed by the students of the college should be mentioned the student chapters, or branches, of the national professional societies, namely, the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, and the American Institute of Architects. All of these societies, combined with the Chemical Society, form one large association of technical students.

In 1920, the students of the College of Engineering and Architecture and the School of Chemistry formed what is known as the Engineers' Bookstore, with the object of securing books and supplies for these students at reduced prices. This bookstore has grown, during the following years, and has developed, under able management, into a large co-operative business. The students of the School of Business, at their request, have been admitted to the privileges of the Engineers' Bookstore.

A new course in Interior Decoration has been established in the Department of Architecture. This course is particularly adapted to the needs of women.—Ora M. Leland, Dean.

The Medical School

IN its present form, the University of Minnesota Medical School is a growth of the Twentieth Century. Not until 1900 were the entrance requirements of the Medical School made identical with those of the University. Three years passed before the present six year combined course in arts and medicine was offered, an innovation which became compulsory in 1908.

The new century at its opening saw the Medical School still on the old campus. There was no University Hospital, no School of Nursing, no Graduate School, no Mayo Foundation,

and not until more than 20 years had passed was the Students' Health Service established.

The Institute of Pathology and Public Health, now occupied jointly by the State Board of Health and the Department of Psychology, was erected in 1907 and was occupied by the Department of Pathology, Bacteriology, and Public Health.

1905 saw the first step taken towards establishing a University Hospital, when the University received a gift of \$113,000 from the estate of Dr. and Mrs. Adolphus F. Elliot to be devoted to the first unit of a teaching hospital. Three years later a group of public spirited citizens gave \$42,000 toward the purchase of the river bank site on which the Elliot Memorial unit of the University Hospital now stands.

Medical training in Minnesota was assigned exclusively to the University of Minnesota in 1908, when Hamline University voted to combine its Medical Department with the University of Minnesota Medical School. A year later the University organized its School of Nursing, the first in the world to be a University department. In 1911 the Elliot Memorial Hospital was opened. A year later, in 1912, the Institute of Anatomy and the new Millard Hall, still the Medical School headquarters, were opened.

Under President George Edgar Vincent a reorganization of the Medical School was carried out in 1912. The resignations of all faculty members were requested. Reappointments of many followed; some were placed on the retired list; others did not return. Not long afterwards, the then dean, Frank F. Westbrook, was invited to become president of the University of British Columbia. He was succeeded in 1913 by the present dean, Elias P. Lyon, who came to Minnesota from Washington University, St. Louis, Mo.

The splendid gift of \$2,000,000 for the Mayo Foundation is treated elsewhere in this issue of "Minnesota Chats," as are also the gifts for the Todd and George Chase Christian Memorial Hospitals and the William Henry Eustis gifts of more than \$1,500,000 for the creation of the Minnesota Hospital and Home for Crippled Children.

Among Campus Views and Notables

Right

At the Center of
University Farm
Administration
and
Engineering Building



Left

Dean E. P. Lyon
Medical School



Right

Dean E. M. Freeman
College of Agriculture
Forestry and Home
Economics



Left

Medical School
Institute
of
Anatomy

Between 1915 and 1920 all medical activities of the University were transferred to the new campus and established either in Millard Hall or the Institute of Anatomy.

Because of limited laboratory facilities, the Medical School has found it necessary to limit the entering class to approximately 100 members, and the selection of those who shall be admitted has been a task requiring the strictest fairness and no little diplomatic delicacy. Applicants are admitted on a basis of scholarship and character, a "C" average in pre-medical work being one of the unwavering requisites. As a consequence of this rather strict selection few of the men who gain admission to the first medical year drop out and the graduating class has often been about as large as it was in its first year. To fill the vacancies of those who do drop out, Minnesota has at all times had a long list of applicants with advanced standing, many of them men from universities which give but the first two years of medicine.

An improvement of outstanding importance to the state was the creation in 1922 of the Department of Preventive Medicine and Public Health, with which was allied the Students' Health Service. The latter organization conducts physical examinations of all entering students, treats students who become ill, follows up the health records of those who are shown by preliminary examinations to need further care, and takes charge of the examination and health supervision of students who are to engage in athletics. It also maintains student hospitals on both the Main Campus and the campus of University Farm. More recent innovations have been the offering of courses in medical technology for the training of clinical and laboratory technicians, which work is given jointly by the College of Science, Literature, and the Arts and the Medical School, and courses in occupational therapy, which are conducted in the College of Education with the advisory assistance of a medical representative.

During the World War the Medical School performed services of high merit. Forty per cent of the faculty entered military service and United States Base Hospital No. 26 was organized and to a large degree staffed at the University.

Dr. R. O. Beard, to whom "Minnesota Chats" is indebted for most of the material in this sketch and in that on the School of Nursing, retires in the spring of 1925 as the last remaining member of the original Medical School faculty. He has been given the rank of professor emeritus by the Board of Regents.

The School of Nursing

THE University of Minnesota has a right to be proud of the progressive spirit of the Medical School, which has led the way to three important innovations in medical education, two of which have already been widely copied, while the third, the Mayo Foundation, would be copied if other institutions were given a like opportunity. Minnesota was the first to require a year of active internship in a hospital, following completion of class and laboratory work in medicine, before the M.D. degree was actually granted. Furthermore, it was at the University of Minnesota in 1909 that the first University School of Nursing was established. Eight seniors were graduated with the first class in 1912, and the present enrollment in the School of Nursing, a division of the Medical School, is above 200.

Both a three years course, leading to a certificate as "Graduate in Nursing" and a five years course, including two years in the Academic College and leading to the college degree, Bachelor of Science in Nursing, are now offered. About one-fourth of the students work for the college degree.

The growth of the School of Nursing was healthy but not great until in 1921 the Central School of Nursing was established, under which four major hospitals of the Twin Cities now offer their facilities to the young women in training. In that year arrangements were made whereby the Miller and Northern Pacific hospitals in St. Paul and the Minneapolis General Hospital were thrown open to student nurses together with the Elliot Hospital on the University campus. Now known as the University of Minnesota Hospitals, the group which started with the Elliot now includes also the George Chase Christian Memorial Cancer Institute and

the Todd Memorial Eye, Ear, Nose, and Throat pavilion.

"Minnesota Chats" is indebted to the 1925 Gopher for the following additional statement on the School of Nursing:

"Some 47 of the graduates of the school have extended their nursing services into homes of their own. Many of these remain missionaries of public health in their communities. Two live at home; two have died; two have entered business. One has become a medical technologist and another, a dietitian. Twenty-eight are employed in private-duty nursing, the primary objective of their training. One is a missionary nurse in a foreign field and another, of equally missionary spirit, has done a unique work among her own people in Japan. The work of these women is done in thirteen states of the Union and three Oriental countries.

"The most significant thing in this historical record of the human product of the school is that sixty-four women, out of the total of 150 graduates, have taken their places in the leadership of their profession, have seized upon the larger opportunities for service to which their calling invites at the present day. It is a noble tale of achievement."

It is worth noting that Minnesota's School of Nursing has been used as a model when several other University Schools of Nursing were established, among them the ones at Yale, Western Reserve University, and one in Paris.

The Mayo Foundation

GRADUATE medical study at the University of Minnesota has benefited for the past 10 years from the splendid facilities and support provided by the Mayo Foundation for Medical Education and Research, an endowment which now exceeds \$2,000,000. In the period between June 9, 1915 and July 16, 1924, 570 different graduate students in medical subjects were registered under the Mayo Foundation. Ninety of these men obtained advanced degrees. Some of the others were not candidates for advanced degrees, and the total includes also men who were still in residence on the date of the report.

The development of the affiliation between the University and the Mayo Foundation came about naturally. In the fall of 1914 the University of Minnesota began graduate work in various fields of medicine and surgery in addition to that already offered in the laboratory branches. The training of medical graduates for special work in pathology, clinical medicine, and surgery also had been developed in the Mayo Clinic in Rochester until in 1912 definite three-year services for graduates in medicine who had served a year's hospital internship were provided. These services were called fellowships.

In order to perfect the organization and place the work on a permanent basis, a corporation, the Mayo Foundation for Medical Education and Research, was founded February 9, 1915, by William J. and Charles H. Mayo. Five months later the University and the Mayo Foundation entered into an agreement by the terms of which the funds and income of the Mayo Foundation for Medical Education and Research were assigned, under the direction of the Board of Regents, to the promotion of graduate work in medicine and to research in medical subjects. On September 13, 1917, the funds and income of the Mayo Foundation were transferred entirely to the University.

"In an age of specialization with the development of graduate work in all fields and phases of the sciences, letters, and arts, educational work such as that carried on by the Foundation needs no elaborate justification," says Dr. Louis B. Wilson, director of the Mayo Foundation, in its General Bulletin. "In a subject like medicine, intimately connected with established fields of research such as biology, chemistry, anatomy, physiology, pathology, and bacteriology, the need for scientific research and for the training of scientific specialists, investigators, and teachers is of vital importance.

"In medicine in the United States, the leading specialists in practice and the trained productive investigators have usually been developed by long years in internships, minor teaching positions, hospital residences, or personal apprenticeships to other specialists. A few have obtained their special training in general practice, gradually narrowing to a particular

field. Many men have broadened themselves by visits to other laboratories or by periods of foreign study. A much larger body of clinical specialists has been developed by so-called poly-clinical medical courses or by the simple and convenient method of self-proclamation.

"Taken as a whole, graduate students who follow these undirected processes are apt to waste time on non-essentials and to acquire a very inadequate knowledge of many of the essentials. Yet, if medical education is to advance, it must at least be able to supplement a faculty of skilled practitioners with men trained to carry forward the frontiers of medical science."

It is to provide this training and to equip certified specialists, investigators, and teachers of medicine that the Mayo Foundation has been established.

A resume of the Mayo Foundation's progress shows that during the first year there were twenty five members of the faculty and seventy-two graduate students. The total budget for the year was \$95,932, all of which was paid by the Mayo Clinic. For the year ending July 1, 1924, there were seventy-two faculty members and 210 graduate students, while the total budget was \$289,249.62, of which \$79,913 was paid by income from the Foundation and the remainder, \$209,336.32, by the Mayo Clinic. During the nine year period from 1915 to 1924 the total expenses have been \$1,853,884, of which \$157,993 has been paid from the income of the Foundation and the remainder, \$1,695,951, by the Mayo Clinic.

Graduate work in medicine at Minnesota is not confined, however, to that offered at Rochester. During the present year 58 students have been taking work of graduate grade on the main campus in Minneapolis; these in addition to the ones who are studying under the Mayo Foundation at Rochester.

The College of Dentistry

DEVELOPMENT of the College of Dentistry in its present form at the University of Minnesota dates from the appointment of Alfred Owre as dean in 1905. In dentistry Minnesota has at all times been among the

most progressive colleges. Some of the steps in advance which have now been taken by many leading colleges were first ventured by Dean Owre and his faculty.

During the 20 years that have elapsed since 1905 the gap of 1500 clock hours' work in biological science that then existed between the medical curriculum and the dental curriculum has been reduced to approximately 500 clock hours, and the Minnesota course in dentistry has been increased from three years, first to four in 1916, and in 1920 to five years. These changes first added a pre-dental academic year to the course and then a fourth dental year in addition to the year of pre-dental work.

A decade after the new century opened, dental methods in practice and instruction were challenged, according to Dean Owre, the first statement coming from Dr. John Hunter of Guy's Hospital, London, England. This was soon after the celebrated report on American medical education had been issued by the Carnegie Foundation for the Advancement of Teaching. Interested teachers of dentistry immediately suggested to that foundation a similar study of the teaching of dentistry, and while this did not bear fruit at the time, continued urgency finally brought the investigation about. Begun three years ago, it has recently been finished and has created the widest interest by its suggestions, chief of which is that dentistry be taught on a two-three basis, with two years of pre-dental academic work and three years of dentistry, thus bringing dental education nearer to medicine and practically establishing it as a medical specialty.

In both of the additions to the length of the dental curriculum, Minnesota led. Not until two years after the pre-dental year was first required here in 1916 did other dental colleges advance to that status. When Minnesota extended its course to five years in 1920, twenty-three other colleges followed its lead, but 20 did not and have not yet done so. (1925.)

New York state has gone so far as to require that dentists hereafter licensed by its officials must have had five years of study, of which two shall have been academic pre-dental work.

The advances that have come about in dentistry have not been the result of individual or scattered effort, but have resulted in large measure from the organization some years ago of the American Association of Dental Faculties, a body which has striven for high standards and has exercised the influence of its collective membership to bring about changes for the better in dental education.

Dean Owre believes that the next great problem confronting dentistry is contained in the question whether it shall definitely become a specialty in medicine. He believes that this change must be brought about. To that end he would not lengthen the dental course but would rearrange both dental and medical curricula so that courses would contribute more directly to training in the specialty at which the students aim.

Dr. Henry L. Ulrich of Minneapolis is credited by Dean Owre with a major contribution to the progress of dentistry, due to the investigation of dental practices made by him following the statement issued by Dr. Hunter of London. Dr. Ulrich's studies especially confirm the theory that much of the older crown and bridge work had been faulty and that, generally speaking, it was doubtful that dead teeth should be left in the mouth. These studies have gone far towards a remodelling of dental practice.

Despite the two major increases in requirements and the length of the course of dental study, the college has grown from an enrollment of 125 in 1900 to one of 430 students in the year 1924.

Minnesota graduates have contributed definitely to the success of the profession throughout the United States. During the recent war, a larger percentage of the graduates of Minnesota entered the service than of any other college. Minnesota graduates have also won distinction in the navy and in the United States Public Health Service.

The development of short courses in dentistry has been a recent achievement in which the college has had hearty co-operation from the General Extension Division. The purpose of these courses has been to offer to all practitioners a chance of familiarizing themselves with the very latest in dental theory and technique.

Of short courses, including those in dentistry, Dr. Price, director of the General Extension Division, has written recently:—

"There is a clear line of demarcation that separates short courses into two major groups. One group is composed of short courses that tend to give the student in brief compass a sweeping survey of the superficial aspects of a fairly wide field of study. These are essentially undergraduate courses. The other group of courses, in which those in dentistry lie, deals with students who are already equipped with the fundamental knowledge required in the field of study, but who lack first-hand acquaintance with recent advancement, improved methods, new discoveries, or developed technique. Such courses are designed primarily for graduates or practitioners of a profession; and the time is usually spent intensively upon a narrowly circumscribed or highly specialized portion of the general subject."

Among the subjects on which short courses have been offered to Minnesota dentists are crown and bridge work, porcelain jacket crowns, anesthesia and extraction, prosthetics, and oral surgery.

The Department of Agriculture

ALTHOUGH agriculture has been taught by the University of Minnesota since the earliest days of the institution, education in agriculture as it is understood today is almost wholly a development of the past twenty five years. A pair of contrasting pictures showing the work of the University's Department of Agriculture in 1900 and 1925 would have little in common. From the earlier scene would be lacking such typical features of the present-day University Farm as the Short Courses, the Agricultural Extension Division, instruction in forestry and in such subjects as agricultural economics, agricultural engineering, or plant pathology. Furthermore, the scientific research that has latterly led to many notable discoveries in cereal chemistry, other branches of biochemistry, in plant pathology, plant breeding and economic entomology would be little in evidence.



Some Heads of University and Col



Above:
Dean Guy S. Ford,
Graduate School



Above:
Dean J. B. Johnston,
College of Science, Litera-
ture, and the Arts



President L. J. ...



Below:
Dean Geo. W. Dowrie
School of Business

Left:
Dean W. R. Appleby,
School of Mines



Right
Dean M. E. Haggerty,
College of Education

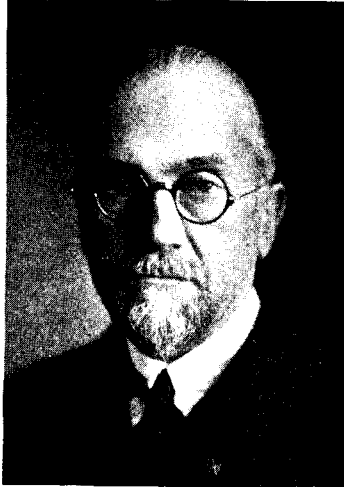


Dean F. J. Kelly

Regiate Administration at Minnesota



Coffman



Above:
Dean Alfred Owre,
College of Dentistry



Above:
Dean Walter C. Coffey,
Dep't of Agriculture



Right:
Dean E. E. Nicholson,
Student Affairs



Below:
Dean F. J. Wulling,
College of Pharmacy



Left:
Dr. R. R. Price,
Director,
General Extension
Division



Administration

Space is too brief to permit following the variations in organization and method that changed the relationships and endeavors of the various units in the Department of Agriculture in the early years of the quarter century, but about 1910 these began to arrange themselves and crystallize into approximately the forms in which they stand today, namely, the inclusive Department of Agriculture, the College of Agriculture, Forestry, and Home Economics, the Central School of Agriculture, the Central Experiment Station and Farm, the outlying schools and farms, and the Agricultural Extension Division. It may be sufficient at first to say that no one of these is very similar today to what it was in 1900, if, indeed, it had sprung into existence at that time.

The recent history of the Division of Home Economics has been sketched elsewhere by its present chief, Miss Wyllie B. McNeal.

Forestry

Forestry, now one of the principal triumvirate of subjects taught in the College of Agriculture, Forestry, and Home Economics, is a development at Minnesota of the twentieth century. Instruction in Forestry was instituted in 1903 and was carried on with varying fortunes until 1910, when Professor Samuel B. Green was appointed dean of forestry and it seemed that a distinct College of Forestry was about to be established. Professor Green's death occurred before the organization could be carried out, and his successor, Professor Edward G. Cheyney, present chief in that field, conducted the work as a unit in the larger college until 1917. In that year Forestry was formally incorporated in the tripartite college under the title, "College of Agriculture, Forestry, and Home Economics."

Meanwhile, in 1908 the state had granted the foresters use of the Itasca State Park for demonstration and field work in forestry, and a year later, in 1909 the St. Louis Mercantile Company donated 2,240 acres of land at Cloquet to be used as a Forest Experiment Station. Both the Itasca field station and the Experiment Station at Cloquet have been operated to excellent effect, until today, especially at Cloquet, results are being obtained that are

of the utmost importance to the future of the tree and lumber industry in Minnesota. Reforestation, the economical utilization of existing forest resources, the up-building and improvement of the farmer's wood-lot, and latterly, the effective commercial use of the forest crop after its severance, have been made the subject of typical studies at Cloquet. With the swiftly awakening interest in the forest and timber problem, this station has an opportunity to become one of the main sources of practical benefit to the people of the state from the University of Minnesota.

The College and Experiment Station

According to Dean E. M. Freeman of the College of Agriculture, the years 1908-10 marked the beginning of the greatly increased interest in agricultural training that has since obtained. At about the same time a new force, federal aid, began to make itself felt. Under the Adams and Hatch laws granting subsidies for research work in agriculture, the experiment station and college were enabled to begin work in new fields, among them plant pathology, agricultural economics, agricultural engineering, beekeeping and agricultural journalism.

A few years later, in 1914, two more acts, the Smith-Lever and Smith-Hughes Laws, extended federal aid, the first for extension purposes, and the second for vocational education. These affected the Department of Agriculture directly, for it was enabled to begin the Boys and Girls Clubwork, which it has since carried to 20,000 young people each year and the Agricultural Extension Division, which has an estimated total of 1,000,000 contacts yearly with rural Minnesotans, according to Dean Walter C. Coffey. Rather than direct contacts these are brought about chiefly through the medium of the county farm bureaus, to whom the experts of the Extension Division pass on the results of experiments conducted at the Central Experiment Station and on University Farm and the other farms and stations at various points in the state. Bulletins and newspaper and magazine articles on agricultural topics also are distributed through this division. By short courses, for which thousands have come to University Farm, the gospel of better farms and better farm life has been furthered.

From the Smith-Hughes Act resulted the University's increasing part in training teachers for agricultural communities. Professor A. V. Storm was brought to Minnesota and given charge of this work, with the result that the College of Agriculture, which had been turning out 12 per cent of the secondary school teachers of agriculture and home economics needed in 1913-14, turned out 71.20 per cent of the Minnesota demand in the year 1924-25. At present students whose aim is teaching are trained jointly in Agriculture and Education or in Home Economics and Agriculture.

A principal accomplishment of the Experiment Station has been the development of new varieties of grains and fruits with characters that especially fit them for Minnesota soil and climate. Notable varieties of wheat, corn, barley and oats have been developed, together with some splendid new fruits raspberries, plums, strawberries, and others. Discoveries that have reduced plant and animal diseases have been made, poultrymen and beekeepers have been assisted, and chemical and engineering researches have made their contribution to the happiness and prosperity of the Minnesota farmer. Studies in agricultural economics, in marketing technique and the like have been distributed in bulletin form and have contributed their share to the advancement of agricultural efficiency in the state.

While the researches at University Farm (place name for the whole central establishment) constitute the chief contribution of the Central Experiment Station, they must not be considered as an asset of the station alone, for they contribute directly to the efficiency and progress of the teaching in the College. Gains in strength and extent by the station are important also to the Graduate School, which finds one of its ablest branches now at University Farm. To it students are coming from all parts of the world where agriculture of our northern type is important, whether in the south temperate regions of Australia and South Africa or the north temperate countries, such as China, Scandinavia, Great Britain, Germany, or France.

The Central School

Coincident with other changes in the College of Agriculture, Forestry, and Home Economics have come some changes in the Central School of Agriculture. Up to about 1910 there was an "intertangling" between the College and the School which left some of the demarking lines rather obscure. This has been eliminated and the Central School now offers a straight three years course to students who do not care to continue into college, together with an additional or "intermediate" year as a fourth secondary year fitting students to enter the collegiate institution.

During all this time the school has been under the direction of its veteran principal, D. D. Mayne.

Latterly the School of Agriculture has placed rather less stress on teaching production and more on home and community improvement. This has come jointly with the development of project work. Projects in four fields, home improvement, home production, community improvement, and community production, are outlined. Students are given projects on which to work during the summer vacations. Supervisors visit these projects, check up on progress, advise the young people as to methods, and then, in the fall, accounts and results are checked over and grades are given on the results.

One of the best results of this method, which amounts to a teaching of rural living, has been that it creates a continuing interest which leads more and more young people to continue their work through the collegiate years. During the past year (1924-25) 57 graduates of the Central School have continued into the college.

The Outlying Units

Important steps in the development of agricultural education have been the successive foundings of outlying schools and demonstration farms in Minnesota. That at Cloquet has already been mentioned. Others have been established as follows: Northwest School and Station, at Crookston; West Central School and Station, at Morris; Fruit Breeding Farm, at Zumbra Heights; North Central Experiment Station, at Grand Rapids; Northeast Experiment Station, at Duluth; Southeast

Experiment Station, at Waseca, and, by act of the 1925 legislature, the operation of the State Experimental Creamery at Albert Lea.

Dean and director is the title given to the head of all work in agriculture by the University of Minnesota. This position, now held by Dean Walter C. Coffey, appointed in 1921, was held before him by William M. Liggett, E. W. Randall and J. W. Olson up to 1910, by Dean A. F. Woods from 1910 to 1917, and from 1917 to 1921 by Dean R. W. Thatcher.

Dean E. M. Freeman, head of the College, has held that position since 1917, having earlier been assistant dean, 1913-17.

The Division of Home Economics

1900 to 1925 represents the first period of growth of the home economics work of college grade at the University of Minnesota. This span of 25 years is characterized by gradual increase in enrollment, increased staff, improved buildings and equipment, development of improved curriculum, and development of extra instruction activities such as the Senior and Junior Short Courses.

The first instruction in home economics was given at the University of Minnesota in 1884. Miss Juliet Carson, Superintendent of the New York School of Cooking, gave a course of lectures on the principles of domestic economy and cookery. Over 1200 women and girls from several states attended. In 1890 Mrs. Mary L. James offered a similar course on the Main Campus.

The course in home economics was actually established with the College of Agriculture in 1902. The purpose was to give breadth, strength, and thoroughness to the concept of the home, and also an appreciation of it as a course for young women. Mrs. Virginia Meredith and Miss Juanita Sheppard constituted the faculty. Lectures on the home and its management were given to include a study of the preparation of food for the family, selection, storage and care of food, equipment of the home, laundering and dyeing. When Mrs. Margaret Blair was added to the staff in 1902, courses in clothing were developed.

From 1902 until 1909 the growth was not rapid, but after that the college grew by bounds. Although the number of students was small, there was always a graduating class in home economics. A complete outline of the course was made in 1904 and remained much the same for ten years.

Following the appointment of Miss Josephine T. Berry as Chief of the Division of Home Economics in March, 1913, important changes and improvements were inaugurated. Suitable entrance requirements were established. Science and Art were made the basis of college work, specialization was made necessary in the junior and senior years as in other colleges, home management and nutrition work were developed.

In 1917 Miss Berry was granted a leave to organize home economics under the newly passed Smith-Hughes law. During her absence that year Miss Mildred Weigley was made Acting Chief and in August, 1918, was made Chief of the Division following the resignation of Miss Berry.

Under the competent direction of Miss Berry and later Miss Weigley, the home economics work at Minnesota was well established and recognized as equal to the best of that type of work in the country. One of the most outstanding accomplishments of Miss Berry's administration was the organization of Home Management. An important innovation was the institution of the course in home management in 1914-15. Students lived at, managed and cared for a home, thus gaining first hand experience and training in practical home management. This new undertaking was eagerly watched by other Universities.

During the years of its development its worth has been demonstrated. The example has been followed by many of the leading schools of the country. Immediately following the inauguration of a child training course in 1919, two children were placed in the home management houses, thereby furnishing the senior college student with an opportunity to gain experience in the care and training of small children. The growth of the home management work made it necessary to secure improved and enlarged facilities. This need was

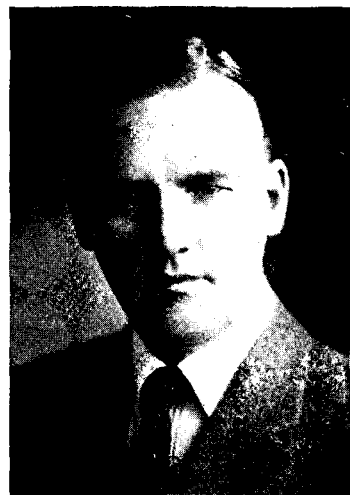
Among Campus Views and Notables



Left
The Law Building

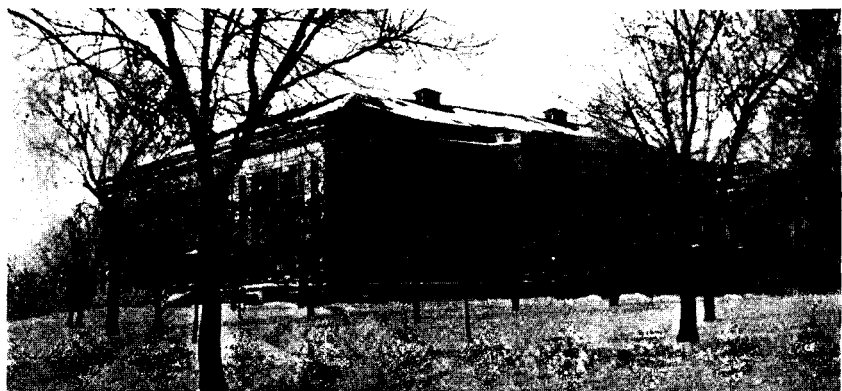


Left:
Dean Everett Fraser,
Law School



Right:
Dean O. M. Leland,
Engineering, Architecture,
and
Chemistry

Right:
The
School of Chemistry



brought to the attention of the President and Board of Regents in 1921 by Miss Weigley. That year the Regents appropriated \$20,000 for the erection of two houses.

In January 1923 Miss Wylle B. McNeal, State Supervisor of Home Economics for Minnesota, was made Chief of the Home Economics Division following the resignation and marriage of Miss Weigley.

Due to the increase in cost of labor and materials and the growing demand for home management, the furthering of the plans were delayed until 1923 when the needed additional sum of \$10,000 was made available. The plans for the houses were completed, the contract was let and the houses built in 1923. They were first occupied on January 1st, 1924.

Graduate work was first listed in the catalog of the Graduate School in 1914-15. Prior to 1918 there was one graduate student. Since that time there have been a number of students receiving graduate degrees, with either a major or minor in home economics. In 1925 two Ph.D. students will have taken their minors in home economics.

Home Economics at the University of Minnesota has made tremendous strides in the past ten years. Much in the way of improvement has been accomplished, much more work lies ahead.

WYLLE B. MCNEAL

The School of Business

IN 1919 the University of Minnesota followed the lead of Pennsylvania, Harvard, Dartmouth, and several state universities by establishing a School of Business as a major collegiate unit.

Under the direction of Dean George W. Dowrie, this college took over the faculty and budget of the department of economics, which formerly had been in the College of Science, Literature, and the Arts. In the latter college was established a two years' pre-business course, with the provision that students who should complete it with an average grade of C were eligible to enter the School of Business for specialized work during their junior and senior years, leading to the degree, Bachelor of Science

in Business. Provision also was made for the admission of mature business men and women into the school as special students.

All instruction in economics, under which head are grouped also statistics, accounting, marketing, and the like, was brought into the School of Business with the exception of the course in agricultural economics which were maintained in the College of Agriculture.

A year later a second pre-business course somewhat similar to that in the College of Science, Literature, and the Arts was established in the College of Agriculture. Its purpose is to give a background in technical agriculture to persons who plan to enter business in which such knowledge would be valuable. In this group the management of grain elevators, creameries, co-operative marketing enterprises, and the like, may be enumerated. Presently, in 1923, still a third pre-business course was established in the College of Engineering, affording still a third type of background to students whose main senior college interest was to be in the School of Business.

When the School of Business was two years old, in 1921, a supplementary training program was inaugurated in connection with Twin-City business enterprises. Under this plan a senior may spend two days a week in a business of the type he expects to enter. He then takes part, successively, in the affairs of the various departments in that business, thus supplementing his academic training on the campus with the practical and demonstrative experiences of the actual institution.

Two main problems have engaged the attention of Dean Dowrie and his faculty during the past two years. The first of these was a revamping of the curriculum with a view, first, to the development of a more orderly and better articulated program of basic subjects and second, to the injection of more scientific content into subjects, together with an expansion of the "case" method as opposed to the formal textbook type of instruction. The second major problem has been the establishment of a Bureau of Business Research with a view to facilitating investigations into the important economic problems of the state of Minnesota. (For growth in attendance see Chart.)

Physical Education for Women

DR. J. ANNA NORRIS, head of the department of physical education for women at the University of Minnesota, points to five major steps in advance that have been taken by that department, of which the two chief ones are its thorough reorganization in 1912 and the construction of an adequate gymnasium, with which has been linked the gradual development of adequate outdoor facilities, making possible a varied and rounded program of physical activities. Coincident with the reorganization the department was placed under the direction of a woman physician, capable of looking after the health of students as well as their physical development.

The three other major steps cited by Dr. Norris are the adoption of a two-year requirement in physical education for women, voted by most of the colleges in 1917; the inauguration of a professional training course in 1919, looking to the preparation of students to conduct scientific physical training work in secondary schools, and the development of a program of student-faculty co-operation as a result of the formation of the Women's Athletic Association, which is now one of the most active student organizations on Minnesota's campus.

The department has also co-operated with the State Department of Education to develop a statewide program of physical education for women.

Prior to the reorganization of the department in 1912-13 it occupied the north wing of the Armory with one exercise room, two showers, a small dressing room and two offices, until the fall of 1915, when it moved into its own building, the Women's Gymnasium. Vacant places in this have been remodeled from time to time, adding to its capacity, until it now contains a lecture room, two large exercise rooms, a corrective gymnastic room, a natatorium, sixty showers, 160 dressing booths, 1526 lockers, and nine offices. The practice of occupying all four exercise spaces at once has made it possible to distribute students in sections according to physical condition or personal inclination.

Its faculty consisted of two women in 1912 and has expanded until it now consists of nine women.

It now gives service to every college on the campus. All require their women students to take a one-quarter course in Hygiene, all except Pharmacy require a one-year course in Physical Education. In 1917 all those requiring Physical Education added swimming to the requirement of one year and in 1919 the requirement was expanded to two years by all such colleges except the Home Economics Division. The colleges have always given academic credit to the extent of six quarter credits for elective work.

After its reorganization in 1912, the Department was given charge of the direction of health as well as Physical Education, and besides the comprehensive initial physical examination and grading of students for purposes of exercise, it carried on a routine system of individual conferences with students showing conditions which warranted a re-checking. This has been expanded until every student in all four classes is summoned for a health conference at least once a year and in the freshman and sophomore classes twice or more times.

At the same time the voluntary visits of students regarding acute physical ailments have been largely transferred to the Health Service.

A program consisting of 22 quarter hours for the service of 637 students has expanded to 100 quarter hours for 1769 students.

The facilities for organized outdoor recreational exercise have increased from nothing at all to three small fields near the gymnasium approximating one and five-sixths acres of ground in all. In addition to this the University tennis courts have increased in number from five or ten in 1915 to thirty-three in 1925, and organized classes learn the game on a group of ten of the courts.

This year for the first time an ice rink has been built for women students on one of the small fields adjacent to the gymnasium and skating and ice games at last have adequate opportunity for development.

In the fall of 1919 a professional course for the preparation of teachers and supervisors of Physical Education leading to a B.S. degree was

inaugurated and the first graduating class (1922) numbered six women. The present senior class numbers twelve, the junior class twenty-six, the sophomore class thirty-two, and the freshman class forty. The course is sponsored by the College of Education and contributed to by the College of Science, Literature and the Arts, the College of Education, and the Medical School.

Since the passage of a state law requiring Physical and Health Education in the public schools, the Department has co-operated with the State Supervisor of Physical and Health Education, whenever, by his request, it could be of service in conference or in the offering of courses for the training of teachers.

The department holds faculty membership in the Women's Division of the National Amateur Athletic Federation.

The Women's Athletic Association was organized in 1909. Since 1913 it has co-operated closely with the department and has developed into an important adjunct. It is a member of the Athletic Conference of American College Women.

It has financed itself by means of small dues, a yearly Penny Carnival and small money-making ventures. It has assisted materially in developing the interest of university women in physical recreation. Its board of control meets weekly throughout the year. Intramural competition is fostered in all the sports.

It has now three subsidiary organizations, the Aquatic League, the Home Economics Branch and the Inter-House League.

Its athletic awards are based on a point system which recognizes field hockey, ice hockey, basket ball, base ball, archery, tennis, swimming, golf, horseback riding, hiking, dancing, apparatus work and winter sports. Winners of 1000 points secure an "M" and are then eligible for consideration for the highest award, the W.A.A. Seal. To gain the Seal the "M" winner must have shown unusual sportsmanship, a spirit of service, satisfactory scholarship, poise and bearing, influence in the university, and an interest in healthful living.

The Law School

THE Law School of the University of Minnesota has kept pace with the development of jurisprudence during the first quarter of the new century, and more important still, it has acquiesced gladly in the innovations aimed at bettering legal education which have been adopted by a great majority of the better American law schools, and has been active in promoting many progressive policies.

A gradual raising of admission standards, a gradual addition to the number of full-time faculty members, though Minnesota has always had some highly qualified professors giving full-time to the Law School, a rapid and successful development of legal practice work as part of the undergraduate training, and the establishment and growth of the Minnesota Law Review have been among the outstanding accomplishments of this department since 1900.

The two last mentioned changes correspond, in an unpretentious but effective way, to the establishment of an "experiment station" and to the institution of extension work, inasmuch as the Minnesota Law Review has been adopted as the official journal of the State Bar Association and in that capacity has carried interest in current legal developments to attorneys throughout the length and breadth of Minnesota.

Minnesota raised the admission standard to its Law School first in 1910, when the entering student was required to have had one year of academic work, and again in 1911, when two years of pre-legal work was adopted as the standard. The requirement remains at two years with a "C" average, but many students voluntarily take more than two years of academic work before they enter law, and an increasing number present themselves to Dean Everett Fraser with an A.B. degree.

Minnesota, from the first, has maintained high standards in the number and quality of its full-time professors. When in 1916 the American Law School Association adopted a rule that schools to be accredited must have three full-time teachers, Minnesota was already on that basis. The standard today, long since met at Minnesota, is that there be one full-time

instructor for each 100 students or major fraction thereof. This is also the standard preferred by the American Bar Association.

Writing in 1910, Dean W. S. Pattee said of the school's standards: "It has been the policy of the department to enlarge the curriculum, increase the years of study, and to exact higher entrance requirements as rapidly as conditions and circumstances amid which the college was operating would, in the judgment of the authorities, warrant or permit."

Practice work as a part of classroom instruction was developed with great success at Minnesota by E. M. Morgan, who later went to Yale and is now on the faculty of the Harvard Law School. In this course students must prepare three complete cases, get out all the papers, make service and carry out the details as carefully as they would in an actual court. Part of this work is done on the campus and part in the office of the Legal Aid Society.

New subjects of study have been introduced from time to time as the development of business and government brought new phases of the law into prominence. Taxation, the law of public utilities, suretyship, partnership and the like have been emphasized to an increasing extent of late years.

Thoroughness of the work done in the Law School rather than a multiplicity of subjects or a diversity of activities is the main goal of the faculty as stated by Dean Fraser. The School devotes itself to training students in the legal way of thinking and to teaching fundamentals so thoroughly that the young lawyer will be able to grasp more specialized phases readily when they present themselves to him.

Since its establishment in 1917 the Minnesota Law Review has grown to a circulation of 1200, more than 1000 of its subscribers being practicing attorneys. It has been praised by legal papers both in this country and England. The University of Minnesota Law Library has grown from 17,000 volumes in 1910 to more than 40,000.

The College of Education

THE College of Education at the University of Minnesota has grown more rapidly than any other educational division established in the past quarter century. Not until 1905 did the Legislature authorize the establishment of this college, an authorization that was put to prompt use when the Board of Regents created the college on December 12 of that year. Last year this relatively new unit, though strictly a senior college, enrolled 1411 students, thus attaining a size second only to that of the College of Science, Literature, and the Arts.

Dean M. E. Haggerty, who succeeded President Coffman as administrator of the College of Education when the latter was elected president of the University, wrote last year an account of the College of Education for *The Alumni Weekly*, in which he said:

"Despite the definite recognition of the importance and desirability of the development of work in education, money for employing a faculty and providing instruction has come slowly, and provisions for buildings and general laboratories have been slower still. The first legislative appropriation ever made for the college was one of \$5,000 in 1915. All other funds that have been devoted to the college have been appropriated by the Board of Regents from the general University funds.

"The work in education was first housed in Folwell hall, but in 1914, when the School of Mines vacated its old building after a fire, that building was remodelled and turned over to the College of Education and its practice school, the University High School. As the work has grown, rooms and suites of rooms have been allotted for educational work in different campus buildings, so that today the classes in education are conducted in eight different buildings on the Main Campus."

The College of Education, being concerned chiefly with the preparation of young men and women who will administer, supervise and teach in the public schools of the state, has oversight of all activities which are primarily teacher training. Those who are studying art, music, physical education or agriculture, for example, with a view to teaching those subjects, register during their junior and senior

years in the College of Education, just as do those who are preparing to teach the natural sciences, history, French or mathematics.

The College of Education has interested itself particularly during the past few years in the training of mature students to act in administrative capacities, and the number of graduate students who register for studies looking in that direction has shown a gratifying increase. Still another major development has been that of a research group whose members have made many studies of statewide importance to the successful conduct of the public schools. Special studies have been made for such communities as Duluth, Austin and Winona. From this college also has come splendid assistance in the development of President Coffman's idea for a Minnesota Society for the Study of Education. This society, now in its third year, is grappling more and more successfully with some of the problems that Minnesota educators are facing, such as the rearrangement of school curricula, vocational and educational guidance, and means of making the transition from high school senior to University freshman a less trying one both for the student and for the teachers.

"How important is all this work in education for the state of Minnesota?" Dean Haggerty asks in his Alumni Weekly paper. "No accurate reply can be made to this query. It may only be pointed out that hundreds of Minnesota boys and girls are being trained each year for an important task, trained to do that task efficiently, and, we believe, with a sincere devotion to human service. What such training means to one boy or girl may be multiplied between three and four hundred times to represent the total outcome of each college year.

"But the reader of this page, if he happens to be a parent, may estimate the value of this training in another way. What does it mean to you and to your boy that he have a trained teacher? Whatever such a teacher means to your boy or girl he means to scores of other boys and girls. These are human values immeasurable by mathematical terms, but none the less real and compelling, and every reader will recognize their presence in the work of the college."

The School of Mines and Its Experiment Station

THE opening of the new century found the School of Mines, then eight years old and known as the School of Mining and Metallurgy, situated in part of Pillsbury Hall, which was then headquarters for the sciences, among them geology and animal biology. Dean W. R. Appleby, who had come to Minnesota in 1892 as professor of mining and metallurgy, was at the head of the school, which had been practically independent since its separation from geology under Dean C. W. Hall in 1897.

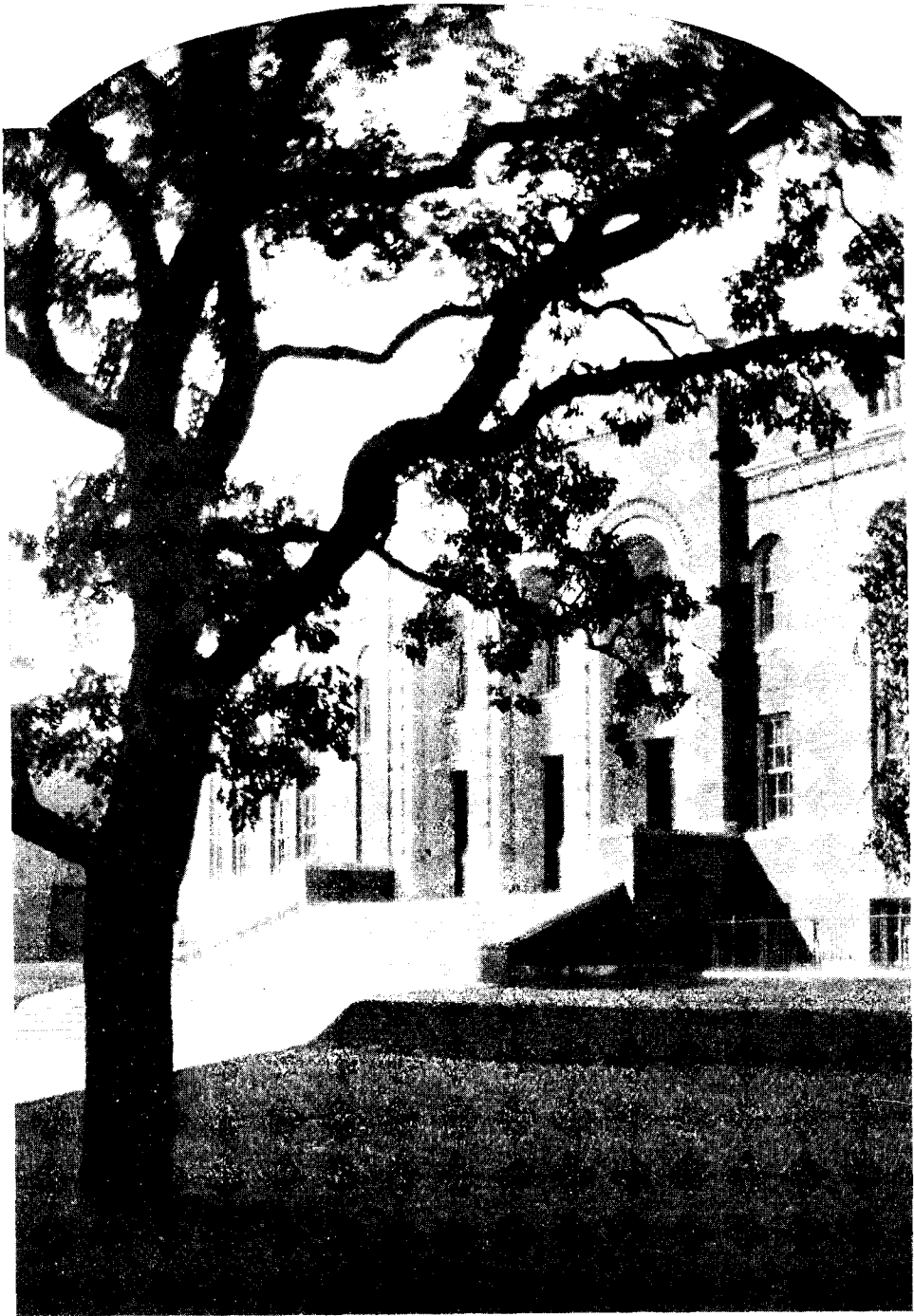
Soon after Professor Appleby was given the title of dean in 1900, the first of the progressive steps was taken that have carried this school to its present high rank. Admission of unclassified students was discontinued in 1902. In the next year work was begun on the new School of Mines building, now the home of the College of Education. It was occupied in 1904. Here the school remained until 1913, when the building was partially destroyed by fire and Dean Appleby with his miners took up temporary quarters in Main Engineering, pending the completion, in 1915, of the present School of Mines building across Pleasant street from Chemistry.

Meanwhile the school was making steady progress in its services to mining education and to the mining industry in Minnesota. In 1909 it made its first estimates of ore deposits for the State Tax Commission, a function which it has continued to perform. Its figures are today the basis for practically all taxation of iron ore in the ground by the state of Minnesota.

Two years later, 1911, the School of Mines Experiment Station was established and the University of Minnesota was launched on the program of research and co-operative investigation by which it has already made possible the use of billions of tons of ore once thought worthless and has prolonged the life of the mining industry in Minnesota by 100 years at a minimum estimate.

Developments of the years between 1905 and 1915 have included the annual field trips, the enlargement and reorganization of the School of Mines library, with its complete

At the Heart of the Campus -- Music Hall



supply of reference works and periodicals on mining and metallurgy, the introduction of courses in metallography (1913) and the establishment at Minnesota of the North Central Station of the United States Bureau of Mines.

Three annual field trips are now conducted, sophomore miners going to the iron range country to study its formations and methods, junior miners travelling through the west where mining operations of many different types are inspected, and candidates for the Engineer of Mines degree in geology accompanying the geologists on their annual field trip into the Black Hills in South Dakota. In mine surveying, and in the actual operations of mining, milling and smelting, as well as in the first hand study of geological formations, the students get invaluable first hand experience on these trips.

The North Central Station of the United States Bureau of Mines was established in 1909 under a co-operative agreement by which the School of Mines houses the government workers, who study Minnesota mining problems for the benefit of all, and the University, in turn, derives benefit from the presence on its campus of the federal bureau's expert technical men.

In the early days the School of Mines was so inadequately equipped that its instructors had to work in two shifts to give all students an opportunity to carry on their work in the assay laboratory. Dean Appleby and his assistants used to work as much as 16 hours a day, carrying their lunches in dinner pails. Today the assay laboratory is one of the most complete in the country.

School of Mines Experiment Station

In the fall of 1923 was completed the new building of the School of Mines Experiment Station, dedicated principally to the task of making Minnesota's billions of tons of low-grade iron ore available for use when the rich deposits of high-grade ores have been exhausted. E. W. Davis, who was appointed superintendent of the station in December, 1918, has already perfected the magnetic log washer, with which the magnetites of the eastern Mesabi range can be cheaply concentrated. He and his staff are at work now on problems presented by

the Cuyuna ores, some of which are of too fine a structure for economical shipment, by the western Mesabi hematites, and by Minnesota's manganiferous ores. The Legislature which recently adjourned (1925) appropriated \$15,000 a year during the biennium for each of two problems, one the problem of the manganiferous and low-grade iron ores, and the other, the metallizing or direct reduction method. The latter contemplates changing the leaner ores directly into iron by a continuous process rather than by first concentrating and then smelting the ore.

United States Bureau of Mines officials have their offices in the new Experiment Station and make use of its splendid laboratories and facilities for conducting experiments.

The School of Chemistry

THE School of Chemistry was established by the Board of Regents in 1897, with the title "School of Technical and Applied Chemistry", and was subsidiary to the College of Science, Literature, and the Arts. This was its status at the opening of the twentieth century. Two courses were offered,—one in analytical and pure chemistry, and the other in arts and chemistry, which latter specialized in the teaching of chemistry. The School then occupied the west half of what was known as Science Hall, but which is now the Men's Union, the east half being occupied by Physics and Electrical Engineering.

By resolution of the Board of Regents, passed May 17, 1904, the School of Chemistry was definitely separated from the College of Science, Literature, and the Arts and established as an independent professional school, or college, in the University, with its own faculty. Professor George B. Frankforter was made dean. In 1903, the demand for technical and applied chemistry had become so urgent that a major course in this line was offered, leading to the degree of Bachelor of Science in Chemical Engineering.

As a result of the growth of the School of Chemistry and, in fact, the entire University, the whole Science building was given over to the School of Chemistry in 1901 and re-

modeled to meet its needs. By 1912, however, the demand for still more room became so urgent that the Board of Regents decided to build a new building for the School of Chemistry, on the site established in the Cass Gilbert plan for the development of the Campus. The new laboratory was built in 1913. Unfortunately, however, the cost of building had so increased that only three-quarters of the building could be completed and, even then, only after the original plan had been very materially changed and reduced.

The period immediately following the World War witnessed such a tremendous increase in the body of students taking courses in chemistry that the need of additional space again became imperative. The Board of Regents provided for the completion of the building by the construction of the final quarter and, also, for the addition of a fourth floor, or roof house. This construction was carried out in 1920-21, thus completing the building as at present.

The present building is complete. It has four main floors, a basement, and a sub-basement. In one portion of the basement, there is housed the chemical storehouse for the entire University. The six teaching divisions into which the School is divided are located as follows: General Inorganic Chemistry and Qualitative Analysis, first and second floors; Analytical Chemistry, third floor; Organic Chemistry, third floor; Physical Chemistry, first floor and basement; Technological Chemistry, second floor and basement; Chemical Engineering, basement.

Six of the rooms on the fourth floor are occupied by the Department of Drawing and Descriptive Geometry of the College of Engineering and Architecture. Two large lecture rooms are also located on the fourth floor. It is expected that when the School of Chemistry has grown to need the entire fourth floor, the drafting rooms will be converted into chemical laboratories, or class rooms.

The Chemistry Library is located on the first floor of the building in quarters specially designed for it. When the new General University Library was completed in 1924, the University Library Committee, which was con-

sidering the consolidation of all of the libraries in the University into the General Library, decided that, in view of the special needs of the School of Chemistry, and also, of the special facilities already provided for the care of the Chemistry Library, as well as the fact that this Library is located in the building adjacent to the General University Library, it would recommend that the Chemistry Library remain in the School of Chemistry for the present.

On July 17, 1919, the Board of Regents voted to correlate the administration of the School of Chemistry with that of the College of Engineering and Architecture under a single administrative head. This action had in view the ultimate organization of the technical schools of the University into a technical college, or institute of technology.

When Dean Frankforter was given leave of absence in 1917 to accept a commission in the U.S. Army, Ordnance Department, vacating the deanship, Professor Lauder W. Jones of the University of Cincinnati was made dean and remained two years. In 1920 Professor O. M. Leland of Cornell University was made dean of the School of Chemistry and of the College of Engineering and Architecture.

ORA M. LELAND, dean

General Extension Division

EXTENSION work of the sort that carries University instruction to the entire state by means of night classes both on and off the campus, short courses, lecture and lyceum work, motion pictures, and correspondence courses, had its inception at the University of Minnesota in 1909 and has grown until (see table) 5,849 students were regularly enrolled in 1924.

It was through the efforts of Dr. John H. Gray, then head of the department of economics, that the Legislature of 1909 made a special annual appropriation of \$5,000 for the development of extension work in business subjects, together with another of the same amount to be used in extension work by the College of Education. At that time several men were added to the University staff to give practically full time to extension teaching.

When President George Edgar Vincent came to the University in 1911 he gave new impetus to the extension work. He disapproved, however, of the plan under which each department was doing its own extension teaching. In pursuit of his general policy of consolidation and co-ordination he brought about in 1913 the organization of a separate unit of administration called the General Extension Division, to which were entrusted all the extra-mural teaching and service functions of the University other than those in the Department of Agriculture. Dr. Richard R. Price was made director.

Today the General Extension Division conducts night classes on the campus and in many downtown buildings in both Minneapolis and St. Paul. There are also regularly organized extension classes in Duluth, with a resident assistant director. As demand warrants, night classes have been established also in several of the Iron Range cities and in other big Minnesota communities.

Night classes are conducted under the three major heads of academic, engineering and business. In each of these groups instruction is given by men especially equipped to teach in that field. A great majority of the extension instructors are, in fact, members of the regular University faculty, though the policy has become to replace these men with full-time members of the Extension Division faculty as rapidly as possible.

Both in the night classes and in courses offered by the Correspondence Study Division college credit is granted for the work successfully done provided the student has met all college prerequisites before entering the course. Any one may take these studies, but those who have not yet advanced to the point where they might take them if they were enrolled as full-time students can not receive college credit.

A rule that students in the Extension Division may be graduated without actually spending a full year in residence and another giving extension students all the student privileges of those who attend the University daytimes have been recent steps in progress.

Divisions of Visual Education and Correspondence Study, a Lecture and Lyceum Bureau and a Community Service Division are

principal projects in the General Extension Division in addition to the night classes it conducts.

Through the medium of short courses, the General Extension Division has come to render one of its most valuable services to those who are able to give but a short time to educational effort.

"The short course as an educational device has arrived", wrote Dr. Price in a recent survey. "Its merit is extreme flexibility in method, scope, and duration, and concentration upon limited objectives or specific fields of endeavor. The short course may demand the full time of the student for a period varying from three days to three months; or it may take only his evening hours two or three times a week for six, eight, ten or twelve weeks."

Outstanding short courses at Minnesota are those offered in medicine and dentistry, which are aimed to bring general practitioners abreast of the most recent developments or to give intensive training over a brief period in some specialty. These have been growing in both popularity and efficacy during the past few years. A short course in embalming is offered by the Medical School and General Extension Division jointly, and there have been short courses in such subjects as retail merchandising, nursing, citizenship and the like.

Short courses offered during the past year may be taken as typical. These were conducted in the following subjects: Medicine, surgery, pathology, obstetrics, pediatrics, physiotherapy, preventive medicine, anesthesia and extraction, Monson principles, prosthetics, embalming, color and design, and textiles.

The College of Pharmacy

DEAN F. J. WULLING of the College of Pharmacy is this year completing his thirty-second year as director of pharmaceutical study at Minnesota. Only this college and one other, Mines, have experienced their entire development under the headship of a single man.

Although Pharmacy was established in the fall of 1893, its period of chief growth and development has come since 1900, and even more notably, since 1910. Today the college

is famous for its exceptional garden of medicinal plants, for its excellent standards, and for that fact that it was the first American College of Pharmacy to go on a three year minimum basis, that system having been adopted in 1916. Not until the fall of the current year, 1925, will the last of the other member colleges in the American Conference of Pharmaceutical Faculties have adopted the same three year minimum requirement.

What may be called the new era in the College of Pharmacy dates from the action of the 1911 legislature, appropriating \$75,000 for a new building. The first Millard Hall, standing where the Pharmacy building now is, had burned shortly before that time, and with the money obtained by reclamation and sale of material damaged in that fire, together with the appropriation, the new structure was put up. The greater space and convenience attracted more students as the years passed. There were 141 students enrolled in the College of Pharmacy in 1924.

Development of the medicinal plant garden to its present position followed the addition of Dr. E. I. Newcomb to the Minnesota faculty in 1910. In that year also Dean Wulling went to Europe to study foreign gardens of medicinal plants, sharing the expenses of the trip himself. The Minnesota garden has outstripped all others in the number of plants cultivated, and the garden materials have been the basis for some unusually valuable research work in drug production.

The undergraduate degrees now offered in Pharmacy are pharmaceutical chemist, granted for the three year course, and bachelor of science in pharmacy, granted for the course of four years. For a fifth year of study the master of science in pharmacy is granted, and for a sixth year, the doctor of science in pharmacy degree. The old two-year course was abandoned in 1916 when the three year minimum was adopted.

The faculty of the college has been active for years in the State Pharmaceutical Association and at all times in recent years the dean and other faculty members have been among the committee chairmen or officers of the association.

During the past year Dr. Newcomb has been

publicity director of the national campaign being conducted by pharmacists to raise money for a headquarters building in one of the large American cities.

The Graduate School

NEARLY every American knows that the United States has become progressively more and more independent in the matter of industrial production. Whereas we once looked to Europe for practically all goods requiring skill in manufacture, we have little by little reached a basis of equality, then of superiority in producing steel, tinplate, certain types of textiles, many kinds of machinery. Now we are coming to stand on our own feet in the manufacture of dyes, such fine instruments as those used for optical and surgical purposes, and in many other lines.

Far fewer realize that a like transformation and development has been going on in the field of higher education. Time was when a man or woman, to take pride in truly superior intellectual training, must have studied abroad; in Germany, say, or England, France or Holland. Here, too, a great change has come about. As long ago as 1900, a full dozen of American universities were doing work which was the equal in many fields of that carried on abroad. And today immeasurable advances have been made beyond the attainments of that period.

Dean Guy Stanton Ford, who directs the graduate school at the University of Minnesota, tells of a speaker at the Peace Conference who declared that the future of advanced education lay with America. He did not imply that intellectual capacity and high attainment in many fields of learning had vanished from Europe. His point was that America has not only the knowledge and scholarly point of view requisite for leadership, but has the equipment, the resources, and the energy that will enable it to progress even though others may falter.

In medical subjects, in agriculture, in school administration, educational psychology, chemical engineering, and in geology and mines subjects, among others, the graduate school at the University of Minnesota ranks among the leading institutions. No other function of the

state can possibly have so broad an influence, nor make so permanent and effective a contribution to world progress, as does the university that trains for skill and discovers unrecognized truths in such fields as these. Individuals or corporations may win fame or wealth by utilizing the new knowledge. The lot of the average man will certainly be bettered. But it must not be forgotten that the material—fact, process, or method—was revealed and made usable by the student.

Graduate Students Explore for Truth

The graduate student is quite a different individual from the average undergraduate working for a bachelor's degree. The latter's purpose is to assimilate existing knowledge. The graduate student works with the ultimate purpose of discovering new truths and giving them to the world. At his best, the undergraduate whose bent is scholarly, is a graduate student in course of preparation. The graduate student pushes on to the end of the marked paths. Then he pioneers. He is an explorer. No matter how many degrees he wins, he considers them incidental. His is the creative mind.

When one comes to the realm of graduate study the words "student" and "teacher" lose their common significance. Every teacher is a student in research, in seeking. Many of those called students in the address book are also teaching.

To this fact, for instance, is due the ability of Minnesota to maintain the standard of teaching for undergraduates which it offers in those fields in which research interest is centered. For the sake of the materials and guidance they find at Minnesota, many graduate students who otherwise would find better paying positions, remain at the University to study and seek, contributing for small returns their knowledge and enthusiasm in the capacity of teachers.

Local Importance Influences Studies

Sometimes one hears the question asked: "Why should Minnesota contribute to the maintenance of a graduate school that draws students from South Africa, India, South America, Scandinavia, England, Germany, and Persia?" What part in the support of the institution do those people play?

For those who ask this question the answer is this: "If we have a graduate school that gives something so good as to attract students from all over the world, what must it not be giving to the state in which it lies and from which it draws a great majority of its students?"

It is not as though we were teaching something of interest to Persians and South Africans only. The graduate school teaches and studies things of interest to Minnesota, and does it so well that men in those distant places hear of it and come to participate.

Minnesota is an agricultural and a mining state, and medical subjects are of unvarying importance to all peoples everywhere. It is for these three subjects of medicine, agriculture, and mining with its related geology, that a majority of the foreign students come to the University of Minnesota. The results of these studies in Minnesota attract their attention and draw them here. But the graduate school is not allowed to become one-sided. It seems strange, but the best collection in the world of source material for the study of seventeenth century English history lies in the aggregate libraries and museums of the Twin Cities. The College of Education at Minnesota is recognized everywhere as among the leaders in its fields. With its splendid equipment for the study of chemistry and the development that is going on in electrical engineering, Minnesota is placed high in those studies. Waterpower is among the state's assets. The importance of electrical engineering will grow, year by year, as far as it is given one to see at present.

Yet the graduate school is maintained on a budget of \$25,000 a year, of which \$18,000 goes into subsidies for publication and research grants. Why? Because opportunities for research hold at the university experts in advanced subjects who support themselves by teaching in the undergraduate colleges. This means superior instruction for undergraduates on the one hand and superior direction of research on the other, not to mention the direct contributions to knowledge of these men themselves.

The growth of Minnesota's graduate school has been rapid. When it was first recognized as a graduate school in 1905, only a handful

of students were enrolled in it. When the present director, Dean Guy Stanton Ford, came to Minnesota in 1913, the registration was 175 men and women. During the four quarters of the last college year 1134 students enrolled for graduate study. Registration for the fall quarter of 601 on the two campuses in the Twin Cities and 164 at the Mayo Foundation, Rochester, indicates a considerable growth over the attendance of a year ago.

Training In Architecture

ARCHITECTURE is one of the undermanned professions. Despite the vast amount of building that has been going on in the United States during the past few years, only about two hundred men a year are turned out by the seventeen accredited collegiate schools of architecture that are recognized by the American Institute of Architects. This number is barely four new men to a state. When one recognizes that the larger cities must absorb far more than the quota that a flat division would allow them, it seems that large regions in this country must receive practically no new architectural talent with college training during the course of an average year.

Minnesota is fortunate to possess one of the seventeen collegiate schools of architecture, the department devoted to that subject in the College of Engineering and Architecture at the University of Minnesota.

Both an Art and a Profession

Because it is recognized as one of the arts, architecture occupies a rather distinguished position among collegiate studies. The student of architecture can not be satisfied with mastery of the technical tools of his profession. No student in any field should be satisfied with that, of course, but the architect must not be. In addition to mastery of the tools of his art, its history, standards, and social significance, he must achieve the power of making trained and cultivated judgments, to quote Prof. F. M. Mann, head of the department at Minnesota. It is largely this power of judgment that makes the architect an artist. He attacks problems

that have no unchangeable solution. By use of his creative talents, one architect will evolve one solution of a problem, another will arrive at a different solution. Both solutions may be equally splendid. The standard of judgment is not so much "is this correct?" as "is this satisfying?" not only to the practical requirements in a building or monument, but to a cultivated recognition of beauty, harmony, expressiveness, and good taste.

There are two very obvious reasons why the architect must be a man of broad general training and of sound culture. The first is that he will design and plan buildings that will stand for years. His works will delight or torture mankind for decades to come, now that the life of the average American structure is lengthening. Society can no longer tolerate the man who perpetrates structural atrocities of any permanence. The second is that the professional standing of the architect makes it necessary for him to take active part in public affairs. He must serve on planning commissions, advise regarding public works, take an active interest in whatever will build a community that is better and more beautiful. In a word, he will be influential, and this influence should come from a man fitted to wield it by the best training society can give him.

The department of architecture as it is now constituted was established in the autumn of 1913 and completed its first year in June, 1914, just eleven years ago. Prior to 1913 one or two attempts at giving architectural instruction had been made, but the effort had lapsed. Prof. Mann, who had already established one school of architecture, that at Washington University St. Louis, Mo., came to Minnesota to shape the new department. There was a surprising response to the announcement that architecture would be offered. The first class numbered nearly 50. At present about three times that number are enrolled as architects. The first year class is considerably diminished before the final years of the course are reached, but in this the school at Minnesota is no different from others. It is estimated that an average number only a little higher than 10 is graduated yearly from each of the seventeen American schools.

Growth Brings Enlarged Faculty

Expansion of the department has brought enlargement of the faculty, which at present numbers ten.

Instruction in art in the sense of painting, drawing, sculpture, etching, and the like has been allotted to the department of architecture.

Minnesota has a school of architecture that is firmly established in a field which provides ample opportunity for its graduates. Ten years ago, the nearest department of architecture was at the University of Illinois. Minnesota was a most logical institution at which to found a new department, and the development of the Minnesota school has borne out the

judgment of those who then made the decision.

Before colleges began offering training in architecture, a step first taken by the Massachusetts Institute of Technology in 1868, architects received apprenticeship training. Even today the college trained men among those who practice as architects are only about 25 per cent of the whole number. But the percentage is sure to increase. Building has become a vastly more complicated process with the introduction of new materials and new equipment. Special training that can be given with more expertness and concentration than is possible under an apprenticeship system is becoming essential to success as a practitioner.

Dean of Women at her Desk

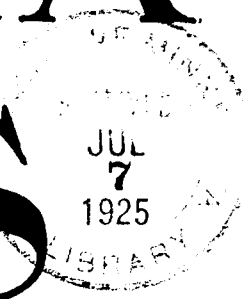


Miss Anne Dudley Blitz

Vol. 5 No. 80

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MINNESOTA CHATS



For a Better
Minnesota



Foreword

IN its current issue MINNESOTA CHATS has tried to depict some of the University of Minnesota's more interesting accomplishments in the field of zoology and to show how the University is contributing to a solution of important economic and scientific problems in mining and forestry. These articles will be found in the order in which they are mentioned here.

IN subsequent issues MINNESOTA CHATS will continue to present for public understanding brief and, it is to be hoped, readable accounts of some of the most worth-while activities and accomplishments of the institution whose welfare so many thousands of Minnesotans have at heart.

RESIDENTS of Minnesota who wish to receive MINNESOTA CHATS regularly should send a request for it to the address shown on the inside page of the back cover. Those who for any reason happen to receive more than one copy are also urged to inform this office.

THE EDITOR

Zoology Does Not Stop At First Syllable

*Men in University of Minnesota's Department
Help Various To Preserve Food Supply,
Teach Medicine, or Save Native Game Fishes*

THERE was once a man who read the weather bureau reports eagerly for years, making daily note of the item "precipitation" which he considered to be something especially scientific and important. Then one day he found out that "precipitation" meant merely rainfall. He quite lost interest in the weather bureau and declared that anybody, or at least nearly anybody, could tell just about how much it had rained. He was "off" the weather reports.

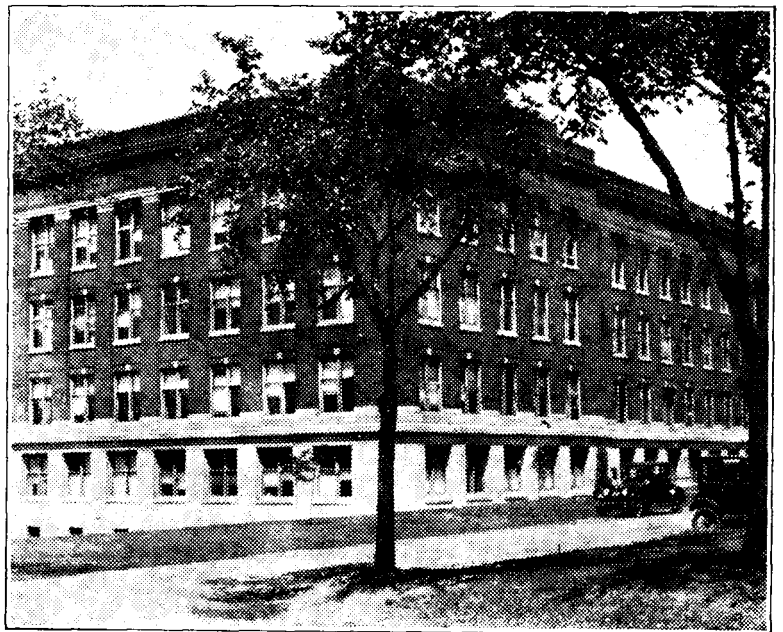
Not improbably, there exists somewhere the opposite of this man, one who always laughed when the word "zoology" was mentioned because it had such a funny sound and reminded him of monkeys running up a tree, sticky-fingered children pop-eyed by the lion cage, and the smell of musty hay. But he was a man who had a high regard for practical achievement, and when he learned presently that men in the various specialties of zoology were battling the insect pests that destroy crops and the parasites that destroy animal and human life, that others were teaching manufacturers how to destroy the worms and weevils that damage \$200,000,000 worth of food-stuffs in this country each year, that zoology laid much of the basis for medical education and at the same time discovered

and showed how the gamy Minnesota bass could be preserved and increased—well, he decided that there must be as much to the ology part of it as to the zoo.

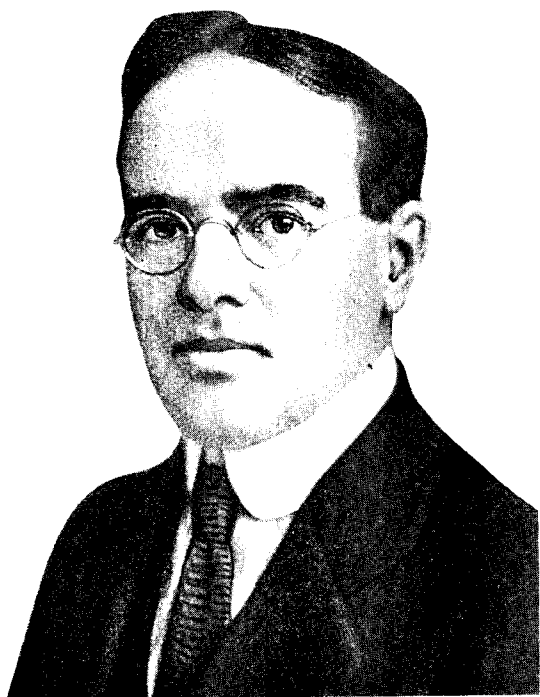
If such a man really exists in Minnesota, then the whole story is a true one, for the accomplishments just enumerated are all true of zoology, officially known as animal biology, at the University of Minnesota.

This department is somewhat in the limelight just now due to the retirement of its veteran head, Professor Henry F. Nachtrieb and the promotion of Professor William A. Riley to fill his place. Dr. Riley's former position as chief of the division of entomology and professor of economic zoology has been filled by the promotion of Professor Royal N. Chapman.

A View of the Animal Biology Building



Headquarters for the studies described in this article.



Dr. William A. Riley

*New head of the department of Animal Biology,
University of Minnesota*

Together with these changes Dr. Riley is bringing into the department a man whose field is "aquiculture," and who will give a part of his time to studies pertinent to the welfare of Minnesota's splendid supply of fish. One acre of every fourteen in Minnesota is an acre of water. The seining and exportation of "coarse fish" has become a considerable industry, and the propagation of Minnesota's famous game fishes, bass, pike, muskellunge and trout is vastly more important. On these the state is destined to build a tourist and outing business unequalled between eastern Canada and the far west. Dr. Maynard Johnson, who is coming to Minnesota as an assistant professor, will devote part of his time to important fish problems, not so much because of an immediate need as because it is the duty of the University to have the information on hand when it is sought by those who must put it to use.

This is but a sidelight on the work at the University of Minnesota in zoology, which

with its sister subject of botany forms the field generally referred to as biology.

Helps Save Nation's Food Supply

In Dr. Chapman Minnesota has one of the outstanding men of the country in the important work of battling the grubs, borers, weevils and worms which annually infest and destroy foodstuffs estimated to be worth more than \$200,000,000, possibly as much as \$300,000,000. Few institutions have done much along this line, and among those that have, Minnesota is prominent. The bureau of entomology of the United States Department of Agriculture is constantly engaged in the same battle.

It stands to reason, of course, that in the huge quantities of flours, breakfast cereals, packed and smoked meats, dried fruits and the like that are kept for periods of months so that there may be an all-the-year supply of food for all of us, a certain percentage should be attacked by the many voracious insect forms which also carry on a steady search for food. The battle between scientists and these insects is one of the most fascinating fights now being waged. It is one of which a good deal has been written recently, though most of this has referred to the struggle to keep insect pests from the growing crops. Keeping them from the product that has been grown, and harvested, and milled and packed is likewise of great importance.

Typical of the problems that confront one in Dr. Chapman's line of work was the recent case on which a hurry-call sent him on a rush journey of 1,000 miles. His clients were wholesale dealers in food who had just received the first \$70,000 shipment on a bacon contract that was to run to half a million. So far as could be learned, the bacon had left the Chicago packers in good condition. On arrival at the point where it was to be cured and packed it was found to be covered with fly eggs. And the flies were of a type unknown to science. A new insect form, not hitherto discovered, had come from nowhere and was threatening to destroy valuable food and ruin an important contract.

There are three important methods of controlling insect pests, the use of chemicals, regulation of the temperature and moisture, and the use of electricity. For bacon, chemicals were out of the question, Dr. Chapman decided to try a temperature method. The question was, what temperature would prevent the eggs from hatching into worms until the bacon had been cured and the menacing spawn could be washed off?

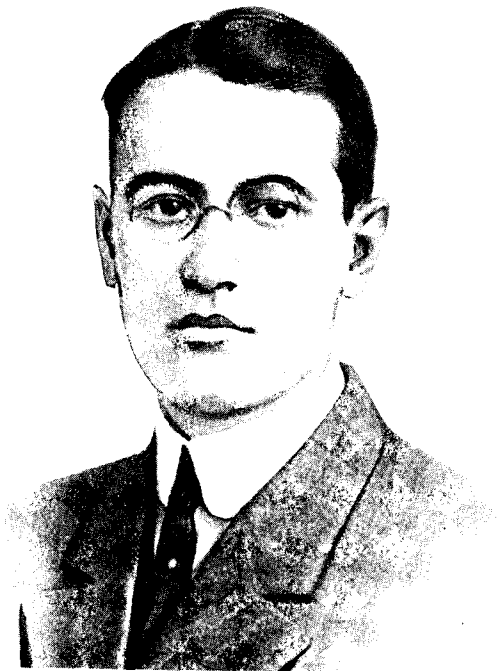
A striking thing about these flies was that they were active in a temperature of 38 degrees above zero, although flies usually are rendered inactive by a temperature of 42 degrees. Dr. Chapman acted on the theory that if this insect could remain alive at an unusually low temperature it probably would hatch at a low temperature. To prevent its hatching, therefore, he had the entire lot of bacon kept very cool to retard development up to the time when it was necessary to apply heat for curing. Then he had the curing process hurried at a high temperature with all possible speed. It was accomplished. They were successful in preventing the hatching. The shipment was saved. A few weeks later scientists on the Pacific coast found another colony of these same flies, wholly without relation in origin to the ones that attacked the bacon and with no more explanation of their arrival. They remain a mystery.

Insects Menace Cereal Foods

Losses due to insect damage occur in the cereal industry at almost every step in the progress of those products from field to plate. At least, infestation by damaging insects may occur at any step. Sometimes the insects get into the grain on the farm or in the small country or big terminal elevator. Again they find their way into a product in process of manufacture, or enter it after it has been finished and shipped, due to the presence of bugs in a car or warehouse. And if even a small percentage of a shipment is found to be infested the manufacturer must get that entire shipment back, for he can not know which seven or eight packages in a hundred may be bad, and every bad package damages the reputation of his business.

Some extremely careful figuring is required at times to determine whether a given source of infestation explains all of the bad packages. The entomologist's job is not complete until all have been explained. Such a problem was set by a southern factory for which Dr. Chapman once did entomological work. Seven per cent of the packages were found to be infested. The makers did not believe that he could solve the problem, but urged him to try. There were no apparent loopholes through which infestation could occur. All of the product was sterilized and packed, then run along a continuous belt to a point where the sanitary containers were sealed.

He searched for several days but could find no source of infestation. Then one day as he watched the girls packing he noticed that the product was coming along the belt faster than they could pack it. Every now and then a girl was setting a filled package aside without sealing it. He asked what was done with these. They were taken to an adjoining room, he was told, and left there until Saturday afternoon, when some of the girls worked overtime and



Dr. Royal N. Chapman
*New chief of the Division of Entomology,
University of Minnesota*

sealed them. Examination showed that all these packages became infested by an insect pest before they were finally sealed.

Making a careful computation of the percentage of output that was delayed in this way, he compared it with the percentage of insect damaged packages that had been reported. The two figures were identical. The problem was solved.

How New Pest Problems Arise

In the history of mankind tribes from stern regions where living was difficult have often come into sunny climes, rich with fruit and sunshine, and conquered them for their own. Although they had not enjoyed luxury before, they were capable of recognizing it when they saw it, and of grasping the opportunities for fat living that presented themselves. The same course sometimes holds true in the insect kingdom, and in two ways. Sometimes insects from distant regions are brought to a place where they find living particularly soft. Sometimes new products are introduced in a region where certain insect forms that have been living a meager existence fall on them as their very own and make merry at the farmer's expense.

A notorious example of the first procedure was the introduction of the Japanese peach moth into the United States on the stems of a spray of cherry blossoms brought home from Japan by Mrs. William Howard Taft. So swiftly has this pest spread in the eastern peach districts that a prominent entomologist in the government employ declared recently that the day is past when a peach tree or two may grace the backyard. Only where there are large orchards in which science contributes to the fight and a steady war of spraying is carried on will the peach flourish.

The other side of the picture shows the "pale western cutworm" at work on the wheat in one section of the Rocky Mountain districts. This fellow was one of the unfortunates whose lot had been cast where there was little food. Not very agile by nature, he failed to migrate to happier valleys. But man played him a princely joke. Man developed dry farming and began to cultivate the acres which had been the pale western cutworm's own. That worm

thought it no more than fair that he farm the valleys on shares, so, when the wheat came up, he devoured everything in sight. On his own grounds he is still supreme.

How To Eliminate Grain Weevils

Specialists in this phase of economic entomology are now looking to temperature regulation as a main weapon in fighting insect pests. Dr. Chapman believes, for example, that the weevils which get into terminal grain elevators would be wholly destroyed by so simple a process as opening the elevator on a very cold winters day and shifting the wheat from one bin to another. In this process the weevil would be rooted out of his warm bed far down in the grain and exposed to a devastating cold. It would finish him.

"One of the great advantages of temperature regulation for fighting insects is that the processes are usually so simple and inexpensive," Dr. Chapman says. "The laboratory work that determines methods is relatively costly, but the operations themselves, once they have been perfected, are cheap by comparison with the value of the foodstuffs endangered."

At the College of Agriculture the University of Minnesota is developing a temperature laboratory for work on such problems as these. If the money needed to perfect it, about \$4,500, is somehow obtained, this laboratory will be equipped to maintain experimental temperatures down to 45 degrees F. below zero. With this equipment scientists will be able to determine the freezing points of insects and also the temperatures which kill them. The freezing point is not always fatal to an insect, which fact is one of the little anomalies which make the work complicated and interesting. A delicate thermoelectric method has been developed for determining just when an insect is frozen. It is not always apparent.

Natural temperatures and rainfall are also being used by scientists now in predicting the future abundance of certain insect pests. So great an influence have these factors on the growth and multiplication of pests that different weather conditions lead definitely to different degrees of survival among the insects.

A patent on chloropicrin, a chemical which kills weevils in stored grain, has recently been obtained by Dr. Chapman and turned over to the University of Minnesota. Chloropicrin represents the chemical method of combating insect pests in food. The process of turning grain from one bin into another during very cold weather may stand as an example of the temperature route of attack. The third promising method is found in the use of electricity. This has recently been tried by passing packages along an endless belt, on which they come in contact with electrodes at successively greater heights until every part of the package has been "shocked". The X-ray has been used on tobacco, also, to kill the cigarette worm.

Pure Science Precedes Applied

So much for one of the practical applications of zoology. Dr. Riley, head of the department, declares emphatically that thorough instruction in the pure science must be fundamental to satisfactory applied work, and with that thought in mind he plans to strengthen both the theoretical and the practical sides of the work.

"The primary reason for teaching animal biology or zoology", he says, "is that we are a part of the animal kingdom. We must orient ourselves in this relationship and so must know the laws that underly life and living forms, reproduction and growth. This becomes more and more important as preventive medicine and public health legislation grow. If the public knew the laws of biology there would be less resistance to measures like compulsory vaccination, things that are resented because of a lack of understanding."

Dr. Riley aims to develop the field of animal biology at Minnesota with a view, first to giving more opportunity for such work to students who want to go beyond the elementary courses

but whose interest is not professional; and second, to correlate the work more completely with work in agriculture and medicine, namely, for professional students. Genetics, entomology and the like are important to students of agriculture, while medical students need such biological subjects as parasitology and comparative anatomy in addition to elementary courses.

At present something like 800 beginning students take the elementary courses in animal biology each year.

Although Dr. Riley's specialty has been the study of parasites that attack animals and man, he has also done much teaching in the broader phases of biology. At De Pauw University he taught histology, embryology, and comparative anatomy, and later, at Cornell, taught general invertebrate zoology prior to the development of his special interest in insects as carriers of disease. For the past 15 years he has devoted himself in large measure to directing the work of graduate students in the study of parasites and similar subjects. Malaria, hookworm, animal worms and various other pests come within the scope of this specialty. Several years ago he was a member of the commission sent by Johns Hopkins University to study the hookworm in Porto Rico. He has also studied the malaria parasite in the south, the insects which carry mountain fever, typhus fever, and the like. Marshall Hertig, a Minnesota graduate and student of Dr. Riley's, is now in China with an expedition financed by the Rockefeller Foundation, studying the insect pest which transmits the dreaded disease known as Kala Azar, a plague which is becoming threateningly prevalent in certain parts of the Orient. Dr. Hertig, a member of the Minnesota faculty, recently had his leave extended for a second year so that he might continue his studies in that field.

"Burning Up" Iron Ore May Yield New Millions

School of Mines Experiment Station at University Is at Work on Process of "Metallizing" To Change Poor Ore into Iron.

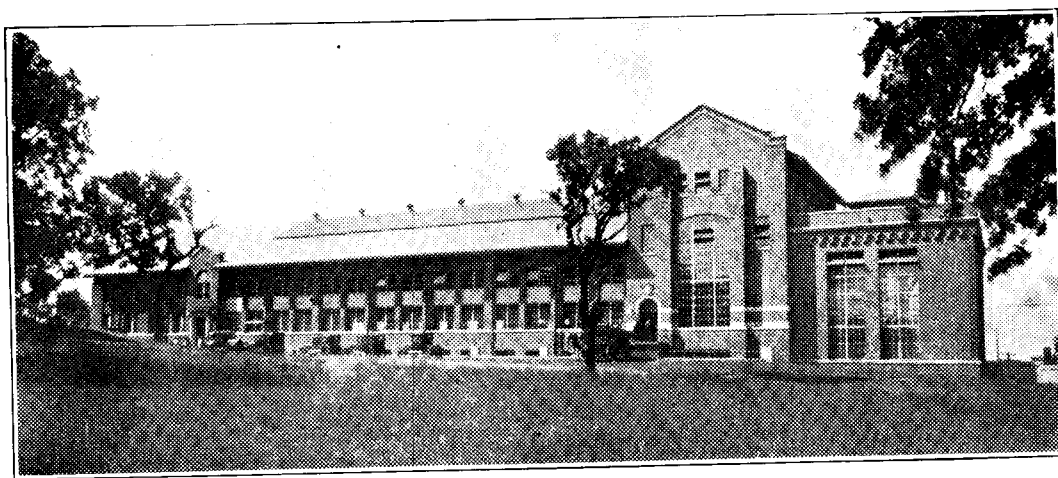
MINNESOTA faces at least four major economic problems. These are, first and foremost, to promote and build up the efficiency and profitableness of its agriculture; second, to govern the extraction of its vast deposits of iron ore in such a way that full value will be received from the high grade ore and that the ore of lower grade will be made commercially available in order to prolong the life of the industry indefinitely; third, to encourage the establishment of manufacturing industries with a view to diversifying the state's economic resources, and fourth, to maintain the efficiency of Minnesota transportation.

The University of Minnesota is making some contribution to the solution of each of these problems, and to the first, agriculture, and the second, improving and prolonging the iron ore extractive industry, the Department of

Agriculture and the School of Mines, respectively, are bending their best efforts.

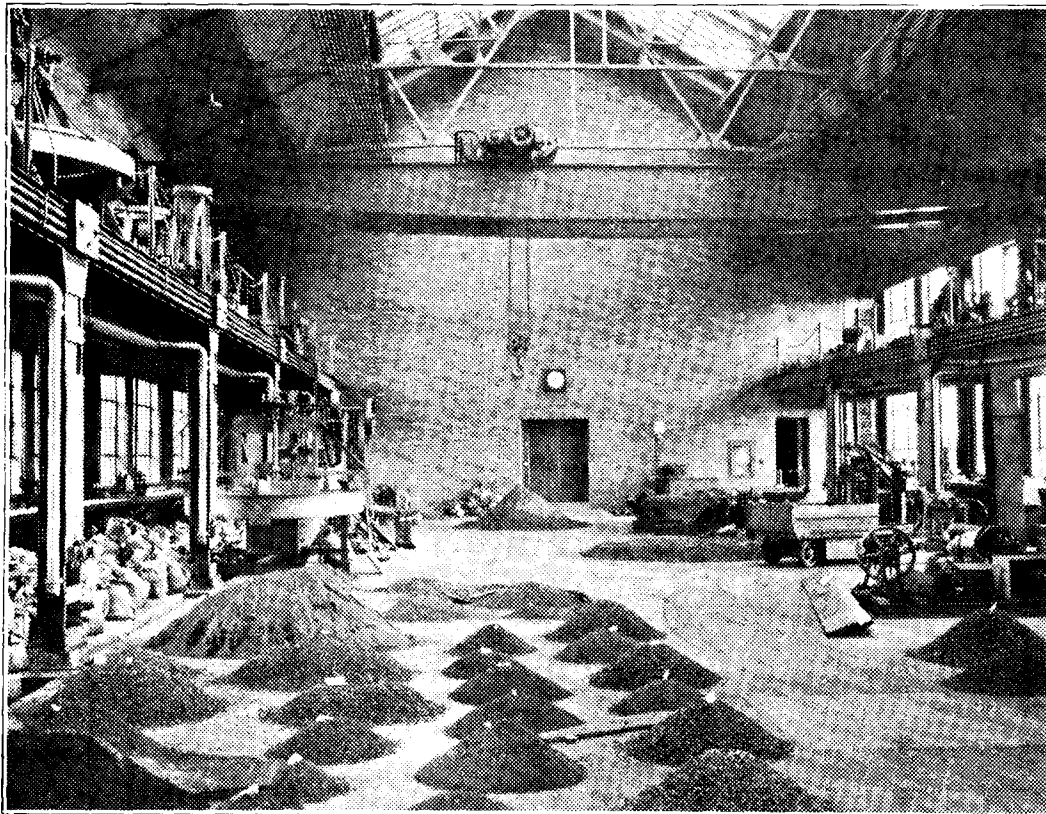
For more than ten years past an annual call has gone out from the School of Mines and the Mines Experiment Station, asking attention to the fact that Minnesota ore of 50 per cent or more iron content will not last forever and urging that all who have the state's future at heart interest themselves in the problem of making the low grade ore available for industry. Publicity has gone to all parts of the state relative to such accomplishments as the perfection of the magnetic log washer, which made it possible to handle the low-grade magnetite ore of the eastern Mesabe Range, and the sintering operations which have been started on the Cuyuna Range.

By an act of the 1925 Legislature, the Mines Experiment Station has been given money with which to attack a new problem in low-grade ore which promises to be of greater importance than any that has yet been met. This is the problem of metallizing or direct reduction, a process by which the ore, instead of being



Mines Experiment Building, University of Minnesota

On The Laboratory Floor, Mines Experiment Station



Each little heap of ore has been identified and tagged preparatory to the tests to which it will be subjected.

treated to improve its quality as ore is converted from ore directly into metallic iron.

If such a process can be perfected the benefit that Minnesota will derive will be tremendous. In the first place, it will mean that the mining of iron ore will be prolonged indefinitely, for there are billions of tons of the lower grade ores, ranging in iron content from 25 to 45 per cent. This will provide a supply of raw material for as long a period as need now be considered. And in the second place, an industry which up to now has been merely extractive, a severance of raw materials from the spot where nature deposited them, will become a manufacturing industry, employing greatly increased numbers of men and yielding a product of far greater value than the raw material.

New Product to Out-Value Ore

E. W. Davis, superintendent of the Mines Experiment Station, gives the comparative fig-

ures as follows: Iron ore, value per ton about \$4 to \$4.50; scrap iron, value per ton about \$15; pig iron, value per ton about \$20. Whereas the best ore now mined brings approximately the price given above for ore, the poorer ore, which will be used if the new process succeeds, is worth today exactly nothing because it is unusable. If the metallizing process converts it successfully into metallic iron it will be worth at least as much as scrap iron, nearly four times the present value of good ore, and possibly worth as much as pig iron, five times as valuable as good ore.

One must remember, though, that the University of Minnesota is not promising to bring this about. Metallizing has been conducted successfully in the laboratory of the School of Mines Experiment Station. In Spain a company having government sanction has begun spending a large amount of money on a metallizing plant at Oviedo on the north coast.

Mr. Davis recently spent several weeks there advising and consulting with the Spanish iron masters. But Minnesota is still confronted by the task of transforming a laboratory process into a process that can be used on a commercial scale. Both Dean W. R. Appleby of the School of Mines and Superintendent Davis are optimistic over the outcome of their experiments. Yet, the Minnesota public must await the outcome of experimentation in the same scientific spirit that leads the expert to try, test and change, with infinite patience, until at last the purpose is accomplished.

From 1892, when a few thousand tons of ore were shipped from the Mesabe Range, up to recent peak years, when thirty, thirty-five, and even forty million tons have been extracted from Minnesota ranges, Minnesota has been in a commanding position as to center of iron ore mining. In many other parts of the world there are splendid ore deposits. True enough. But Minnesota has had equally fine ore, has had pits open and mining equipment installed; has had transportation systems from the pits to Duluth-Superior, and at that point has had access to the remarkable through water route from mine to furnace which the Great Lakes afford. Why, then, turn to other deposits? The answer has been obvious enough. The iron masters have not turned to other deposits, and some of the best of the others remain practically unworked.

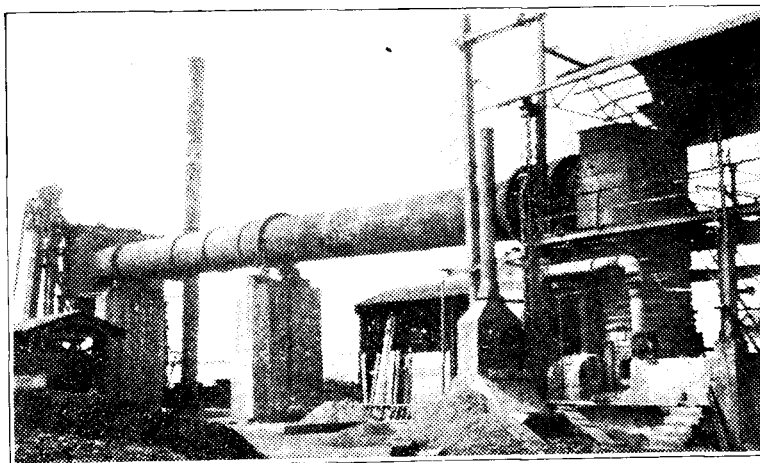
Loss of Mining Called Possible

Let us now reverse the picture. Geologists and mining experts know that the Minnesota deposits of ore ranging above 45 or 50 per cent iron content can not last forever. In all probability the peak of high-grade ore production has been reached. Right now some of the famous mines have been worked out and the leases on them thrown up by leading mining

concerns. There is no ground for hope that others will escape the same fate. Nature grows but one crop of ore, and when it has been harvested no fertilization or rotation, or dry farming will ever bring it back.

If the day comes when mining concerns find it no longer worth their while to seek in Minnesota for high-grade ores, and if at that time the processes for making low-grade ores usable have not been perfected, the mining companies, Mr. Davis says, will move their equipment and forces to one of the other big known deposits, and the once famous Mesabi Range will stand just as vacant and desolate, due to the competition of other deposits, as those other deposits now stand due to Minnesota's superiority. The same inexorable economic law will operate to bring that situation about.

Metallizing Plant at Oviedo, Spain



This picture was taken by H. H. Wade of the Experiment Station, who went with E. W. Davis on his recent trip to Spain. The ore enters at the left and progresses slowly down the long tube while its oxygen content is burned out by the gasified fuel that enters at the right.

Among the consequences of such an abandonment, some would be serious. Cities and villages now dependent on mining would dwindle and disappear. Thousands of incomes derived from labor, management or ownership in the mining industry would vanish. Taxes derived by the state from the known deposits of ore, from profits on the occupation of mining it, and from gross earnings of the railroads which carry it from pit to port would be lost.

Minnesota would be left with a choice between two evils. It might either sink back and become a second rate state in its economic efficiency, its contribution to national wealth and in the standards of its various activities and institutions, or it would have to impose a heavier burden on its remaining taxpayers. Primarily, of course, these are the farmers. Secondly, these taxpayers are the manufacturing and distributive industries and the transportation companies. If the four main economic problems of the state are to improve and strengthen its agriculture, manufacturing, transportation, and mining, it would do well to look to the future welfare of its mines, lest their loss impose a crippling burden on the prosperity of the other three.

Romance of Science Comes to View

There is always romance in science, and the mining experts of the University of Minnesota, in a red litter of iron ore that brings a hopeless look to the janitor's face, amid the clang of chains, the grinding of crushers and the roar of experimental furnaces operating at 1,000 degrees centigrade, are fighting their battle in the building assigned to them on the campus. Asked what they are about, they will say that they are trying to perfect the direct reduction process for metallizing lean ores. Then one sits down to talk to them, and presently discovers that they are battling at an economic Marne. They are fighting for the future prosperity of the state. And the fight is not only for the sake of fending off an economic disaster. If they win they will not only do that, but will increase and prolong mining, diversify manufacturing industry, establish new state wealth and provide additional tonnage to maintain the transportation system that is so vital to the prosperity of agriculture.

If the metallizing process works, iron and steel will be made in Minnesota right at the mines.

This involves a new conception of Minnesota's industrial possibilities. Steel is made in this state now at only one place, Duluth, because Minnesota has no coal and such a plant would have to be established at a point to which the coking coal of the eastern beds could

be brought by cheap transportation, a water haul.

One of the great advantages of metallizing will be, however, that it will require only the cheapest of fuels. North Dakota lignite will be perfectly satisfactory, the experts believe, although they must yet work out the particular type of furnace in which a fuel of that type will accomplish the desired results. It is because the process is still in its experimental stages and because furnaces and other machines must be built and rebuilt until the right arrangement is found that the Legislature has granted them \$15,000 a year for two years for this work. There is no sensationalism in the considered statement that if they make metallizing a success the ultimate return to the state and its people will run into millions, probably billions of dollars.

How "Metallizing" Is Conducted

Technically, the process of metallizing will consist in heating the iron ore, (oxide of iron), to a temperature of about 1,000 degrees centigrade, in a furnace in which it has been mixed with some gaseous or pulverized fuel. The fuel will act as the "reducing agent", in that it will burn by combining with oxygen, not from the air but from the iron oxide. This process will be continued until the oxygen originally combined with the iron in the iron oxide has been completely burned up and only the metallic iron and a small percentage of silica (sand) will be left. The silica will be separated by mechanical means and the iron will remain.

It will be largely due to the use of pulverized or gaseous fuel that the complete burning out of the oxygen will be possible. Such a fuel can be mixed with the ore far more thoroughly than can the coal that is used in a blast furnace in smelting metallic iron out of an ore. A remarkable thing about the prospective process is that the change from ore to metal will be accomplished without melting the material. The metallic iron, after the reduction, will look much like the ore with which the process was begun, except that it will be black rather than red.

Some of the steps in the process will be exceptionally interesting. When the ore first enters the heating zone and its temperature is raised, the combined water and carbon dioxide (CO_2) will be driven off, together with other volatile materials, leaving a straight hematite, or red oxide of iron. As the heating continues, the material will change into a series of different combinations, each containing less oxygen than the one before. Thus the hematite, Fe_2O_3 , becomes magnetite, Fe_3O_4 , which changes, in turn to FeO , where iron and oxygen exist, atom for atom. This in the end becomes straight Fe, or iron. And at the temperature of 1,000 degrees centigrade the material will not even have melted.

Presumably this material will then be removed from the furnace and crushed so that one of the magnetic processes may be used to separate the iron from the remaining silica. The metallic iron will then be agglomerated, or pressed into lumps like briquets for greater ease in handling and to prevent the wastage that would take place if it were in the form of dust.

Minnesota's low-grade ores are of three types, hematite, magnetite, and manganiferous hematite, which last contains a varying percentage of manganese. A great advantage of the direct reduction process will be that any of these types of ores can be treated in that way with equally good results. As the chemical description shows, the hematite becomes magnetite in any case as the reduction goes on. And magnetic separation of the iron from the silica as a last step will be possible because the substance will then be metallic iron, which is, of course, magnetic.

Although some time must pass, a great deal of experimenting be done and a large money investment be made before an actual steel industry grows up in interior Minnesota as a result of the development of direct reduction. Mr. Davis believes that the product from a metallizing plant would find an immediate market at open-hearth steel furnaces. These mills already use a tremendous amount of scrap iron and scrap steel in their process, and the metallic product from direct reduction, he says, will have almost exactly the properties of scrap.

Operators will find it immediately desirable in his opinion, and will buy it at approximately scrap prices.

Each new process yet developed at the Mines Experiment Station has found one or more companies willing to spend large amounts of money to try it out in actual operation. The Mesabe Iron Company has spent millions on its plant at Babbitt which makes use of the magnetic log washer. Cuyuna Range interests have introduced the sintering process for ores of fine structure, which was recommended to them by the University. It remains to be seen, of course, whether private capital will try out metallizing if it is developed in a way that makes it commercially feasible. But it is an excellent bet that not only one company, but more, will welcome the opportunity if once the process receives the scientific OK. Owners of ore deposits that have never been worked because the material was not quite up to grade will be eager to try it. Those who own properties from which the higher grade ores have been removed and which, while once very profitable, have since ceased to yield an income, will in all likelihood be even more eager to try it than will the others. A fair trial for the process seems assured if the laboratory workers perfect the process and place the seal of approval on it.

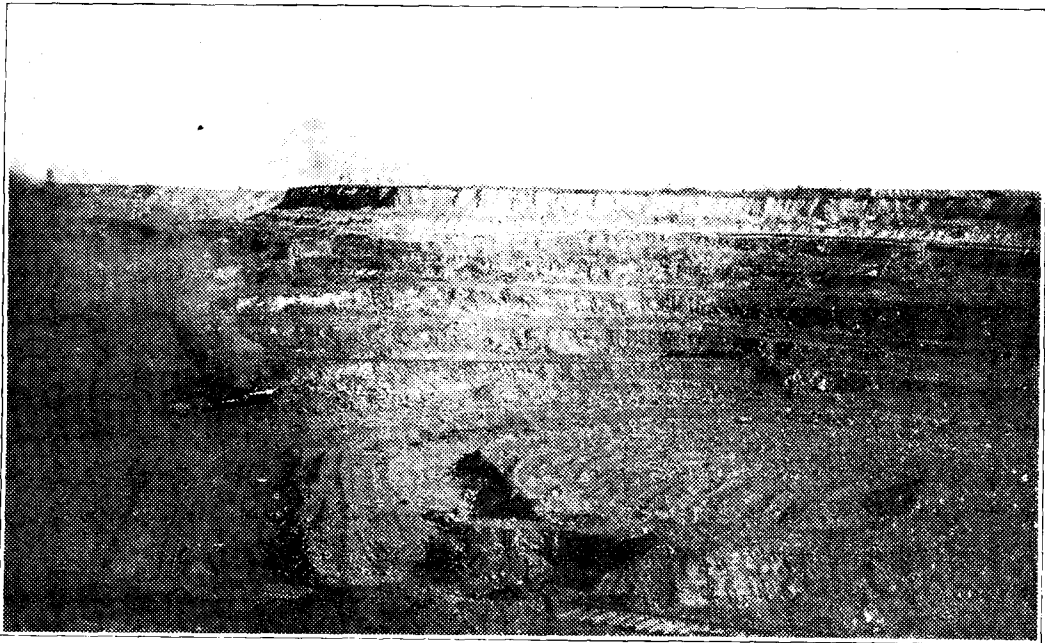
Tax Problem To Be Considered

A word of warning that has to do with the tax problem is sounded by the superintendent of the Mines Experiment Station in his discussion of means for utilizing the leaner ores and prolonging the life of Minnesota mining. He points out that while companies mining ore of 55, 60 and 65 per cent iron content can pay almost any taxes, companies that must install expensive plants and furnaces to treat and reduce the lower grade ores will have such heavy expenses that the tax burden might easily drive them out of business. For this reason he believes that the highest statesmanship should be resorted to in determining the state's policy toward the development of this new industry. Canada and Spain, he says, have gone so far as to subsidize the business of extracting lean ores. He believes that the return from heavy

taxes on high grade ores should all go to the state to be placed in a general fund from which a permanent income would be derived even after all of those ores were gone. "This" says he, "would truly be changing iron into gold."

With that income assured it might be possible for the state to deal more leniently with the struggling concerns that may soon attack the problem of utilizing the poorer mineral resources of the state.

Typical Open Pit Mine of the Minnesota Ranges



The steam shovel in the lower left hand corner is dwarfed by comparison with the great pile of ore which it is attacking

Preparing To Plant a 14,000,000 Acre Field

Foresters at University's Cloquet Experiment Station Work on Problem of Re-establishing the Value of Vast Cutover Area in Minnesota

THOUGH a native tree rather than an immigrant, the Norway pine is a link in name at least which might have been honored in some way during the recent Norse-American Centennial celebration in Minnesota. Much of the virgin growth of timber which once made so heavy a contribution to the prosperity and upbuilding of Minnesota was Norway pine, and today interest in this tree is continued because of its high value as a lumber producer and its personal peculiarities, which make its

growth one of the difficult problems in the study of reforestation.

Many know—many others, perhaps, do not—that the University of Minnesota maintains near Cloquet a Forest Experiment Station devoted to the task of solving Minnesota forest problems, reforestation, scientific cutting of standing timber, utilization of product, wind-break growth and many other important matters. It conducts experiments to show what trees will grow best with given soil and climatic conditions, whether one, two or three year old trees will give best results per dollar in tree planting, how re-seeding from natural trees succeeds, or whether it is better to gather the seed from the trees and conduct artificial re-seeding.

In all these fields there are interesting experiments going on at Cloquet, but there is one in particular which seems ample to convince any casual visitor of the value of scientific observation and experiment in solving problems of silviculture and forest management.

This experiment shows that out of the 84 months that are contained in seven long years, only the last three, or possibly four, offer the proper conditions for cutting a stand of Norway pine if one wishes a plentiful stand of young trees to grow up from naturally deposited seed. The Norway pine bears cones only once in seven years, and these cones will scatter good seed for natural re-seeding only toward the end of the season, when they are ripe.

A considerable tract on the grounds of the Cloquet station was cleared of its Norway pine shortly before the University of Minnesota acquired the tract. As luck would have it, this timber was cut in its seventh year, the year of its seed-bearing. Had it been cut in any other year natural reproduction would have been practically negligible.

"So Big"



*There, little spruce tree,
Don't you cry.
You'll be an "uxtry" by and by.*

Despite the advantage of the seventh year, however, the woodsmen began clearing this tract before the seed was ripe. As a result one can trace the progress of the felling across the tract, not quite day by day, but at least month by month, by observing the reproduction of young trees. On the side where cutting was begun before the cones were ripe the new growth is relatively sparse. As one crosses into the territory where the big trees crashed down when their cones were filled with ripe seed, he enters a luxurious growth of new trees that offers convincing testimony to the fact that this cutting was done at exactly the right time. A sixty or eighty foot tree swooping down as it is severed from the stump and striking the earth with a great smash is an effective instrument for broadcasting seed.

When one considers that the timber owner who did not know that Norway pine bore seed only once in seven years would have eighty chances to cut at the wrong time against three

or four to cut scientifically, the value of careful forest studies begins to be apparent. The chances against him would be approximately 20 to 1.

This seems to be a simple little matter, yet, if there were ways of learning how many of Minnesota's 14,000,000 acres of cutover land suffered serious retardation in the production of new crops of Norway pine because they were cut over at "any old time", the truth would probably be appalling.

Donation Started Experiment Station

The University of Minnesota's Forest Experiment Station at Cloquet was established 15 years ago or so when the St. Louis River Mercantile Company donated a tract of 2200 acres to the University for that purpose. Judicious purchases of adjacent land have since brought that total to about 2900 acres. The station lies about five miles west of Cloquet on

In a Garden of Pines That Has Been "Weeded"



The native stand of Norway pine that covers part of the Experiment Station tract decorates one of the state's chief beauty spots.

high land which includes several types of soil, a meadow through which a trout stream flows, one considerable tract of virgin Norway pine, and typical stands of second growth timber of many species. This is the natural layout. University foresters have since planted about 500 different half-acre experimental plots as a basis for their studies, together with extensive seed-beds, a nursery tract for larger seedlings, have made thinnings in thick growth, conducted scientific logging operations to test production methods, carried on scientific seed gathering, and in other ways have contributed to accurate knowledge of forestry.

Professor Edward G. Cheyney, chief of the division of forestry in the College of Agriculture, Forestry, and Home Economics, declares that there are two main obstacles which must be removed before 100,000,000 acres of cut-over land in the United States, of which Minnesota has 14,000,000, will be brought under new forest crops to any degree worth considering. First of these obstacles is the fire hazard, and second is the tax hazard. No matter how much one knows about reforestation, tree growth, scientific logging and the like, says he, money will not go into tree planting operations if fire is to wipe out all that has been done or if unscientific taxation is to absorb an undue share of the income. Both statements seem sufficiently obvious to be classed as truisms, though that makes them none the less important. Rather, it adds emphasis to them.

Since 1840 large scale lumbering in the United States has progressed steadily from the Atlantic to the Pacific coast. Much of the 100,000,000 acres that have been left behind as the woodsman's axe gathered its crop, not always in the most careful manner, are land that is marginal, that can be cultivated for ordinary agricultural crops only in times of extraordinary demand or price. The vast amount of this land, which in an average year produces nothing, has become a dead waste in the national economy. It is to the foresters of the nation that America must look to make these acres once more productive. The crop for which nature seems to have intended them, a tree crop, is apparently the one to which they must again be planted.

Long Haul Puts Up Lumber Price

Here in Minnesota the price of lumber has gone up in direct ratio with the distance that it has had to be hauled as the forests receded farther and farther into the west and south. Freight rates per thousand feet of lumber from either the west coast or the southern lumber producing districts are now greater than the same amount of lumber used to cost at retail in Minnesota's best lumbering days. Minnesota still produces a large amount of lumber, but most of it goes into special uses—boxes, sash and doors, paper manufacture, clothespins, toothpicks, staves, poles, ties, and many such specialties. The construction lumber which is usually bought by the builder is for the most part brought great distances. So the problem has become very important and immediate to residents of the state. Wisconsin and Michigan are situated much as is Minnesota, except for the fact that Michigan reached a state of depletion somewhat sooner than did the other two states. Being further east, lumbering operations began there correspondingly earlier.

This is the basic economic situation that makes experimentation in scientific forestry an important matter to the state. And, as Professor Cheyney points out, the fire hazard and the tax hazard are now said to be standing in the way of large-scale reforestation. There seems to be little hope that either the nation or the state can go into reforestation on a large scale. Too much money would be required and too many precedents would be broken, to say nothing of the difficulty of building up an effective and permanent organization. As a result private capital must be interested, and private capital has been saying that it must have some assurance against these two hazards before it does very much about the matter.

Probably it is enough to say that the amendment to the state constitution, lost last fall because of the small popular vote, and which provides that taxes on standing timber shall be payable only when some of that timber is cut, making the land yield a return, will be submitted to the people again a year from next fall. It is a severance tax. Instead of imposing a continuing burden on timber lands whether

productive or not, it imposes taxes only when the investment is yielding an income to the owner. Foresters assert that such a law would enable a company to foresee what its tax burden was to be. By giving certainty to an item of expense which is now extremely uncertain and sometimes menacing, the law would be, say these forest experts, a direct encouragement to private enterprise in reforestation and tree culture.

The actual work of fighting forest fires belongs to the Department of Forestry rather than the Forest Experiment Station of the University, but the latter's foresters are making a contribution. Weather conditions are a principal cause of fire. Winds, drouth and heat encourage fire. Both the men at the Forest Experiment Station and the staff of the Lakes States Forest Station of the United States Department of Agriculture are working on problems connected with fire causes. Meanwhile, an increase in the force of the Department of Forestry is assuring added protection against the actual fires.

But the tax problem is political and the fire protection problem one that must be met chiefly by another branch of state service than the Experiment Station. Its big job, according to Thorvald Schantz-Hansen, superintendent, is to obtain all the information it can about trees as a crop. It is studying how to plant, cultivate, and cut the lumber crop, all against the time when the other two obstacles have been sufficiently minimized so that tree planting will be under way on hundreds of thousands of acres. That day, he says, is sure to come.

Typical Experiments at the Station

"Here" he says as one follows him through the station forest, "is a typical experiment in thinning."

One looks around in a dense stand of jack pine, a type which only a few years ago was considered worthless. It is now one of the mainstays in producing pulpwood for some of the coarser grades of paper.

In a patch of jack pine that averaged 2400 trees to the acre, 69 per cent of the trees by number and 56 per cent of the stand by volume have been removed. The remaining trees are

being left for five years. At the end of that time the relative increase in growth due to improved conditions will be measured. The results will be an important contribution to the knowledge of those who own considerable stands of jack pine in the north.

Elsewhere at the station is an experiment dating back to the days when jack pine still was scorned. In this experiment a plot of jack pine was underplanted with white pine, probably the best variety of all. This stand is now 12 years old and the white pines range from one to six feet in height, although they have been growing in the shade of the larger growth. Some day, when commercial demand leads to cutting the jack pine, a splendid, healthy growth of young white pines will be ready to spring up rapidly in response to the added sunshine and moisture they will receive.

Natural seeding is often a very successful means of reproducing pine forests, but men who have made a study of the subject advise strongly against artificial seeding. If one plants the seed where the final stand is to grow, he will be followed by an army of insects and animals, all eager for a full meal. The birds will be there; so will the chipmunks and squirrels, the mice and gophers. And insects follow these to attack the tiny growth if it sprouts.

Norway Pine Seed "Comes High"

Every effort to avoid waste must be made in planting trees, not only because the process of growth is so slow, but because some varieties of seed are very expensive. The seed of the Norway pine, produced but once in seven years, is quoted at an average of \$22.50 a pound and is one of the most valuable seeds known. It is far too expensive to broadcast for a chipmunk's picnic. Other seeds, more easily obtainable, cost less, but still are of respectable value. White pine ranges from \$2.50 to \$3 a pound; jack pine from \$3.50 to \$4 and white spruce from \$6 to \$8 per pound. The spruce seed is very tiny, and it takes a great many seeds to make a pound.

Instead of planting the seed where the tree is finally to stand, the forester plants it in a specially prepared seedbed where it comes up looking like a coat of thick green fur or moss.

Spruce in seedbeds at Cloquet comes up so thickly that the beds resemble nothing more than rugs closely woven of tiny green feathers. One would sooner associate them with foliage plants in a flower garden than with anything so sturdy as even the most delicate tree. One who stepped on the bed would enjoy the thrill of being a giant for a moment, crushing from two to three hundred trees at a single step.

After two years in this well-tended cradle there are three possibilities for the tiny tree. It may be transplanted at once to its ultimate destination, in which case it is known as "2-0 stock". Or it may be transplanted to a second nursery bed and left there for a year, making it "2-1 stock". The third alternative is to leave it for two years in the second nursery plot. This third type, known as "2-2 stock" is sturdiest of all in the opinion of the University foresters at Cloquet. Opinions differ as to which of these stocks is best, inasmuch as the smaller stock, such as "2-0" can be handled and planted faster than some of the larger stocks. The men at Cloquet believe, however, that the added labor cost included in a planting of "2-2 stock" is more than offset by the greater survival and quicker growth of the sturdier transplants.

Many of the 500 experimental half acre plots at the Forest Experiment Station are devoted to demonstrations of the

relative worth of these three types of stock. This, however, is but one of many types of experimental plots. It must be remembered that there are, besides the various kinds of pine, such trees as spruce, tamarack, hemlock, aspen, birch and maple. When one begins to study how these trees grow on different kinds of soil, under different moisture conditions, when varying types of transplant stock are used, and so on, it becomes apparent that a vast number of experimental combinations may be formed. Probably 500 plots are only a beginning on the variety of problems that might be tackled, thought at first glance the number seems to be a large one.

As Professor Cheyney explains it, the man who is going to invest a large sum of money in planting trees will want to know what trees to

plant on the soil and under the moisture conditions which he has, or what kind of soil and moisture conditions to seek if he is determined to raise a certain kind of tree. He wants to know how long it will be before he gets a return and what return he may expect in view of the conditions under which he is working. He must know, also, what methods he should employ in logging off his timber. As fast as they can, the Forest Experiment people are preparing to answer these questions.

During the past winter Professor T. Schantz-

"The Three Pines"



This cluster is a landmark at the Cloquet Forest Experiment Station, and also an example in natural reproduction as the smaller trees below testify.

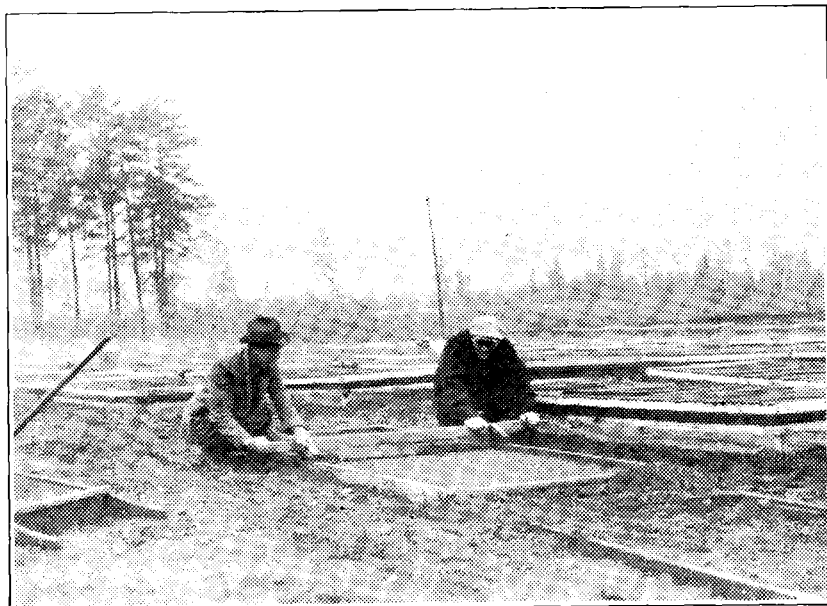
Hansen conducted a small-scale logging operation on part of the Experiment Station tract which illustrates the possibilities of certain types of second-growth land. From a tract of 30 acres which the University bought 16 years ago for \$880 he cut about 70,000 board feet of timber at a profit of \$10 per thousand feet. His net profit from the operation came to \$1158.56. And after all this had been done there was left timber which he says will yield additional returns of \$1800, after which all of the land, worth more than \$800, will remain. The station, which employs profits of this kind in its

own budget, will gain in all about \$3000 from the tract and still have left land worth the original purchase price. This is an example of the possibilities in some of the better cutover lands that are to be found in Minnesota's 14,000,000 acres of that type.

Another source of income to the station is the collection and sale of seeds. Last year 1014 bushels of Norway pine cones were collected, from which 601 pounds of seed were extracted. The station pays \$2 a bushel for the cones, as it has not a large enough force to do its own collecting. Each bushel yields from one half to three fourths of a pound of seed, and the price is \$22.50 a pound.

Not the least interesting place at the Forest

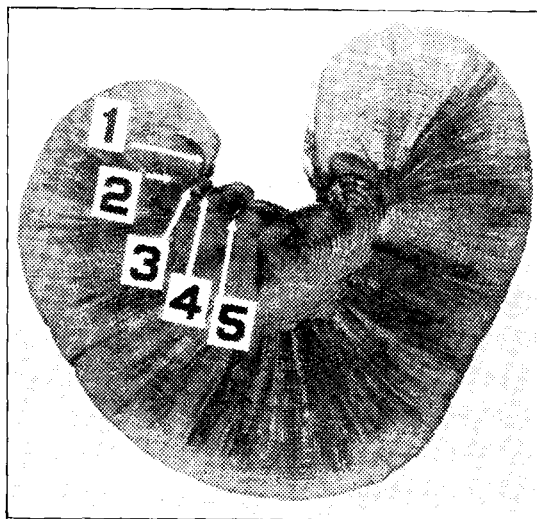
Room Enough to Plant a Forest



Smoothing the bed in which many thousand spruce seeds will presently be planted.

Experiment Station is the seed extracting plant. Here the cones are first put in a fire-proof drying room, where the temperature is run up to 120 or 140 degrees F. This causes the petals of the cone to curl outward, making it easier for the seeds to fall out when they are transferred to the extracting machine. In it they are whirled around at a great rate of speed. After a short run the hoppers are emptied and the seeds that come out are of the best grade. The cones are then run through again for a longer period and the smaller and less perfect seeds are extracted and graded as seconds. The extracting process also breaks off the natural wings with which these wind-borne seed are equipped, making them

Pine Shows Scars of Five Fires



The pine of which this is a cross-section healed scars caused by forest fires in 1842, '55, '64, '74 and '94, that numbered "1" being the last.

ferred to the extracting machine. In it they are whirled around at a great rate of speed. After a short run the hoppers are emptied and the seeds that come out are of the best grade. The cones are then run through again for a longer period and the smaller and less perfect seeds are extracted and graded as seconds. The extracting process also breaks off the natural wings with which these wind-borne seed are equipped, making them

easier to handle, pack, and plant. They are then sacked and placed in a cooled verminproof cabinet against the time of sale or use.

Windbreak Experiment Helps the Farmer

Among typical projects being carried on by Professor Shantz-Hansen and his staff, the demonstration windbreak work has held a prominent place. Windbreaks have been planted on the farms of 260 co-operating farmers, chiefly men living near the western boundary of Minnesota. These farmers are selected by county agents. They are given directions for planting the windbreaks and the trees are sold to them at cost. The premises are inspected before the trees are set and annually for three years after planting. One member of the station staff is continually busy on these projects. Reports from the 48 completed windbreaks, those that are five years old, show that 83 per cent of the conifers and 99 per cent of the hardwoods have survived. In forestry parlance "hardwoods" are all trees not of the conifer or evergreen varieties.

A second important project has been a survey of the cutover lands in Lake and St. Louis counties to determine the amount and character of the existing second growth. Results so far seem to indicate that very little of this cutover land is barren, though some of it has grown up to undesirable species, while in large districts fire has kept the new growth in what is called the "young-age class."

Development of a plan for the station area to serve as a guide for cutting operations on all lands of the same type as it, and the studies of forest planting, typified by the 500 half-acre plots, are other projects on which the station force is working. A fifth is a fire project aimed to determine the retardation of natural reproduction involved in one, two or three burnings. Data show that the loss in growth equals that of from five to twenty years.

Included here is an account by Professor Schantz-Hansen of the history of forest fires during 100 years near the site of the Cloquet Experiment Station, as imprinted by the flames on the trunk of a large pine tree. He says:—

A Century of Forest Fires

No more interesting histories have ever been written than those recorded by Nature in her language of trees, rocks, soils, or fossils. These languages are not in any way alike. Some of them are difficult to translate except for the trained observer, others can be easily learned and when once mastered they present an unceasing source of information and pleasure. Possibly the most easily understood of all these modes of expression is the record of the trees.

There is illustrated herewith a page from one of Nature's histories as written in the language of the trees. Here in this condensed form we have a record of events for the past century. True, not all events are recorded here. There is no record of elections, no description of battles lost or won, but just the story of the development of one portion of nature.

The rest of the book from which this page was taken tells us that in 1620 or thereabouts, when the first settlement of our country began, nature planted a stand of Norway pine on the area which is now the Cloquet Forest Experiment Station. This stand grew and developed into a splendid stand of Norway pine, presenting a really beautiful site with its straight, clean, reddish brown trunks glowing in the sunlight. Underneath was a fine carpet of silky brown needles, soft to the touch and sweet to the smell. Nature's history tells of two hundred years of peace and quiet. There were years of drought and years of moisture, years of heat and years of cold, but no great catastrophe or cataclysm.

Then in 1819 came the disaster. Fire swept through this wonderful stand and destroyed nearly all of it. The cause of the fire nobody knows—it may have come from lightning or through an effort to improve a hunting ground. Nature doesn't always record the cause.

With inexhaustible patience nature began to rebuild the work of centuries. With the seed left unburned in the ashes and with seed produced by the survivors she planted a new stand. It is the record of this stand that we have illustrated herewith.

For 22 years the work of reconstruction went on at a rapid rate unhampered. Then in 1842 the work of rebuilding was nearly destroyed. Another fire burned the area, killing many of the young trees. Fortunately nature had planted enough to provide for just such a contingency.

The story tells us that thirteen years were allowed to repair the damage. Then in 1855 fire came again. Wounds caused by the previous fire were not healed. This second burning served to aggravate the old wounds and make it more difficult for nature to heal. For nine years there was no further break in the reconstruction. Then in 1864 there came another fire; this was followed by yet

another in 1874. And in 1894, the year of the well remembered Hinckley fire, nature wrote the last record of fire on this page.

These repeated burnings have so marked the trees that it is almost beyond the power of nature to erase the effect. In spite of all the handicaps a thorough job of reconstruction has been done. It takes a keen or trained eye to select the remnant of the original stand from the younger stand.

Much more could be read from this page if time were taken to do so. It does present an interesting story of Nature's patience and of her ability to accomplish her object even in the face of difficulties which may seem unsurmountable.

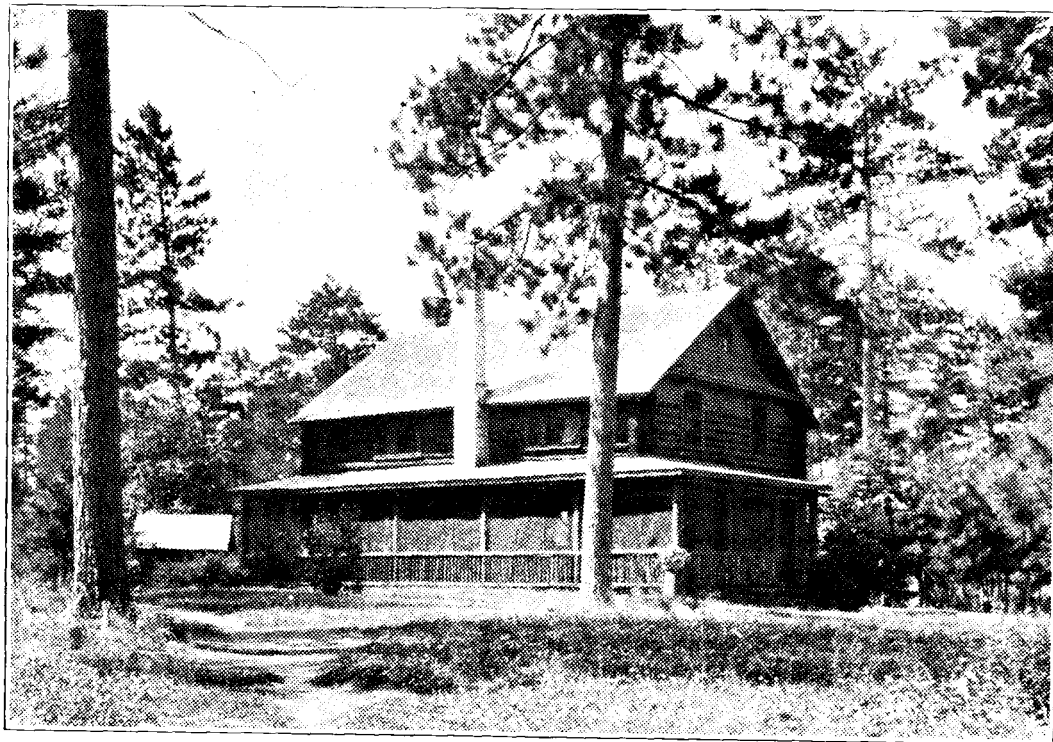
Now for Better Blueberry Pie

There is no end to the experiments that can be conducted at a place so ideally located for solving northern Minnesota problems as is Cloquet. The station is now co-operating with the division of horticulture. College of Agriculture, on experiments to improve the blueberry. These promise ultimately to develop for Minnesota a type of blueberry far superior to anything that now grows wild and to add an important product to the cultivated fruit crops of the state. There are enough blueberry fields in Minnesota today to furnish the

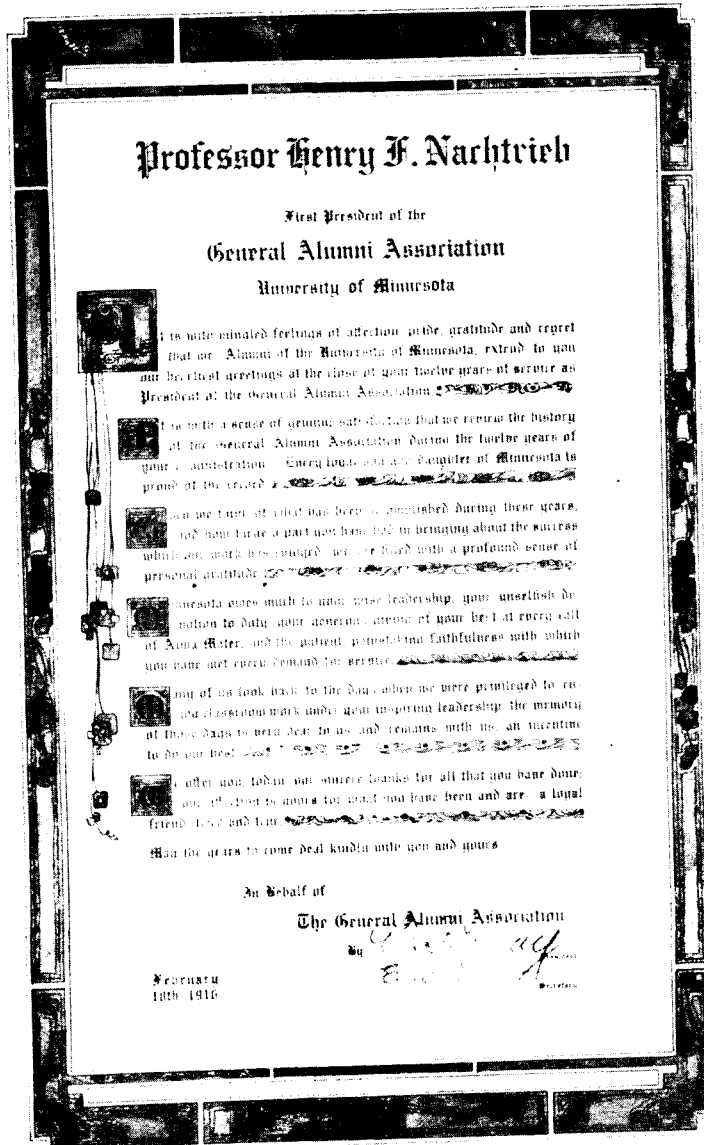
basis of an industry equal in importance and yield to New Jersey's famous cranberry crop. Apple, plum and pin cherry trees also have been planted at Cloquet by the division of horticulture to determine the suitability of different varieties to the climate in that part of the state. One sees here and there, also, imported trees, some from Siberia, some from China, Canada, Russia, or Scandinavia, which are being tended and watched in the hope that they will be suitable and profitable additions to Minnesota's calendar of native species.

Headquarters at the Cloquet Station is a true beauty spot. The buildings are set in a splendid grove of large pines, beneath which, in June, modest but exquisite magenta moccasin flowers show themselves. The white-throated sparrow by the roadside cheerily predicts "more wet" and from the deeper forest a liquid, echoing call tells that wood thrushes are there. Norway, white and jack pines nod side by side, inviting the visitor to ask questions of the foresters. The trout are small, but the brook itself is friendly and companionable.

The Place the City Man Dreamed About



Foreman's Cottage at the Cloquet Forest Experiment Station of the University of Minnesota



Of the many honors which came to Prof. Henry F. Nachtrieb during nearly 40 years in the department of Animal Biology, none was more prized by him than the testimonial given him when he retired as president of the General Alumni Association, in 1916, after twelve years of service. Professor Nachtrieb was a prime mover in the organization of this association in 1904. The picture above shows the testimonial given him upon his retirement.

Vol. 5 No. 81

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MINNESOTA CHATS



For a Better
Minnesota

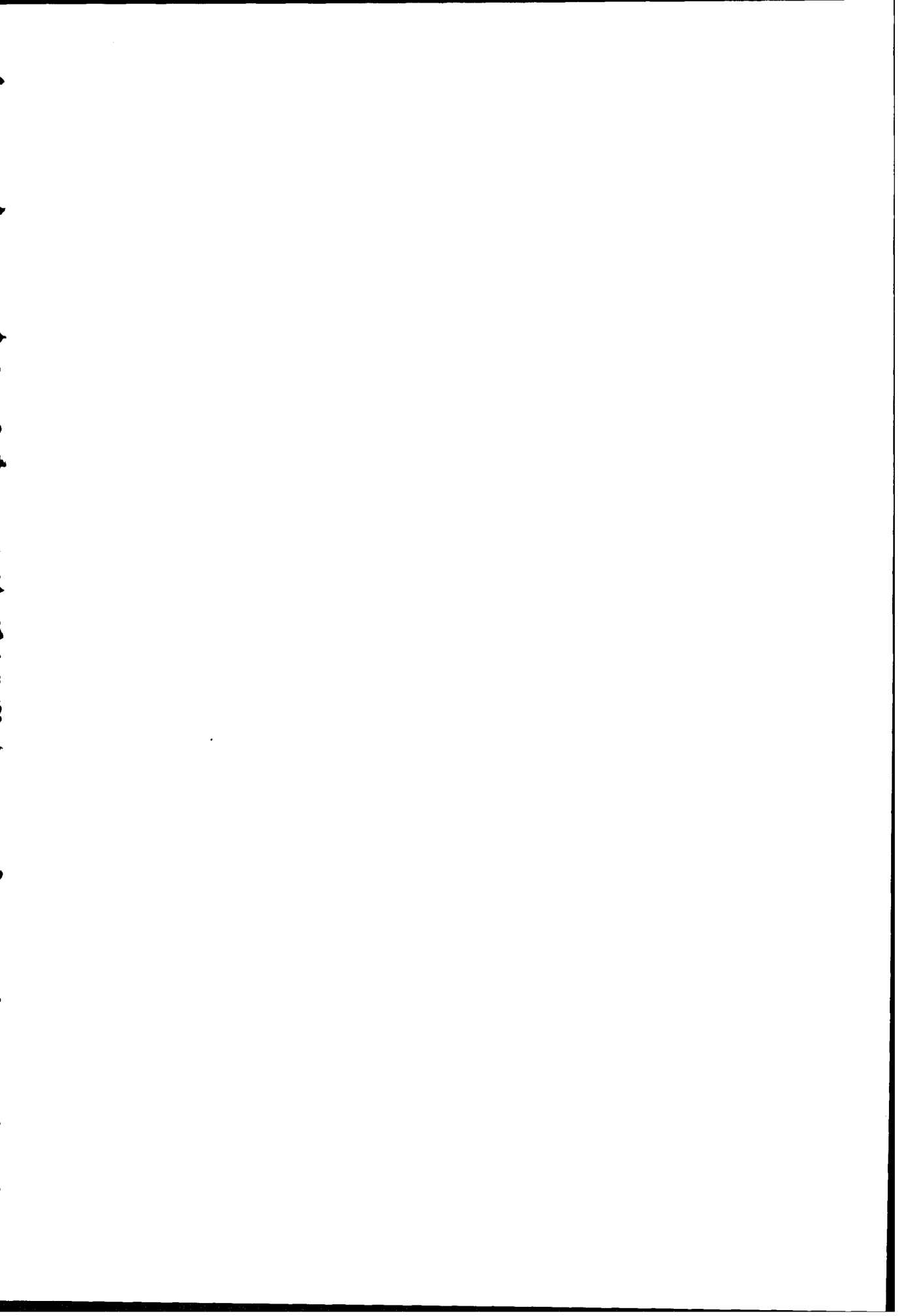
Foreword

FOLLOWING a mid-summer silence during the month of August MINNESOTA CHATS has resumed publication and will continue its efforts to report on and interpret accurately some of the more important and interesting activities of the University of Minnesota.

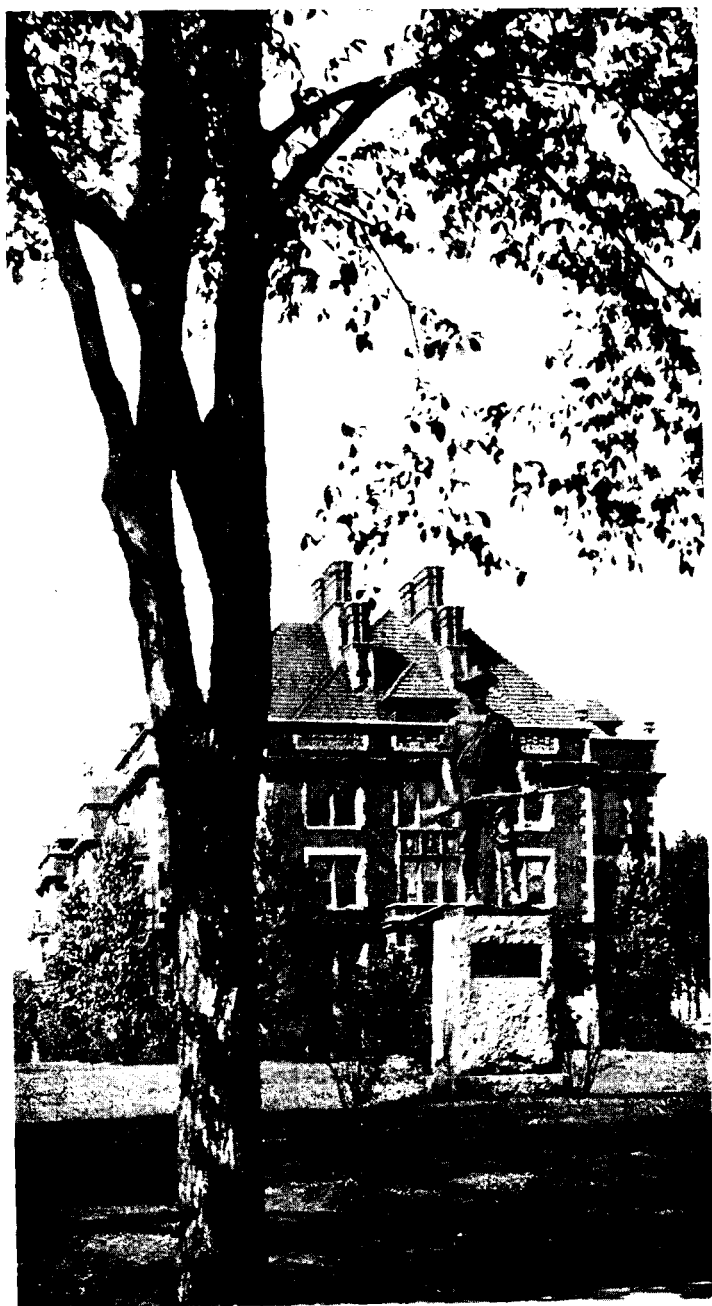
IN the current issue will be found a discussion of reading, by the University librarian, Frank K. Walter; the report of the University Employment Bureau, which found jobs for more than 1,000 students during the past year; a brief article on the new Institute of Child Welfare, and a summary of the football prospects at Minnesota this fall.

MINNESOTA CHATS is sent to every newspaper in Minnesota, besides going to many individuals. If Minnesota editors who receive it should decide to extend the courtesy of an exchange subscription to their papers, sent to MINNESOTA CHATS, Administration Building, University of Minnesota, Minneapolis, the favor would be greatly appreciated.

THE EDITOR



Folwell Hall from the Armory



The chief recitation building for liberal arts subjects at the University of Minnesota is named for the institution's venerable first president who will be 93 years old this fall.

In a Quiet Corner With a Little Book

By Frank K. Walter

Librarian, The University of Minnesota

S AID Thomas a Kempis: "I have sought repose everywhere but nowhere have I found it save in out of the way corners and in little books."

One might casually think that a life of seventy years in a monastery, such as that in which Thomas lived, would have offered a plentitude of repose without a private retreat. But all things are relative. The daily routine of the cloister service, the regular copying of manuscripts in the monastery scriptorium, the instruction of novices, the frequent sermons and the writing of numerous books were to him what the worse crowded and more complicated daily schedules of our own days are to us.

To the "hard headed business man" who figures so prominently in political campaigns and at booster banquets, but who really is rarely met in actual experience, the life of a librarian must often appear a life of consummate ease for which the tax payer extravagantly pays. In our attempts to prove such ideas wrong we are often prone to crowd our working and our leisure hours with all kinds of projects, pertinent and impertinent, and to forget sometimes that our duty as public servants does not keep us from personal obligation to live our own lives in a way that may promote the good of our own souls.

Motion is not necessarily progress. The engine of any automobile may move as rapidly and be as noisy when the car is at rest as when it is in the stream of traffic. A librarian may be so engrossed with the mechanism of her work that she may forget to see whether the

Although Mr. Walter's excellent words of advice on the value and necessity of books were addressed to graduates of the Wisconsin Librarian School at commencement time and were directed at librarians, they are equally applicable to all readers. It is for this reason that his article is published here with the idea that it will not only bring helpful suggestions to many librarians but will also be of interest to hundreds who read for their own enjoyment and the enrichment of their lives.

work itself is progressing.

No apology for professional organization of libraries need be made. Systematic effort is necessary for the successful performance of any social function. The church ritual, the routine of college and university credits and curricula, the involved rec-

ords of a bank, the catalog code and loan desk rules of a library and even the irresistible lure of a fashion quarterly alike have their rise in the eternal need of men and women for standards by which to guide their daily lives. The two outstanding characteristics of the modern library as compared with the libraries of earlier days are not the more costly buildings or the larger number of books these contain. They are the ideal of service to the whole community instead of to a favored few and the greater perfection of the technical processes through which this service is made possible. When service is attempted without adequate organization, the attempt fails. When the machinery of the organization is given precedence over the needs of the people, the work of the library becomes mechanical and fails to attract the people in whose interests it is established and maintained.

The young librarian must steer a middle course between the attitude of the library patron to whom the library stands as an opportunity for personal profit and that of the case-hardened library veteran to whom satisfactory statistics are a goal rather than a means and to whom books are a commodity on which to base statistics. In other words, the librarian who is chiefly concerned with private reading is of little worth to her community. The librarian who

is little concerned with private reading is of not much value to herself.

Eminent biologists and students of sociology assert that man has gained little if any in mental ability within historic times. His greater achievements, so this school of scientists says, comes from his greater social organization. He does more because he uses his own powers in closer relation with the past achievements and present powers of other men. In these days it is literally true that no man liveth unto himself.

Must Supply Individual Needs

The other side we are more likely to forget. Social machinery enables us to move faster and farther, but it does not and can not keep us from being individuals. Paradoxically, the better genuine individual needs are supplied, the greater the power of society becomes. It is not selfish, but unselfish for each of us to seek for himself the greatest happiness and the greatest amount of power his ability and his opportunities permit as far as consistent with the rights of others. In seeking the kingdom of God, and his righteousness for ourselves, we may also hasten the coming of the Kingdom of Heaven to all men.

The conditions of modern life will seldom permit us to forget that we are parts of society. There are many tendencies which may make us neglect our self-development. There is a constant temptation to take our opinions second hand instead of using other's ideas to help us to independent decisions of our own.

There is much of this danger inherent in the work of the modern library. The patrons are so numerous, even in rather small places, that knowledge of their personal inclinations and needs is impossible. The number of books is so large that intimate knowledge of them is equally impossible. We select them as the merchant selects his goods: by sample, by catalog or through the statements in book reviews, and book lists. One can imagine how gleefully the physicians and undertakers would chuckle if grocers tried to sample personally all the edibles they carry in stock. As severe a case of mental indigestion would be the fate of any librarian who tried to get personal knowledge of all her stock.

This necessity of confining our knowledge of most books to second-hand opinions about

them, to a slight knowledge of their authors and of the firms which publish them or of the number of times they circulate often makes us forget the necessity of knowing intimately some books as well as knowing many of them by reputation.

Librarian Must Love Books

The loneliest man is not the hermit, but the man who has a nodding acquaintance with many people, who lives surrounded by crowds, but who has no small circle of real friends whom he knows and by whom he is really known. The librarian who handles books as a part of her daily work without growing to love them is to be pitied. She may increase circulation statistics. She may be deeply interested in seeing others interested in her wares. If she does not also know personally what books may mean in one's life she is not a complete success. It is not the machinery, but the intangible spirit of any institution which is the real measure of its worth. In the sale of any business the "good will," which is only another name for this spirit, is likely to be the biggest asset. There are two good will items in the assets of any library which can be furnished only by its staff: one is an interest in and a knowledge of people and the other is a knowledge and love of books. Without the latter, the former is ineffective. The library is not primarily an employment bureau, a lecture bureau, a center for the dissemination of social propaganda, an industrial welfare department or a school. It is all of these in part. It is only so as these other activities are related to the primary function of the library. This function is to provide books and other printed material suitable to the varied needs of the community.

What is the reason that so much in the library field is still undeveloped and that those just beginning library service still have so many laurels to gain? Perhaps, no one can briefly and satisfactorily answer this. One may perhaps hazard the opinion that one cause is because so many librarians have clearly recognized only part of their duty. They are saturated with the idea of public service and they are firmly convinced that promoting good reading is a means of real service. Too few of them have gone the rest of the way to reach the logical conclusion that

librarians as well as others need private reading and personal books.

The person who does not read can hardly expect to kindle very often or very effectually in others an interest in which she does not share. It is intellectual contagion, not intellectual infection which makes readers of others. In self defence the librarian must read if she wishes to succeed.

Reading for the sake of others is laudable, but it is neither necessary nor desirable to read always with an eye to others' benefit. Reading, like food, must most often be suited to one's own personality. It is patriotic to abstain from wheat bread that our allies in war may not be forced to eat corn which they can not enjoy. It is idiotic to make one's indigestion chronic by continuing after the war is over to eat corn or mixed flour which one can neither enjoy nor digest.

What the Corner Holds for You

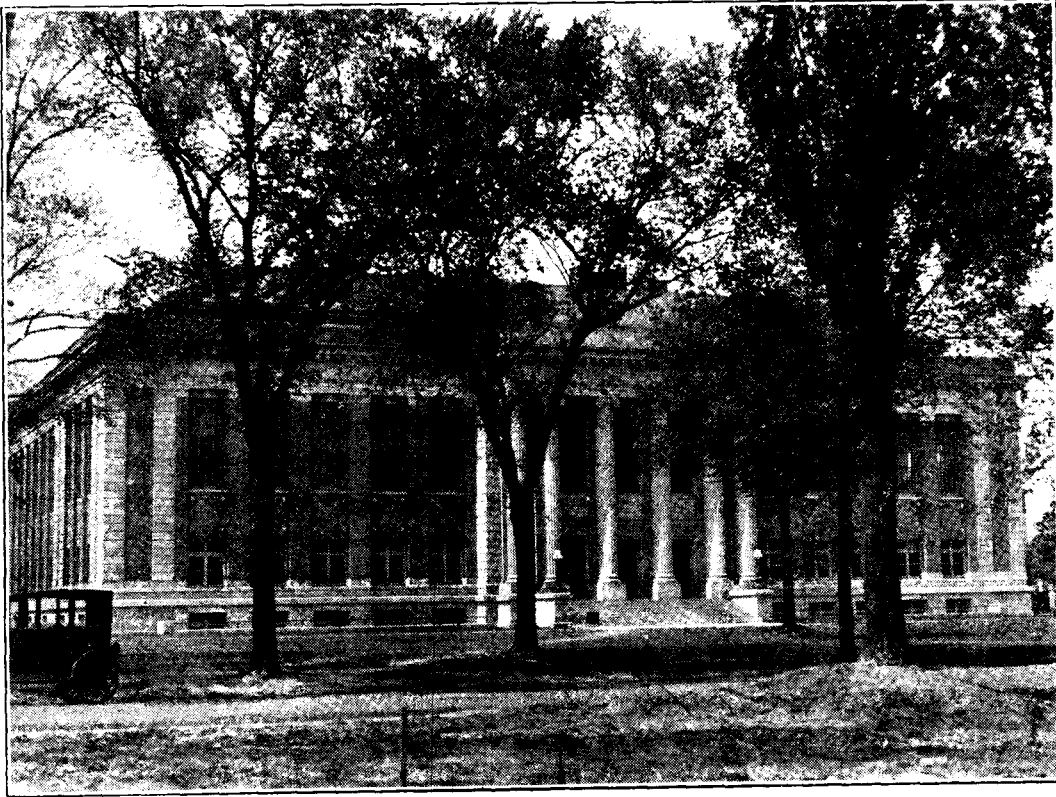
For three reasons, among others, I would enjoin you to seek the seclusion of some quiet corner with a little book of your own. In the first place, you must needs keep yourself informed about what the world is doing as well as about what it has done. You may gain your knowledge by engaging directly in the activity about which you wish to learn, but life is too short and the work of the world too varied to make this a very promising method. You may converse with others about what they are doing or learn from them what others are doing. Unfortunately, the average man does not always converse well along such lines. To one not interested deeply in golf, the peculiarities of automobiles, the rules of bridge, or under certain conditions, in the lightning changes of fashion, the conversational method does not always bring rich rewards of valuable information. One often must get out of the current to see the progress of the stream and to notice that it is the stream and not the banks which moves. It is most often in books, in magazines and newspapers that one can get the best perspective of social progress in the limited periods of his leisure. Information is the real water of life to the mind. Therefore, read in your quiet corner from your little book that you may know more about the life around you.

In the second place, read for your own self-culture. Just what culture is no one seems quite to know. The dictionary makers give long lists of approximate definitions, none of which quite satisfy. From these definitions we may select the phrase, "refinement in manners or taste" as being vague enough to be inclusive and simple enough to be understood. Culture is more than information. It is more than natural ability. It is easily recognized, but seldom consciously acquired. It comes best as a by-product. It shows in one's social attitude and it is the basis of all genuine democracy. It makes one tolerant toward others' viewpoints and opinions. It gives the open mind which keeps the conservative from becoming a bigot and the radical from lapsing into fanaticism. It is acquired through contact, direct or indirect, with others who are high-minded, clean-souled and considerate and discriminating in taste. Few of us have opportunity to know personally and intimately very many of deep and genuine culture. All of us have the opportunity of knowing indirectly great numbers of the cultured of every period and of every country through the books they have written or which have been written about them.

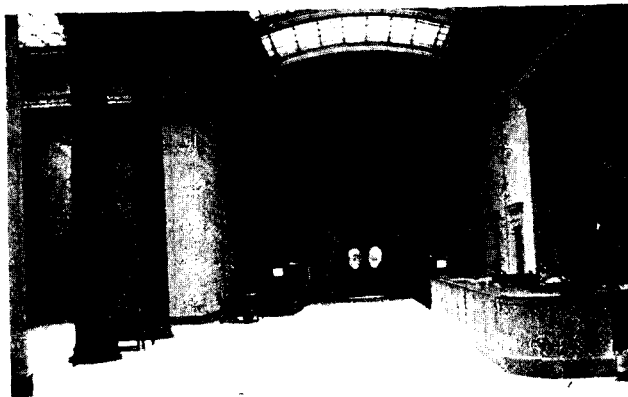
In the third place, retire to your quiet corner with your little book for the pure pleasure of reading. If you do not like to read you have no real place in the professional work of a library. If you like people better than books, try, not to like people less, but to like books more. In your reading for pleasure do not be unduly awed by book lists or by critics' opinions. They have their place. Only the ignorant despise counsel, but no man is very mature who does not weigh advice and then make his own decision.

One of the greatest pleasures of reading lies in the power to discriminate for one's self. This usually requires a considerable period of training, of conscious selection of that which is recognized as the best. In due time selection of the good should become as unconscious as the correct fingering of his instrument is to the musician skilled through long periods of conscious and even mechanical practice. Many years ago Ruskin asserted that taste is the only test of morality and that a man is really good only when he practices right action often enough for

University of Minnesota Library and Its Director



Above—The library;
right, an interior.



Frank K. Walter (left), author of the accompanying article, is librarian of the beautiful structure in which University of Minnesota students do much of their studying

him to form the habit of choosing the good without conscious effort. Much the same is true of reading. It is possible, as our love of book-lists and the supervision we give the purchases of books for our library indicate, to cultivate a love for the good. No one should be satisfied until he has learned to like what the experience of the world has found good in books. "A man ought to read just as inclination leads him," said Dr. Samuel Johnson, "for what he reads as a task will do him little good." It follows that the better trained his inclination, the more profit as well as pleasure he will get. At the same time, it must be recognized that taste in reading like taste in everything else is largely individual and that there is no certain standard. Not everyone can enjoy or truly appreciate all the classics, nor are there many which are equally esteemed at all times. Dryden was sure he could improve Chaucer. Pope revamped the Iliad. Bjornsen and Ibsen were sincerely skeptical about each other's ability. An ambitious hack-writer has recently written a little blue book on "Dante and other waning classics." Few living men or women have read the "Faery Queen" from start to finish. Mencken and Sherman quarrel, to their mutual financial benefit, as to whether Victorian standards of tastes and morals are true or false. Long before either of them, George Bernard Shaw learned the value of consistent surface dissent.

Suit the Book to Your Mood

The average man and even the average librarian will often, like Thomas, find more repose in a good second-rate writer more nearly of his own mental calibre than in the works of the great, who are great because, though universal in appeal, they tower high above the generality of mankind. In such cases, be honest and rest and refresh yourselves with the best you can enjoy at the time. Temper your reading as the wise do their food, to their age, their incomes, their needs and their palates. It is better to be one of a circle of clean-minded friends most of whom are just enough superior to stimulate one than to be an insincere social climber or to make

a pretense at culture one neither possesses, nor enjoys nor has the power to acquire.

In the original, Thomas refers to his books as "libelli," that is "little books" or "pamphlets" or books of minor value. This affectionate diminutive, undoubtedly refers to the little books of devotion, or the smaller and more intimate sermons or dissertations in the monastery library as compared with the bulky tomes of the fathers and their commentators which were the arsenals of the medieval theologians. As far as there were popular books available, these were popular books in which he found repose.

In this quiet corner, you will, I trust, have little books of your own. The real book-lover is usually the book-owner. From the days of Richard de Bury, Bishop of Durham and Chaucer's clerk of Oxenford, whose "Twenty bookes clad in blak or reed" Mr. Pearson has revived in a collection of pleasantly casual essays, to the present when even hall-bedrooms and "two rooms and kitchenette" have not stopped book-buying, people who read rightly will own the books they like best. The borrowed book is like the casual acquaintance or the business associate: pleasant to meet, profitable to cultivate and necessary in emergencies, but not sure to be around when most needed or when most likely to be really enjoyed.

One's private library need not be large. Even a small bookcase will hold enough books to be a lasting delight if the choice is confined to books which bear re-reading. They must be personal books which bear their message to the owner and which can be picked up when wanted and laid aside when their mission of the moment is accomplished. In comparison with most of the luxuries and many of the necessities their cost is small, even in these days of high book prices. Empty bookshelves in a librarian's home are an anomaly and should be a rarity as well.

May you all join the company of readers for peace and repose and the good of your own soul as you have this night joined the company of those who have dedicated themselves to the service of others through books.

A Divining Rod For Bread and Butter

The University Employment Bureau

DUE chiefly to its thorough organization for helping the self-supporting or self-helping student to find work and to the fact that it is situated in a large center of population, the University of Minnesota last year found employment for 1277 students who are estimated to have earned by the end of the fiscal year the sum of \$12,203.22. These figures are those contained in the annual report to J. C. Poucher, superintendent of service, by the retiring manager of the University Employment Bureau, Frank V. Moulton.

By stretching a point rather than sticking to facts, student earnings might have been represented as much larger. For instance, the report does not include the earnings of a considerable number of young women who work for their board and room in private homes. Such positions are filled through the office of the dean of women, Miss Blitz, and there is no record of them at the employment bureau. Neither does it include an estimate of the rather large earnings in summer canvassing and selling positions filled by students, many of whom have come into contact with those opportunities through the employment bureau. It does accept as proper for its totals, an estimate of the amount students placed in temporary positions but who have not yet finished the jobs, will have earned by the time the job is completed.

Figures on earnings provided by the Employment Bureau naturally represent far less than the total annual earnings of students. Scores of students find positions for themselves without recourse to the employment bureau. Many others in their junior and senior years carry on work in contacts made for them one or two years ago by the employment bureau which are not, however, in the records of the bureau's current year. Many students resident in the twin cities are in almost as favorable a position to find jobs for themselves, due to neighbor-

hood, family and business acquaintances, as is the bureau itself. The bureau, however, holds an admittedly important place among those university organizations which are conducted with a view chiefly to the direct help and guidance of the student. Hidden in its records are many obscure stories of the happy chance that has made a college education possible to someone who would otherwise have had to renounce that ambition.

"From July 1, 1924 to July 1, 1925," says the report, "the University of Minnesota Employment Bureau has been responsible for the placement of 1277 persons in positions of either a temporary or permanent nature. We have estimated that the total earnings on these placements has or will soon amount to at least \$123,203.22, as compared to our report of the preceding year which included 1,090 placements with a total of \$96,240.51 earned. It has been our purpose to make this estimate as conservative as possible and we feel certain that, were it possible to secure the actual amount earned on each placement, we should be able to report an even higher total earned.

Employers' Estimates Are Used

In preparing this estimate we have computed the amount in accordance with the statement of each employer at the time when he called us, unless we have later received more accurate reports either from the employer or the person whom we sent out. We might mention the fact that employers usually underestimate the length of time required to do work; also, additional work often turns up. Quite frequently a student who gives satisfaction on a temporary job is retained by the same employer in some permanent position.

This report does not include a number of, we might say, "indirect placements." It has been our policy to keep in touch to some extent

with some of the down-town employers who often use certain types of student or graduate help. Often on receiving applications from people of these types we have suggested that they call on some employer to whose needs we felt they were suited. Quite frequently this has resulted in the applicant's employment either immediately or in the near future.

There are several factors besides the increase in the number of placements which have influenced the increase in the amount earned this year. Notable among these is the fact that more of our "Full Time Permanent" placements were positions for graduates and consequently were more remunerative than the ordinary run of full time positions for younger people. In estimating the amount earned on our full time permanent placements, we have considered the amount earned in one year if there was no raise in pay during that time.

During the last year we have also kept in closer touch with employers with whom we have placed people, which has, in many instances, resulted in our discovery that our estimates for those particular positions were much less than the actual earnings. Because of this we have also been able to obtain the earnings on several canvassing and selling position for the school year which we had filled, and therefore this estimate includes a small portion of that class of placements which were to a great extent omitted heretofore.

At this time, we also wish to call attention to the fact that this report does not include either facts or estimates relative to the earnings of a large number of students who are spending the summer canvassing or selling. Many of these positions we filled ourselves and in a great many more instances we aided the representatives of various reliable companies in their efforts to secure student salesmen. Because of the great variation in the amounts earned by different individuals in this type of work, and the extreme difficulty of securing complete or even semi-accurate information relative to earnings, we have not attempted to include summer sales work in our report.

We have not enumerated positions in which girls enter private homes to work for board and room, as those positions are filled through the office of the dean of women.

As has always been true, we have been unable to find work for a number of the girl students who have applied at this office. On the average they are, even more than the men, untrained, and inexperienced in any form of work which we might be able to find for them.

Gradually through our own efforts and as a results of satisfactory placements, the University Employment Bureau is becoming more widely known in the Twin Cities. Probably the greatest factor in this has been through our placements of graduates and students permanently out of school. In many instances we have found summer vacation and part time positions for students which we would never have obtained except for connections established through our placements of graduates.

Applications

MEN

General--part time	870
Summer vacation--full time	139
Summer Session--part time	93
Full Time--permanently	134
Total	1,236

WOMEN

General--part time	200
Stenographers--part time	64
Summer Vacation--full time	93
Summer Session--part time	50
Full Time--miscellaneous	166
Stenographers--full time	112
Total	685

Grand Total 1,921

General Summary of Placements

MEN

400	Odd Jobs	\$ 1,714.00
14	Janitor & Furnace Work	1,170.90
84	Miscellaneous	9,306.12
153	Work for Board	19,186.85
44	Clerking in Stores	4,904.50
44	Clerical	2,147.45
5	Boys' Club & Settlement Work	1,280.00
10	Tutors & Teachers	784.50
148	Ticket Takers, Guards, etc.	2,878.89

			Temporary Positions		
15	Musicians	1,058.00			
50	Canvassers & Salesmen	2,809.00			
47	Summer Vacation	10,546.16			
22	Full Time--permanent	25,440.00			
1,206	Total	\$83,226.37			
WOMEN					
44	Miscellaneous	\$ 1,517.25	400	Odd Jobs	\$ 1,714.00
28	Summer Vacation	1,646.60	51	Miscellaneous	1,330.20
102	Clerical	5,794.85	47	Summer Vacation	10,546.16
33	Stenographic	4,873.65	31	Clerical	453.50
17	Tutors & Teachers	798.90	148	Ticket Takers, Guards, etc.	2,878.89
28	Full Time--permanent	13,628.80	15	Musicians	1,058.00
			50	Canvassers & Salesmen	2,809.00
			745	Total	\$20,789.75
WOMEN					
254	Total	\$28,260.05	44	Miscellaneous	\$ 470.80
	Amount earned after July 1, 1925, on placements made after that date*	11,925.10	28	Summer Vacation	1,646.60
			79	Stenographic & Clerical	1,246.20
1,277	Grand Total	\$123,203.22	148	Total	\$ 3,363.60

* Does not include Summer Vacation positions.

Summary of Permanent Part Time Positions

MEN		
43	Miscellaneous	\$ 8,760.42
153	Work for Board	19,186.85
44	Clerking in Stores	4,904.50
14	Janitor & Furnace Work	1,170.90
13	Clerical	1,693.95
5	Boys' Club & Settlement Work	1,280.00
276	Total	\$36,996.62
WOMEN		
17	Miscellaneous	\$ 1,845.35
31	Clerical	4,839.50
25	Stenographic	4,582.80
73	Total	\$11,267.65

Full Time Permanent Positions

28	Women	\$13,628.80
22	Men	25,440.00
50	Total	\$39,068.80

Amount probably to be earned after July 1, 1925, on placements made during the preceding year:

Women	Clerical	\$ 1,412.50
Women	Miscellaneous	None sure
Men	Clerical	4,207.60
Men	Miscellaneous	6,332.00
	Total	\$11,952.10

A Study of the Birth of Personality in Children

By Dr. John E. Anderson

Director, Institute of Child Welfare

THE Institute of Child Welfare of the University of Minnesota is established under a grant of \$250,000 from the Laura Spelman Rockefeller Memorial of New York City, the funds to be spent over a period of five years. The purpose of the Institute is to secure through the co-operation of a number of scientific departments of the University as much fundamental knowledge as possible about the small child and to make the knowledge thus secured together with that accumulated through earlier studies available to the people of the state through the extension services of the University. Further, the Institute through its facilities and staff will be able to interest able students in the problems of young children, thus providing trained workers and experts for the future. Hence, the Institute fulfills a three-fold function: it is a research organization seeking scientific knowledge of the child; it is a training organization for future workers; and as an educational organization, it will be a center for the dissemination of knowledge about the child to parents and others actually engaged in the training of children.

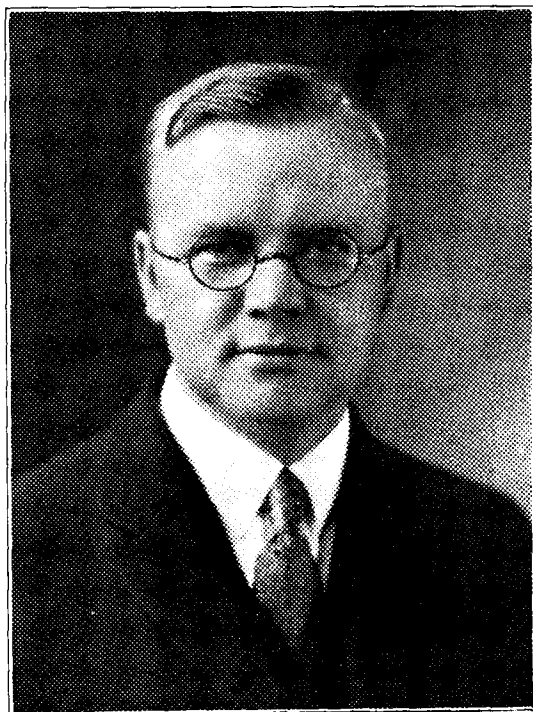
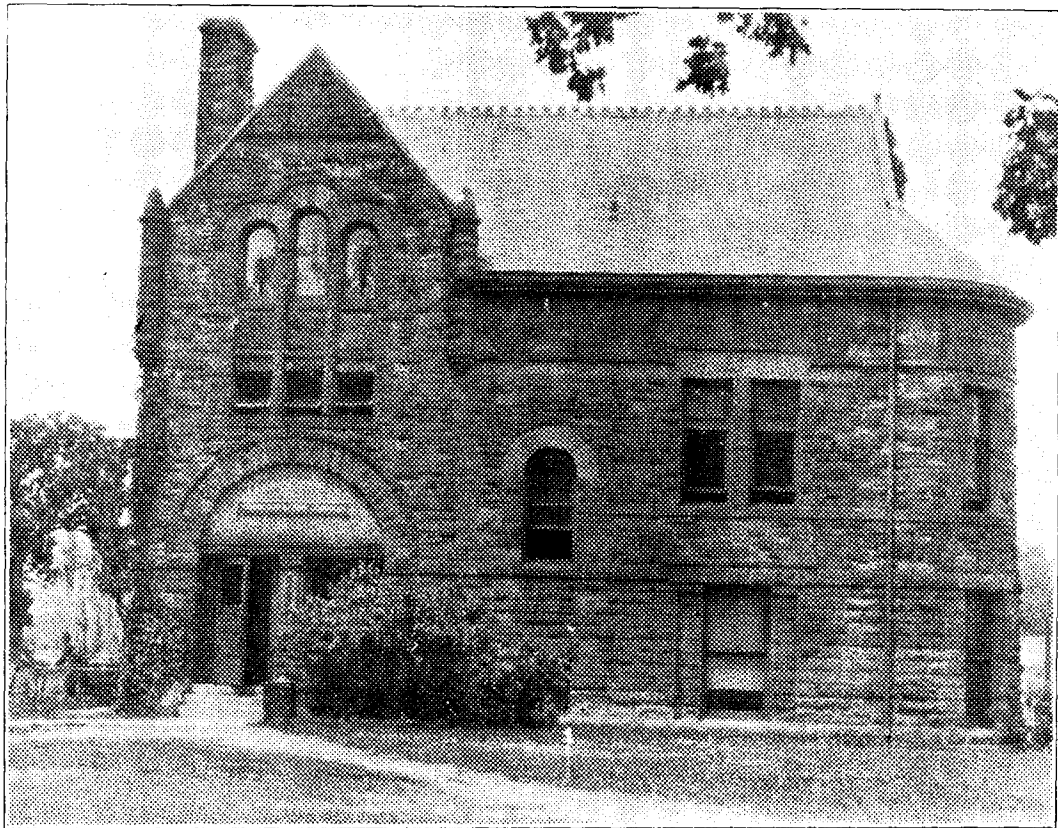
Although the staffs of the Institute and of the co-operating departments of the University are interested in the development of children throughout the entire period of childhood and adolescence, the work of the Institute will center almost entirely about the pre-school child, that is, the child from birth up to six years of age. Within the last thirty years, a tremendous amount of scientific study has been devoted to the mental and physical development of the school child, due in large part to the accessibility of such children in large numbers in the public schools of the country. Children below six years of age, with the exception of a relatively small number found in institutions, are in the

home and become available for observation and study only when they become ill or are seriously abnormal. Very recently, great interest has arisen in the pre-school child. More and more, workers with children and with adults have become impressed with the fact that the pre-school age is a very important period in the whole development of the individual in part because of the rapid pace at which development proceeds compared with that of later years, and in part because so many of the fundamental character and behavior tendencies of the individual become fixed in that period.

Seek 30 For Nursery School

One of the first projects to be undertaken by the Institute is the establishment of a Nursery School for thirty children, a group of fifteen between the ages of three and one-half and four years, and a group of fifteen between the ages of two and two and one-half years. These children will be in the school from nine in the morning until four in the afternoon and will be provided with a noon-day lunch and with facilities for taking a nap after lunch. For this group of thirty children, an experimental educational program will be undertaken for the purpose of determining better methods of instructing and handling small children. The instruction will be informal and individual to an even greater extent than is that of the kindergarten. Thorough physical and mental examinations will be made periodically in order to obtain records of the physical and mental development of the children. Observations and studies will be made of their behavior and conduct. It is hoped that in the selection of these children, a healthy, normal group of children may be obtained, since the Institute is interested in obtaining the facts of the normal develop-

The Home of the New Institute of Child Welfare



Dr. John E. Anderson (left), formerly in charge of the Institute of Psychology at Yale University, has been placed in charge of the new Institute of Child Welfare at the University of Minnesota. Shown above is the first home of the campus Y.M.C.A. which has since been the Music building, the home of student publications and journalism, and is now to house the new Child Welfare venture under Dr. Anderson.

ment of the child. Comparable studies will be made on children under home conditions.

As a second project, the Institute hopes to make arrangements for careful observation and study of a group of infants between birth and two years of age under hospital and home conditions in order to obtain as much knowledge as possible about the physical development and mental development of the infant. Although a considerable literature has accumulated on the development of the infant, much of it consists of observations made upon single and usually rather exceptional children. The scientific and practical importance of the conclusions is so great that studies on groups under carefully controlled conditions are necessary, both to check up on what has already been found and to secure data of wider applicability.

The Institute will make use of the facilities afforded by the various departments of the University of Minnesota in the study of the small child. There are on the regular staff of the University a number of well-known experts in the various scientific fields who are interested in the study of the small child. The Institute through its facilities will give the men in those departments opportunity to carry on their studies under very favorable conditions. Eight departments are to be co-operating on the projects: Anatomy, Home Economics, Education, Pediatrics, Psychiatric, Psychology, Sociology, and Public Health Nursing. The Institute is interested in any type of scientific work which will advance our knowledge of the small child.

Some of the Study Problems

Typical problems which come within the scope of the Institute are: the physical growth of the child as shown by measurements of weight and the length of the entire body and of various parts of the body, the development of

sense organs and of the senses, the study of fatigue and sleep, the study of eating and sleeping habits, the study of the inherited behavior of the child as shown in his native responses, the modification of his inherited responses by the environment and education, the development of language, the development of intelligence and other mental processes, and the emotional life of the small child in relation to the formation of habits and personality.

Through the extension services of the University, the Institute hopes to develop a service which will bring to the people of the State of Minnesota, particularly the parents who are faced with the problems of training small children, the knowledge which has been accumulated with reference to such problems. This knowledge will be made available through the various channels that are already in existence for bringing the results of University work to the people. Bulletins, study courses, organization of study groups, lectures, demonstrations, etc., will be a part of the extension program.

The Institute will be housed in the building known as the Publications Bldg., formerly used for the Music School and for the Y.M.C.A. This building is being remodeled for the Nursery School and the central offices of the Institute. On the first floor, a kitchen in which the noon lunches of the children can be prepared is being installed. The remainder of this floor is being taken up with medical and psychological examination rooms and with offices. On the second floor are two large play or class rooms with toilet and cloak room space. On the third floor, there is a large sleeping room which will be provided with cots, and several small rooms which will be used for examining and research purposes. Adequate play and recreational facilities will be provided in a playground back of the building.

Minnesota's New Coach; Other Facts On Football

The First Seven Games Will Be at Home

SO many splendid things have been said about Dr. Clarence W. Spears, Minnesota's new headcoach of football, since his mid-summer arrival on the campus, that little remains to be set down, either of announcement, praise, or well-wishing.

This may not be wholly to Dr. Spears liking — not that little remains to be said — but that so much has already been said, for since he shook the coal dust of West Virginia from his shoes and voluntarily chose to subject himself to the wheat chaff of Minnesota he has said just about nothing concerning his own prowess and only little more on the subject of football prospects.

An early-season analysis of Dr. Spears would indicate that he chums rather more with the verb "to do" than with the commoner and higher pitched "to say." One suspects that he broke his toy balloon when a child and instantly lost faith in hot air. His slogan is probably, "say it with touchdowns."

In the fall of 1919 it was the writer's good fortune to see Dr. Spears' Dartmouth team play two of the strongest elevens produced that season in the east, Penn State and Colgate. Penn State was an exceptionally speedy team, built around the famous halfback, Way, who was almost a Red Grange. Spears' team took their measure and beat them, stopping Way as completely as Minnesota stopped the wonderful Illinois halfback a year ago. Colgate then presented a wholly different problem by sending a team of giants against Dr. Spears' Dartmouth players. It was "the" Colgate team, the best of many good ones. They almost beat Dartmouth and would have done so had not the team been superlatively coached to follow the ball and keep on fighting. In the last half minute of play a stocky little tackle from down Boston way snatched a Colgate fumble, tore away from tacklers and made the touchdown

that was needed to tie the score. With 59 of the 60 minutes up, the team hadn't quit fighting and it saved the game in that last remaining minute.

Two years later Spears went to West Virginia and made a team of which little had been heard one of the sensations of eastern football. Such is the record of Minnesota's new coach.

Play An Unusual Schedule

The schedule which Minnesota will play this fall presents the interesting phenomenon of a straight string of seven home games, beginning Oct. 3 and continuing through Nov. 14, on which date Iowa will journey up to Minneapolis to oppose the Gophers in the annual homecoming contest. The sole game to be played away from Memorial Stadium will be that with Michigan, which will take place at Ann Arbor on November 21, the closing day of the Western Conference season.

Minnesota plays but three conference games in its string of eight, these being Wisconsin on Oct. 31, which will be "Dad's Day"; Iowa on Nov. 14, and Michigan.

The schedule of non-conference games is to be of high quality, however. The opening game, Oct. 3, will be with North Dakota in accordance with long accepted tradition. Grinnell, which provided upsets in the Missouri Valley conference last fall, will come next, on Oct. 10, to be followed on Oct. 17 by Wabash, the college where Bill Spaulding made his reputation as a mighty halfback.

Minnesota fans will have one of the season's treats on Oct. 24 when Knute Rockne will bring his celebrated Notre Dame team into the Northwest to take part in an intersectional battle. "The Four Horsemen" have all been graduated, but football enthusiasts are expecting some sort of "Death on a White Horse" to rise

up and take their place on the South Bend gridiron. Wisconsin (Dad's Day) follows Notre Dame on Oct. 31 and Butler College will play in the Stadium Nov. 7. Iowa (Homecoming) on Nov. 14 and the Michigan game at Ann Arbor Nov. 21 will complete the schedule, one of the most interesting that has ever been arranged for a University of Minnesota football team. What it lacks in conference battles it makes up, nearly, in the novelty and reputation of other opponents.

Season tickets, offering all seven home games for a combined price of \$12, one dollar less than the sum of the individual ticket prices, will remain on sale through mail orders up to Sept. 21 and may be bought at the university ticket headquarters up to the day of the first game. General mail orders for seats will be received up to two weeks before the date of any game, while those on the priority list must have their orders in three weeks before the date of the game if they wish to retain the priority privilege for that game. After mail orders for any game close, seats will remain on sale at specified places in Minneapolis and St. Paul, also at the campus ticket office, up to the hour of the game.

The price of the North Dakota game will be \$1. Prices for Grinnell, Butler, and Wabash will be \$1.50, while the two home conference games (Iowa and Wisconsin) and the

Notre Dame game will cost \$2.50. Mail orders should be addressed: "Football ticket manager," University of Minnesota, Minneapolis, Minn.

Only a Few Veterans Return

The Gophers will have a relatively small nucleus of veterans on hand when the fall practice season begins. Except for the ends and center the entire line was lost by graduation last

spring and two of last season's outstanding backfield players also sailed away on the magic carpet of their diplomas.

Of last year's freshman squad, which must be depended on to provide most of the Gophers' "Fighting sophomores" for 1925, it can be said that it was as good as any freshman outfit that has trod Northrop Field in years. This, however, is a statement of the average and does not come down to specific individuals, for there are no great outstanding stars in prospect at Minnesota and those who "make" Dr. Clarence Spears' new Minnesota eleven will have to do so on their 1925 showing, not their freshman performance.

Men lost by graduation include Clarence Schutte and Carl Lidberg, the great pair of backs who beat Illinois last year. From the line are gone Captain Ted Cox and Louis Gross, each of whom played tackle under Bill Spaulding for three years, also



Dr. Clarence W. Spears

Chet Gay and George Abrahamson, dependable veterans at the guard position. A number of other letter men who found their way into many games have also left the roster.

Returning men are headed by Captain Herman Ascher at right half, a dependable back and excellent punter; Malcolm Graham, a quarter back who rises on occasions to great heights; Pete Guzy, an able lieutenant to Graham at quarter; Conrad Cooper, the chief veteran of the organization, who is a splendid performer at center; Bob Peplaw and three veteran ends, Roger Wheeler, Freddie Just and Chuck Morris. With these men as a nucleus, Dr. Spears will set to work on the task of producing a western conference team.

Approximately 20 men are included on the list of available graduates from the 1924 freshman squad to the 1925 varsity. These are the following: Backs, Shorty Almquist, Clarence Arendsee, Hoerbert Joesting, Harold Murrell, Bill O'Shields, Neil Rengel, Bill Schoener, Tom Withrow and Mallie Nydahl; ends, Clement Gierok, George Tuttle, Frank Bauman and Bob Williams; linemen, Bill Kaminski, Mitchell Gary, Tiny Drill, Bill Meili, Albert Maeder, Wendell Bredemus. Others may appear.

There are just six linemen mentioned and

from them, presumably, four positions must be filled. It gives no very wide range of choice in the task of replacing a thoroughly seasoned and veteran line. Backfield material seems more plentiful, but the list will almost certainly be cut into by non-return. It is too early in the season to comment on the relative capabilities of the men named. But it does seem likely that a team well capable of taking care of itself will evolve from the lot of them.

Director Fred Luehring and Dr. Clarence Spears, headcoach, have added to the teaching roster a group of men who seem capable of giving high class service. There are, for example, Bob Saxton, the old Dartmouth star, who will work with the ends; Sig Harris, for years right hand man to Dr. H. L. Williams when he coached at Minnesota, and Major Ray Hill, U.S.A., now stationed at Minnesota. Major Hill was backfield coach when Howard Jones turned out his world-beating teams at Iowa. Aiding these men will be Sherman Finger, chief freshman coach, the old fullback of Walter Eckersall's Chicago days, H. T. Taylor, Merton Dunnigan, Lou Keller, and Blaine McKusick. Minnesota plays seven straight games at home, then goes to Ann Arbor to end the season against Yost on November 21.

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MINNESOTA CHATS



For a Better
Minnesota

Foreword

University sets October 31st as Dad's Day

THE fathers of all who are students in the University of Minnesota have been cordially invited to visit the campus on Saturday, October 31, to take part in the activities of the second annual Dad's Day.

THE father of a young man or young woman in college sometimes has but the haziest idea of the actual routine of college life, either on or off the campus. Many of these "Dads" have gone to college, but a great many of them have not. Many fathers and mothers of students whose home are right in Minneapolis or St. Paul have never gone to the effort of paying a thorough visit to the University of Minnesota, though thousands of them pass it once a week, or once a day, for years and years. Dad's Day will offer a special opportunity for these and will also become, it is hoped, an occasion when hundreds of fathers from other communities throughout the state will make an effort to visit, and become more familiar with, the University.

FATHERS will visit classes, laboratories and spots of campus interest in the morning, and many of them will arrange to attend the Minnesota-Wisconsin football game in the afternoon. At night there will be a dinner for the fathers, at which one or more members of the administration will describe university life and the university's plans so that the visitors may understand these things more sympathetically.

THE EDITOR

Training of Veterans in Colleges Soon to End

Minnesota's "War Specials" Have Splendid Records

WITH the completion next June of the present college year will pass one of the most remarkable efforts in the history of higher education in the United States, the attendance at American colleges and universities of the thousands of partially disabled war veterans who have been studying as trainees under the United States Veterans Bureau.

Comprising a group which must have reached 50,000 to 75,000 men in the various American institutions of higher learning, these trainees have been men of every type and of almost every degree of academic preparation for college. And not the least interesting thing about them, especially from the educational point of view, has been the fact that while some with full college preparation have either been unable to carry on college work or have become discouraged and dropped out, others with preparation ranging no higher than the work of a fourth, fifth or sixth grade in elementary schools have grappled successfully with college subjects and have been graduated with creditable standings.

The trainees from the first have been divided into two groups, men who could meet all entrance requirements and who therefore became regular students of the university, peculiar only in the fact that the government was paying them compensation, and War Specials, or students unable to meet entrance requirements but who were deemed by university officials to be fit for and in need of certain studies which the institution could offer them. From the time this work was started in 1919 until the present fall 1227 men of the War Special class and a somewhat larger number of regularly enrolled students have studied at the University of Minnesota, which may be taken as typical.

Despite the fact that only a relatively small

percentage of all the War Specials attempted to take a well-rounded course of study such as might possibly fit them for a degree, between 15 and 20 of these men, unprepared technically for college and in some cases with no more than a fifth or sixth grade education as a basis for their further work, have completed university courses and have been given degrees. As evidence of the part which sheer mental ability as opposed to the usual, formal types of prepara-

tion, can play in life this situation is one that is attracting widespread interest among college administrators.

The arrangement by which the Veterans Bureau men were placed in colleges and universities was made in 1919 and, as has been stated, it will be terminated with the completion of the current year. The peak attendance came in the year 1922-'23. The number of War Specials at Minnesota, for example, has ranged as follows: 1919-'20, 22; 1920-'21, 105; 1921-'22, 219; 1922-'23, 230; 1923-'24, 143; 1924-'25, 89;

1925-'26, 34. Counting those who have held over from past years there are now, in September, 1925, 155 War Specials on the rolls of the University of Minnesota, while records show that the number should be 189 but for the fact that some men have dropped out without formal explanations. There are still in this group some men who will complete the work for a degree during the present year, bringing the total number of graduates to 20 or maybe more.

Dean Edward E. Nicholson, who has had charge of the trainees during most of the six-year period, describes the problem presented to university officials in 1919 as a perplexing one. Should it be demanded that a trainee present full entrance requirements, or should they accept those men to whom, plainly, they could offer



Dean Edward E. Nicholson

beneficial courses, whether or not preparation was technically satisfactory? Should new courses be developed, especially designed to meet the trainees' needs? Should men without entrance requirements, if they proved themselves competent, be allowed to hurdle the usual barriers and gain degrees, or should they be restricted to attendance on scattered classes?

It was decided that any men who, in the opinion of the university official in charge would be benefitted by university work, no matter what it was, should be admitted as War Specials. Men who met entrance requirements were classed as regular students and members of the appropriate classes. It was decided, further, that no new courses should be established for any of these men, but that men without entrance requirements who proved capable of carrying full work should be permitted to register as candidates for a degree. It becomes a little difficult to trace the course of all these men due to the fact that when they proved their ability and became candidates for degrees they left the War Special group and joined in the general mass.

Dean Nicholson recalls that for many of the trainees, recently come from the excitement of camp and battlefield, it was terribly hard to settle down and apply themselves consistently to college work. Many had passed through painful experiences in hospitals. Others were shell-shock victims with serious nervous disturbances. The great majority, however, despite physical handicaps, were intent on accomplishment. The manner in which they summoned their powers, conquered their fidgets and settled down to work attracted the attention and aroused the admiration of teachers and administrators. The system soon proved itself a success.

Interesting and Typical Cases

Because these men were admitted and assigned to various courses of study on his judgment as officer in charge, Dean Nicholson followed their careers closely with a view to checking his own decisions and observing the progress of the students. In this way a number of remarkable cases came to his attention.

He describes one fine appearing man who said he had gone to about the eighth grade in school but had qualified as a captain of artillery in a reserve officers training camp. Prior to entering

the army he had been employed in a factory manufacturing electrical appliances. He wanted to continue in allied studies and selected electrical engineering. The dean believed that he must have had trigonometry in order to qualify as an artillery officer and was correspondingly surprised when this student returned in about two weeks, utterly discouraged, reporting that he was a flunk in "math."

The man was of an unusually intent and serious-minded type and was correspondingly downcast over his difficulties. He was advised, therefore, not to despair, but to enter a night class in the extension division and take trigonometry. He did so. In one college quarter he completed the subject and was able to continue with his engineering. After a year and a half he resigned to become assistant superintendent of the firm for which he had been working. The arrangement with the firm was that he should be given free periods every year or so in which to continue his education.

"It reads like a success romance, but it is a simple report of facts," the dean declared.

Many of the War Specials and other trainees were married men with children. Among these there have appeared some remarkable examples of the value of incentive in college work and also some unusual instances of appreciation for the opportunities which an educational institution offers to students. An example of the latter was a married man with four children who appeared at the dean's office during a campaign to raise the money for a stadium. He explained how eager he was to give in accordance with his means and how careful he must be not to cripple his ability to maintain the simple home in which his family was housed. He was assured that nothing was expected of him beyond what his own good will might dictate, although that might be little or even nothing. His adviser was astounded when he said that he and his wife, after a conference lasting far into the night, had decided to give \$150. This was to be paid in five years.

"If I were you," Dean Nicholson told him, "I should make my note read, 'payable in 10 years.' You are making the note, you know, and can make it read as you wish."

So that was all settled, and on a better basis than anyone, on either side, had expected.

Perhaps the outstanding instance of success in studies by a man with negligible preparation was that of a War Special who had gone only into the fourth grade in secondary school who was admitted to a regular class as a candidate for his bachelor's degree after having done unusually good work for two years. In two years more he won his diploma with a "B" average for his entire course.

The man who has supervised these 1227 War Specials feels that one of the finest things they have gotten from the work is the renewed feeling of confidence in life, of the worth-whileness of the world as it is constituted and organized, and of the joy of becoming substantial and valuable members of society. As they have progressed they have come from experience to understand the true value of social institutions and have changed from depressed, irritable, questioning individuals into men who are eager to take their place in society, do their share, and enjoy the increasing portion of the world's benefits that has been theirs.

All has not been smooth sailing for the trainees, however. In a report made when the volume of this work was at its height, the administrator pointed out the following difficulties:

"Many of them have been away from this type of work for so long that it takes some time for them to find their feet and get under way.

"Some of these men come to the university with an assigned objective for which they are in no way fitted. A study of these unsuccessful cases and a change of objective has in many cases worked wonders and has made the difference between failure and success.

"The physical condition of some of the men is such that successful college work is impossible. In some cases this condition is temporary, but it is permanent in others.

"Some of the men are required to lose an undue amount of time from their class work by calls for physical examinations and conferences incident to their relations to the Veterans Bureau."

The further statement was made that the mature trainees, men of 30 or so, who had enjoyed part but not all of a high school course, were proving superior as students to the younger men who had finished high school but had enjoyed less actual experience of the world.

In a report on the adequacy of federal payments, asked by the government, Dean Nicholson wrote: "The pay for the married man, particularly the one with family, is none too high. In the case of the unmarried man, without dependents, it is too high, encouraging in some cases, extravagance and frequently great dissatisfaction with possible returns on re-entering productive fields."

Stop, Look—and Spare Minnesota's State Flower



Botanists say the ruthless picking of the lady slippers is threatening our most prized wild-flower with extinction.

The Preservation of Wild Flowers and Trees

By Dr. C. O. Rosendahl

Department of Botany, University of Minnesota

THE propaganda for the preservation of wild flowers is a phase of the general conservation movement. To a great many practical minded people this endeavor to save and perpetuate our wild flowers appears as only another one of the numerous sentimental uplifts with which we are so sorely afflicted these days. We all realize fully the seriousness of the destruction of our forests and the depletion of oil and coal supplies. We feel the need for the conservation of these resources because it affects so obviously the economic life of the state and the nation. These and other things minister to our material and physical well being and we react more readily to stimuli of this sort. But we should remember that our spiritual and aesthetic nature needs as much to be ministered unto as our bodily wants.

We cannot measure in dollars and cents the benefits we derive from our contact with the out-of-doors, yet no one who has tramped and camped and lingered in the open country will deny that his life has been enriched thereby. That which adds to the wholesome recreational side of our lives becomes more and more important with the increasing rush and strain of modern civilization. The longing to get out into the open, away from the noise and turmoil of the city is but natural revolt against a too artificial mode of life. I know no better surcease from trouble and care than a sojourn in the northern woods, and most of us feel with the poet, though we cannot express it so well, that

*There is a pleasure in the pathless woods,
There is a rapture on the lonely shore,
There is society, where none intrudes,
By the deep Sea, and Music in its roar:
I love not Man the less, but Nature more
From these our interviews, in which I steal
From all that I may be, or have been before,
To mingle with the Universe, and feel
What I can ne'er express—yet can not all conceal.*

A great many find their relaxation and recre-

ation out-of-doors in fishing or hunting, or in sports of various kinds, but a far greater and increasing number derive their benefits from their vacations and hours spent out in the open in the study and enjoyment of animal and plant life. To all of these, whether they fish, hunt, play or study, or just loaf, the preservation of all forms of wild life and the beauties of nature becomes of vital importance and deserves serious consideration. Some one has said that a wholesome appreciation for things in nature is one of the best assets of good citizenship, and the eminent naturalist, Alfred Russell Wallace, speaking about the influence upon character, says that "Living things are here for a purpose in some way connected with us: and if in our blind ignorance or prejudice we destroy them before we have earnestly endeavored to learn the lesson they are intended to teach us, we and our successors will be the losers—morally, intellectually and perhaps even physically."

From the sentimental and aesthetic side alone, therefore, the preservation of our flowers and trees is amply justified.

But is the preservation of our wild flowers and trees, aside from those species which have medicinal or other economic use, of any practical value? It surely is, both in direct and indirect ways.

Natural Organisms Are in Balance

Throughout the whole of undisturbed organic nature there is a nicely adjusted balance between all the organisms composing it. A state of equilibrium is normally maintained and life flows on evenly throughout the ages. No single species of organism or group of organisms gains the mastery to the extent of driving out or completely destroying others. Probably very few of us realize or stop to consider how important a part our wild flowers play in this balance of nature. The relation between insects and plants is so intimate and has existed thus so long that it is safe to assert that all showy flow-

ers of the woods and the meadows would probably not be in existence today except for the part the insects had in their development. These two great groups of organisms have evolved together, and the relationship has become so finely adjusted that any disturbance of it, such as the eradication of numerous species of wild flowers, entails serious results. It reacts profoundly upon the local insect world, this in turn upon bird life, and so on through the whole scale of inter-related organisms. Viewed in this light the assemblage of wild flowers comes to have an economic value of such importance as to merit protection and preservation.

The part which our wild flowers play in making Minnesota a land so attractive to the tourist is a major one. In the first place nature has endowed our state with a greatly varied topography and a diversity of soils such as none but the mountainous states can show. No other state in the Union can boast of so great an area of fresh water lakes and streams. The fame of the Land of Ten Thousand Lakes is becoming world wide. The beauty and charm of our scenery are attracting ever-increasing numbers seeking recreation and out-of-door enjoyment. That which makes the state so attractive from a recreational standpoint is its rich and varied vegetation in a setting of unusual natural topography.

The state occupies a strategic position in a biologic sense. Within our borders three distinct floral elements meet and mingle. In the north and northeast we find an extensive area covered with the northeastern evergreen or coniferous forest. In the southeast and central parts there are located hardwood forests of such richness as to compare favorably with those of the Ohio valley. To the west of the forest lies the undulating prairie or grassland where the rainfall is still sufficient to maintain its verdure.

In each of these distinct vegetation areas there dwell hundreds of species of plants more or less characteristic of each. From the earliest spring until late in the autumn there is an uninterrupted display of bloom, partly because of the variety of habitats and partly because nearly half of all the families of flowering plants and ferns are represented in the 2000 species which go to make up the Minnesota flora. Without the flowers we should still have our numerous lakes

and streams. We might have our various types of forest, but much of their charm would be gone and it is even doubtful if they could perpetuate themselves because the necessary equilibrium could not be maintained.

The state auditor has predicted that the tourist business is going to be one of the major industries of the state within a few years. This will come to pass only if we can formulate and carry out definite policies of conservation and maintain the beauties which now attract the tourist traveler.

It is true that we still have our varied topography and rich soil but it should be remembered that much of that teeming and wonderful wild life which the early explorers describe with so much enthusiasm has been profoundly affected by the influence of modern civilization.

The transformation of the wild land through settlement must go on, but in the process there has been a degree of thoughtless and ruthless destruction which is not warranted and which can never be repaired.

Taking possession of the suitable land for agriculture, utilization of this forest and other natural resources are just and legitimate pursuits, and it is only natural that our early settlers should have regarded the wild flowers as of no particular value in the scheme of things. But there are certain forms of destruction and exploitation which are wholly unjustifiable and which are threatening the complete extinction of the more attractive forms of plant and animal life.

It is not necessary for me to dwell upon the evils of forest fires. The effect of fires upon forms of vegetation other than forest trees, however, is seldom pointed out. We have become accustomed to think of the evil of burning as being confined largely to the northern part of the state, not realizing that the harm done is state wide.

Burning Destroys Millions of Blooms

Under the mistaken notion that burning is "good for the grass," many set fires in the spring or fall to their lawns, their waste lots, their pastures, meadows, hillsides, and even woods. True, it cleans up the place. But the fertilizing effect of the ashes is far less than that of the humus-building vegetable matter which is de-

stroyed. Bushes and shrubs and seedling trees are killed. The early wild flowers are either singed or killed or, if they have not yet emerged from the ground, they are deprived of the vegetable litter which is absolutely essential for their maintenance. In its ruinous effects upon all forms of wild life, burning is one of the worst practices we engage in.

And next to burning, especially in so far as it affects the destruction of the most charming of our wild flowers, I would put promiscuous drainage. It is not as spectacular as fire and the evils are not so readily discovered, but it works insidiously. Many of our orchids and other rare and interesting swamp or bog plants are so nicely adjusted with respect to water level that a fluctuation of a few inches will exterminate them over large areas of swamp or bog. The complete disappearance of the pink and white lady's slipper from certain districts is more often the result of drainage than of picking. On the pretext of reclaiming land for agricultural purposes large tracts of northern swamp land have been drained. Not only do most of these areas prove worthless as farming land but the natural vegetation is ruined for good. These drained peat bogs in dry seasons constitute a constant menace as the starting places of devastating forest fires. Infinitely more harm than good has resulted from many of the drainage schemes within our borders.

The permanent lowering of the water table in many parts of the state incident to cultivation of the land has driven out many of the more exacting species of flowers, but this condition cannot be remedied or avoided. They have to take refuge where their demands can be met and so we find them retreating farther and farther back into the depth of the forest, stealing into the shady ravines or lurking under overhanging rocks. In such out-of-the-way places they hold their own—yes, even multiply and become numerous. But remember that these are the last retreats for most of our charming native flowers.

As long as travel was slow and as long as those who wanted to pick flowers had to travel far afoot there was comparatively little danger of extermination. But all this has been changed by the advent of the automobile and all the flower sanctuaries of yesterday are everywhere being invaded and despoiled by the thoughtless pickers and diggers. It is against this last form

of destruction that it has become necessary to organize Wild Flower Preservation Societies, and with this and similar conservation organizations largely rests the fate of many of our wildings. In a state like Minnesota, with still a great deal of waste land and even in her more thickly settled communities with many wild nooks and corners, the need for definite protective measures has not been so pressing.

A New State Law That Helps

In the eastern part of the country where many species have totally disappeared and all of the more attractive ones have become rare around the great centers of population it became obvious years ago that some means of protection would have to be devised. Many states have already passed laws prohibiting the picking of certain species. Others attempt to secure protection by prohibiting the sale of species in danger of extermination. Such a law was passed by the Minnesota Legislature at its last session and the plants designated not to be sold are the state flower or pink and white Lady's Slipper, and all other orchids, two species of wild lily, all native species of Trillium, the Trailing Arbutus and the Fringed Gentian.

Questions will occur to many as to certain features of this new law. Why does it prohibit the selling of flowers and not their picking? The reason for this is that there is no way whatsoever of enforcing a law all over the state which prohibits the picking of so much as a single specimen of a designated species. Such a law would be broken every day of the blossoming season by children who can see no harm in picking a flower or two. A law of this kind obviously defeats itself. Whereas the selling of large quantities of showy flowers on streets and in flower markets can readily be detected and stopped and the machinery for enforcing this law is available.

To some it will seem that the list of protected species is far too short. Why are not Blood-roots, Water Lilies, Hepaticas and other familiar kinds included among the select?

When the list was under consideration it became apparent that different persons had different flowers which each one felt should be protected. To have included all or most of them would have made the list so long as to be utterly absurd. Just because a given species has become

rare in a certain locality is not the main criterion why it should be put under protection against picking. Other causes may account for its increasing scarcity and the question is opened up as to. Which flowers need protection against picking?

In attempting to answer this question adequately, it would be necessary to consider the mode of growth and reproduction, the methods of dispersal and particularly the household habits of all of the plants involved. This



Fringed gentian, of the musical name and purple beauty, is now on the protected list.

would take too much time and a few concrete examples will serve for illustration.

Most of our desirable wild flowers are perennial plants. They are generally provided with underground parts well designed to carry the plants through the unfavorable seasons. In spite of this general similarity they vary enormously, however, in their ability to withstand disturbance or change of conditions. Some are particular in their demands in regard to shade, moisture, chemical and physical nature of the soil. Others are quite indifferent in these respects. They differ in the way they bear their leaves and flowers, which becomes an important item in considering protection. The common Blood Root and the Dutchman's Breeches bear their leaves and flowers separately. We may pick the flowers without in the least disturbing the underground parts or leaves and the only injury effected is a reduction in the supply of seeds.

The violets are even better designed to withstand picking for in addition to the ordinary showy flower appearing early in the season they produce abundantly later on inconspicuous closed flowers near the ground all of which set seed abundantly. Common plants which bear flowers and leaves separately are the Pasque flower, Hepatica, False Meadow Rue, Purple Avens, Wood Sorrel, Water Lilies, Pitcher Plants, Shooting Star, and many others, all of which are not materially injured by the picking of their bloom so long as the leaves and roots are not disturbed.

There is a large group of our native flowers which produce basal leaves and also leaves upon the flowering stem. As familiar examples can be cited the Columbine, Anemones, Marsh Marigold, Buttercups, Meadow Rue, Toothwort, Bluebells, Wild Geranium and Lupine. As a general rule, when these are picked the basal leaves are left behind and frequently some of the stem leaves, so that ample provision is left for growth and food making. Plants of this category are not in imminent danger of extinction from flower pickers. That they are growing scarcer is mainly because of the operation of other destructive causes which have been named.

If our wild plants were all constructed on the plan of the groups just mentioned they would

perpetuate themselves in abundance in spite of moderate picking, but many of them are not.

Lilies Are Sensitive to Picking

In the lily family where belong the Trillium, Lily, Bellwort, Solomon's Seal, False Lily of the Valley, the leaves are on the flowering stalk, sometimes all of them so close to the flower that you can not pluck it without taking all the leaves. In such cases even if the root should be left, all the mechanism for growth and reproduction is destroyed and what is left dies. All the native Trilliums have become scarce around the cities and towns because of picking and the same is true of lilies and a few other plants of this family.

Then there is the group of low or creeping shrubs or semi-woody plants, where belong the Prince's Pine, Wintergreen, Bearberry, Swamp Laurel and Trailing Arbutus, sweetest of all the springtime flowers. Picking these flowers means in each case complete uprooting of the entire plant. In the early spring considerable shipments of trailing arbutus are made to the cities where the flowers are sold at florists' places and department stores. Our new state law prohibiting its sale will, it is hoped, put a stop to this practice.

Some plants have adopted the habit of cutting down their life cycle to a season's growth. Their dormant period is spent in the seed. Obviously plants of this kind are poorly equipped in the struggle for existence, especially against man. Against animals, on the other hand, they protect themselves by developing bitter qualities in their leaves. But the flower must be left if seeds are to be developed. That is the reason why our gentians are vanishing from the meadows so rapidly.

Of all the wild flowers of which our state can boast none can compare with the orchids in rare beauty and charm. They are the aristocrats of the plant kingdom. In some respects they are the most specialized and highly developed of all plants. They have become adapted to the mode of insect pollination entirely and as a result have evolved some of the most bizarre and complicated as well as showy flowers known. So finely adjusted is the relationship between insect and flower that a given species of orchid has to

depend upon a certain species of insect for its pollination. Furthermore these strange plants have established a sort of communistic partnership with a lowly form of fungus which is mutually beneficial to both organisms and without which the orchid is not able to survive. No wonder, therefore, that they are finicky and resent being disturbed. They shun the haunts of man and retreat before his disturbing advance.



The earliest of the wood lilies. Trillium, is in danger because one destroys the plant in plucking the blossom.

Anything which upsets the nicely adjusted balance in nature is inimical to their welfare and some of them are becoming rare or are on the verge of extinction within our borders. It may be that these most interesting of all our wild flowers have sealed their own doom in over-specialization, for the evidence goes to show that even before the intrusion of the white man's civilization some species had become exceedingly scarce. As an example of this may be cited the instance of a small bog orchid having been found half a dozen times upon the North American continent, two of these localities being in Minnesota, two in Alaska and the others in Canada. It is noteworthy in this connection that of all the orchids indigenous to the northern half of the United States and Canada over half still grow native in Minnesota.

The picking of plants so intricately adjusted to their habitats and to other organisms means their rapid extinction. They are among the most difficult of all plants to cultivate and only a few kinds will survive for any length of time in our gardens. Removing them from their chosen habitats simply means their destruction, and it is far better to leave them undisturbed in the hope that they may escape and survive.

It is a wise provision of the newly enacted law that puts all our orchids on the protected list.

Tree Protection a Different Problem

The preservation of our trees and shrubs presents a somewhat different problem from that of the herbaceous plants, although the same principal causes have operated in their destruction. I am speaking now principally concerning the more or less ornamental types of trees and not those which constitute the great forests.

Trees and shrubs respond to the same factors of temperature, moisture and soil as the herbs but, having their principal growing area above ground, and this exposed throughout the entire year, they are more liable to the injurious and killing effects of grazing, burning and cutting down than plants with buried stems. Furthermore their general conspicuousness, especially during the flowering season or during autumn coloration, makes them the particular prey of the motoring vandal.

Not only along our principal highways but even upon numerous byways they are stripped of their branches, broken or twisted, some kinds both during spring and autumn, and left in a ragged or dying condition. Hosts are dug up carelessly, wrapped and transported fearfully, transplanted unskillfully in unsuitable places and perish miserably unwept and unsung.

During the height of the tourist season in July and August thousands of cars can be seen festooned with evergreens gathered in the north woods and intended to beautify backyards and farmsteads of southern Minnesota, Iowa, Nebraska and places even farther away. With the roots poorly protected, branches waving in the drying gale created by the rushing car, these plants are in no condition to transplant at the journey's end. No nurseryman would ever think of sending out stock consisting of trees 5 to 25 years old, dug at that time of the year. It is a safe guess that ninety-nine per cent of the evergreen trees carried away by the tourist during the late summer never survive. The business is nearly a total loss. In the long run the harm done to regrowth in the north is very considerable.

To afford protection to the shrubs and trees along the routes of travel, trespass laws will have to be enforced in spite of the fact that these are an unmitigated nuisance to the well behaved nature lover. To protect the vegetation along rights-of-way I would suggest that the aid of the state highway department be enlisted. With suitable placards and warnings much good could be accomplished and with a highway police system, talked about but perhaps not imminent, the problem would be simplified.

Fortunately for us and those who come after us we have certain groups of plants, many of them very ornamental, which defy man's worst efforts to destroy them. This speaks well for the plants but not for us.

Many of our weeds are ornamental—(the dandelion, for instance)—and quite a few useful. At least to help to keep us out of mischief.

But I have in mind particularly such forms as Asters, Goldenrods, Daisies, Blazing Star, Sunflowers, Wild Rose, and a host of others which have solved so successfully the riddle of

existence that they defy the inroads of destruction. We are blest with scores of species of this sturdy, exuberant band.

So prolific are they in reproduction, so effective in seed dispersal, so tenacious of life in general that no amount of picking is going to affect them. Only persistent cultivation of the ground, pasturing or excessive drainage can hold them back. We need not worry about these. Although they lack the grace and the charm of the woodland denizens, they nevertheless form a very important adjunct to our floral treasures.

Wild Life Sanctuaries Are Needed

There is a method of protection and preservation of wild flowers and wild life in general which I should like to see greatly extended in our state, and that is the establishment of *wild life sanctuaries*. Already we have a number of these in the form of state parks and state and national forests. There are also a considerable number of game refuges, but the latter offer little protection to vegetation. So far as plants are concerned these preserves need not be large, although the large ones would offer greater variety of topography and consequently of habitats. But they should be numerous, scattered all up and down the state and should be

selected for the possibilities they offer for the re-establishment of species which have disappeared as well as preserving those still present. That plants will come back in time to regions from which they have been driven is certain so far as the climate permits, for we know that most of the state was swept bare of vegetation by successive ice invasions and as many times repopulated.

In most parts of the state, but especially in the wooded regions, there are rough tracts unsuitable for cultivation. In some places the state or local communities could purchase these or where this is not feasible the owners themselves could well afford to spare a few acres. Practically all that is necessary for the preservation of the wild flowers is for such tracts to be fenced in to keep out all stock, and to prevent fires at all times. In fact every farm could have its own little flower sanctuary. In the aggregate this would count tremendously on the side of the perpetuation of both plants and animals. I should like to point out what a wild life sanctuary can do for the bringing back and the perpetuation of wild life and I can choose no better example than Itasca Park.

When the state acquired this tract, much of the most valuable timber had been cut, but there



The delicate, graceful beauty of the springtime is personified in the dogtooth violet of our northern woods.

were still considerable patches of undisturbed forest, and the swamps had not been drained. It was made an absolute sanctuary for all forms of wild life, except fish, and today, in less than a generation from its establishment, it stands as one of the scenic wonders of the state, second only to the Superior National Forest. Many kinds of wild animals are more numerous within the boundaries of the park than in the same area before it was first disturbed by white men. As for the vegetation, I can safely assert that no other part of the state of equal extent compares with it in actual number of species and especially in the abundance of striking forms. We can hunt all up and down the state in vain for such rare things as Calypso, the Ram's head Lady Slipper, and the round leaved orchis, but in Itasca Park they abound, and nowhere else have I seen the state flower grow in such profusion.

The state has put forth no special efforts to perfect this place except to give absolute and continuous protection to wild life, and what has been accomplished in one place can be achieved in others.

This is a sanctuary, in the full sense of the term, such as could be and should be set aside in many diverse parts of the state.

I am thoroughly convinced that a conservation policy adopted now looking towards the establishment of well selected preserves would accomplish a great deal for the distant future and nothing we could do at this time would bring greater blessings upon us from posterity. For the immediate future I am not so optimistic. From the very outset we are faced by the problem of protecting everything by restrictions and prohibitions and the sad fact is everywhere too apparent that our greatest difficulty these days

is with the very general disregard of all laws and the neglect of proper enforcement.

Educate the Children to Spare

Those who have grown up without the respect or reverence or better feelings of any kind for the beautiful in out-door-nature are not going to be improved by law. They will go on defiling and despoiling the country side as they have done before. As I view the situation, our hope for progress, here as along so many other lines, lies mainly in a policy of education.

The children can be taught to admire and appreciate wild flowers in their native haunts without having to pluck them. They can be made to understand their life story, how they solve the problems of existence and many other fascinating things connected with their lives. When the children come to look upon plants as living beings, endowed with vital substances akin to their own, growing, reproducing, traveling, conquering, they will desist from plucking thoughtlessly or destroying wantonly.

I look most hopefully for future results for the protection and preservation of wild flowers and all forms of wild life from properly conducted nature study work in the grade schools, and from well planned, interestingly taught courses in botany and zoology or general biology in all the high schools of the state. Furthermore, such organizations as the Women's Clubs, the Boy Scouts and the Camp Fire Girls can be made to aid tremendously the cause of conservation. That they have not gotten the results hitherto that we would wish may be due to inertia, or obstacles to be overcome on account of ignorance and prejudice, or failure on the part of leaders fully to grasp the possibilities for good which are theirs to make use of.

What About the Drinking Water on Trains?

Describing an Unheralded Campus Laboratory

ONE who poked about the campus of a large university for any great length of time would probably come upon interesting things, among which many would also be surprising. In this latter class would fall his discovery that in a small office tucked away in a corner of the campus there are those who know, because they make it their business to find out, just what kind of water one drinks on a railroad train.

Last spring, let us say, that big, gushing spring at Spruce Creek from which the O. P. and B. railroad filled its boiler and tender, was a matter of no concern whatever to the United States government. But, when in April the railroad decided also to use the water for drinking purposes in its passenger coaches and diners, the federal government stepped into the picture and, in accordance with the regulations of the United States Public Health Service, it called on the state to help. The latter turned the matter over to the State Board of Health, which maintains its laboratories on the campus of the university.

Twenty years ago, or even very much less, one of the favorite admonitions given by mothers when a son or daughter started on a railway journey was this: "Please don't drink water on the train. You can never tell what you'll catch."

Times have changed. Nowadays the drinking water on a railway train is about as likely to be pure as to be wet. Not only does Uncle Sam say it must be, but practically every state has a law to the same effect. Most states enforce the laws themselves, some of them more stringently than the federal government does. Where state enforcement is not effective, federal authorities step in.

This important function of seeing to it that the passengers who use American railroads each year are protected against contaminated water on the trains, is one of the vast jumble of duties that are allotted to the treasury department. Along with the national debt and defense against smuggling the nationwide offensive against railroad

water germs is the treasury's. This is because the treasury department includes the United States Public Health Service, which obtains its power here through the federal interstate quarantine regulations.

As originally promulgated, the ruling said that there must be federal inspection of all water used on trains engaged in interstate commerce. State officials however, beginning in Minnesota, ruled that any passenger who might be making an interstate trip was entitled to this thorough protection, and, as a passenger starting an interstate trip might first take the smallest and rattliest of local trains, the rule has come by now to cover practically any passenger train in the country. If a spring or well is the source of water used for drinking on the single shabby coach hooked for accommodation onto a lumber train, north, south, east, or west, then that water is subject to federal examination and to state inspection.

There is intended no implication that before the United States Public Health Service began its crusade the water tanks in passenger coaches were a particularly fertile source of contamination or the spread of disease. Many believed them to be, it is true, and there probably was some basis for that belief, inasmuch as trains were of all sorts, people of all degrees of carefulness and carelessness and water as often uninspected as inspected. But the general belief that water on trains was nothing to drink persisted for many years. It undoubtedly persists to this day, especially in the minds of mothers whose children are going for a vacation trip or to school in another town. They are wrong.

Back in 1913 when H. A. Whittaker, who is now director of the division of sanitation in the State Department of Health, first sent inquiries to railroads in Minnesota, he found that of 61 reported sources of railroad drinking water 29 could be approved and 32 could not. Today it is more or less rare for a water source to be disapproved. And al-

though Minnesota laws are considerably more stringent than the federal laws, he feels sure these bodies are supposed to send representatives tion it is obtained as incapable of conveying more stringent than the federal laws, he feels sure that the force of governmental regulation is an important factor in the improvement. From his wide familiarity with work of this sort throughout the nation, he believes that the improvement in most other states has been comparable, though some states lack the funds and laboratory facilities for carrying on the very careful checking that has been resorted to in the pioneer states of the movement such as Minnesota.

Federal regulations require that railroads report twice a year the town, type of source, whether well, spring and the like, and ownership of the places from which they obtain drinking water. Copies of all these reports go to the state boards of health and at least once a year these bodies are supposed to send representatives to examine the premises and test the water.

The law under which this is done reads as follows: "Water provided by common carriers on cars, vessels or vehicles operated in interstate traffic for the use of passengers shall be furnished under the following conditions:

"Water shall be certified by the state or municipal health authority within whose jurisdiction it is obtained as incapable of conveying disease: provided, that water in regard to the safety of which a reasonable doubt exists may be used if the same has been treated in such manner as to render it incapable of conveying disease, and the fact of such treatment is certified by the aforesaid health officer."

Minnesota was a pioneer in taking up the work outlined by this

general regulation of the United States Public Health Service, and its experience may be taken as typical. Questionnaires were sent to all railroads asking them to name their sources of water supply, and compliance was general. It was decided, however, not to depend on the railroads to send in samples of water for testing, but to do this with the field force of the States Public Health Service, and its experience may be taken as typical. Questionnaires were sent to all railroads asking them to name their sources of water supply, and compliance was general. It was decided, however, not to depend on the railroads to send in samples of water for testing, but to do this with the field force of the state department of health. This was decided on not because the railroads might have sent in false samples but because it takes a trained expert to procure a water sample without introducing into it matter which is not in the actual water supply. The operator's hands may not be clean, or he may not have cleaned his sample container thoroughly enough, or the spout may have become contaminated by some other agency than the water. Experience has taught that it is almost hopeless to depend on samples taken by the inexperienced.

In very few cases are water supplies on private property approved for railroad use. The sources should be either on the property of the railroad itself or should be the municipal water supply at the point where tanks are filled. The reason for this is obvious. It is far more difficult to maintain effective control over a privately owned well or spring than over one owned by a city or a public service company.

The thoroughness with which water supplies are investigated may be deduced from



Testing Effects of Pollution on Fish

the list of points on which they are checked. Not only must the water itself be pure but the environment of the supply must be one that would not lend itself readily to pollution and the construction of the well, tank, or spring container must be of an approved type not liable to decompose in such a way as to admit infecting agencies. Well construction is preferably of the type into which surface water can not seep under any circumstances. Ground seepage is of far less importance, for in the course of ten feet down from the surface it is thoroughly purified.

Nowadays the person who would be perfectly safe in drinking water on trains would do well to make sure that he has a perfectly clean cup, that his hands are perfectly clean and that no one else uses his cup. The water itself is all right if the word of the United States Public Health Service may be taken for it.

The duty of inspecting water supply sources for Minnesota passenger trains is but one of many interesting activities carried on in the laboratories of the Minnesota State Department of Health situated on the campus of the University of Minnesota. While these are not an actual part of the university organization they make at least two contributions to the university's program, first in offering students and faculty members a chance to observe their operations and experiments, and second, in that Dr. Whittaker and other members of the staff serve as teachers in the university's department of preventive medicine and public health. This department is under the direction of Dr. Harold S. Diehl, who also has charge of the Student Health Service and the course of training for public health nurses.

Guard Rivers From Pollution

One of the main problems in public health now confronting the state of Minnesota, according to Dr. Whittaker, is that of regulating the pollution of rivers and public waters. In one or two places in the state, he says, pollution has already reached the point where it is a nuisance, if not a menace.

His belief, which is also that of the State Department of Health, is that a survey should be made of all rivers in the state, with a view to classifying them in three ways,—waters so valuable for pleasure purposes or so important as

drinking water supplies that they should receive no polluting material; waters that can withstand a certain amount of pollution without being damaged for other uses, and, in the third class, unimportant streams that may be polluted to an indefinite degree without either inconveniencing or endangering the people of the state.

An example of a body of water of the first type would be Lake Harriet in Minneapolis, which already is protected from all pollution except that which is carried into it by the inevitable flow off of surface waters after a rain. In the second type would be such large rivers as the Mississippi, Minnesota, or St. Croix. These streams are so large that they will accommodate a considerable amount of pollution without being seriously affected. In the third class would be, for instance, the Cloquet river at Cloquet, Minnesota. At that point it is polluted beyond all redemption by chemicals and other waste from the paper industry, but it is more important to use the waters in that way than in any other. The only service for which they are called upon after leaving Cloquet is that of helping provide water power at the big dam in the St. Louis river near the boundary of Jay Cook State Park, and the polluting material does not in any way affect their serviceability in producing kilowatts.

How Much Can a Poor Fish Stand?

In the Department of Health laboratories at present the visitor may spend a few moments watching a seemingly simple experiment which is likely to result in a large contribution to the preservation of millions of fishes in Minnesota lakes and streams. The experiment is intended to demonstrate how much pollution of the water a fish can withstand without turning up, not his toes but his stomach, in that well known, fishy way. The work is being directed by J. A. Childs.

Through the courtesy of the Minnesota Department of Conservation some specimens of young fish of different varieties have been obtained. There are three or four snappy, half-pound black bass, a small school of sunfish, some suckers, crappies and the like.

Mechanical devices have been arranged in such a way that polluting matter of various types finds its way into tanks of water. In one there is a slow dripping of the type of waste that

comes from a paper mill. Creamery waste, said to be one of the most dangerous of all types to fishes, is allowed to work into another tank. Into another drips a waste having an effect similar to that of sludge from a city sewer.

The proceedings are really none too pleasant for the fishes employed in the experiment, but only one or two of them have found things too much, so far at least, and they are engaged in a great welfare undertaking on behalf of their fellow fishes.

The department is not yet ready to make any announcement concerning the results of these experiments, but they will be made public when the work has been completed. It is known, of course, that any one of the three types of pollution that have been mentioned may have a serious effect on a fish, especially fish of the game type. The work that is being done on the campus is intended to show the point at which pollution must be stopped if the fishes are to be preserved.

Polluting matter makes things bad for the fishes in two ways, according to Dr. Whittaker. It may be a substance that is positively harmful and poisonous, which will kill no matter what other conditions are. It may, on the other hand, be a substance that has so strong a tendency to combine with oxygen that it uses up from the water the element which the fish must have as a basis for life. The amount of waste admitted to any one of the small tanks is extremely small but is kept approximately in proportion to the probable inflow of waste from a creamery, papermill or sewer in a stream proportionately bigger than the tank.

When the time comes to make a survey and classification of Minnesota streams, Dr. Whittaker says, their importance as fishing grounds can be taken into account when they are classified, and the extent to which the fishes can endure dangerous matter in the water will be a helpful guide in deciding the possible extent of pollution.

One of the most recent publications of the division of sanitation is a study of water supplies and sewage systems for farm residences, copies of which may be obtained from the State Department of Health on the University of Minnesota campus. This study deals with one of the most important of all aspects of health work. In its introduction the pamphlet says:

"Water is the one natural beverage which is

an absolute necessity for the preservation of all life. The physical comfort and health of every individual depends to a very considerable extent upon having an adequate and suitable supply of water. Several factors enter into the consideration of the problem. Water to be satisfactory for drinking purposes should be pleasant to the sight and taste, free from disagreeable odor, and incapable of causing discomfort or disease."

It is a disease aspect of the problem that particularly interests health authorities. In up-to-date municipalities which supply water to their citizens, elaborate means are now taken to prevent the presence of material in the water which might cause disease among the consumers. Precautions to the same end should be employed in obtaining a water supply for the farmer. There is this difference in the two cases—the municipality must consider the distribution of large quantities of water both for consumption and for fire protection, while the farm water supply is confined usually to the necessities of one family.

In order to understand how a safe water supply may be obtained, it is necessary to be familiar with a few of the principles which underlie the spread of infectious diseases. It is known that infectious diseases are caused by very minute forms of vegetable life called bacteria, which are so small that they cannot be seen without the aid of a powerful microscope. Many different varieties of bacteria are found in nature: some kinds, and of these there are a very great number, are harmless to the human being; a few other kinds, which are known as disease-producing bacteria, will cause sickness, and sometimes death. In order to bring about sickness, they must find some way of getting into the body. This is usually through the mouth. Once inside, they reproduce very rapidly, so that soon enormous numbers are developed, and the individual who is unfortunate enough to harbor them becomes sick. Nature attempts to cure the sickness, in part by getting rid of the bacteria, so that during the illness and in certain cases for a long time after apparent recovery from the disease, the patient discharges the bacteria which have caused the disease. The latter statement applies particularly to recovered typhoid cases who may continue to discharge typhoid organisms throughout their lives, and constitute what are known as typhoid carriers.

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MINNESOTA CHATS



For a Better
Minnesota

Foreword

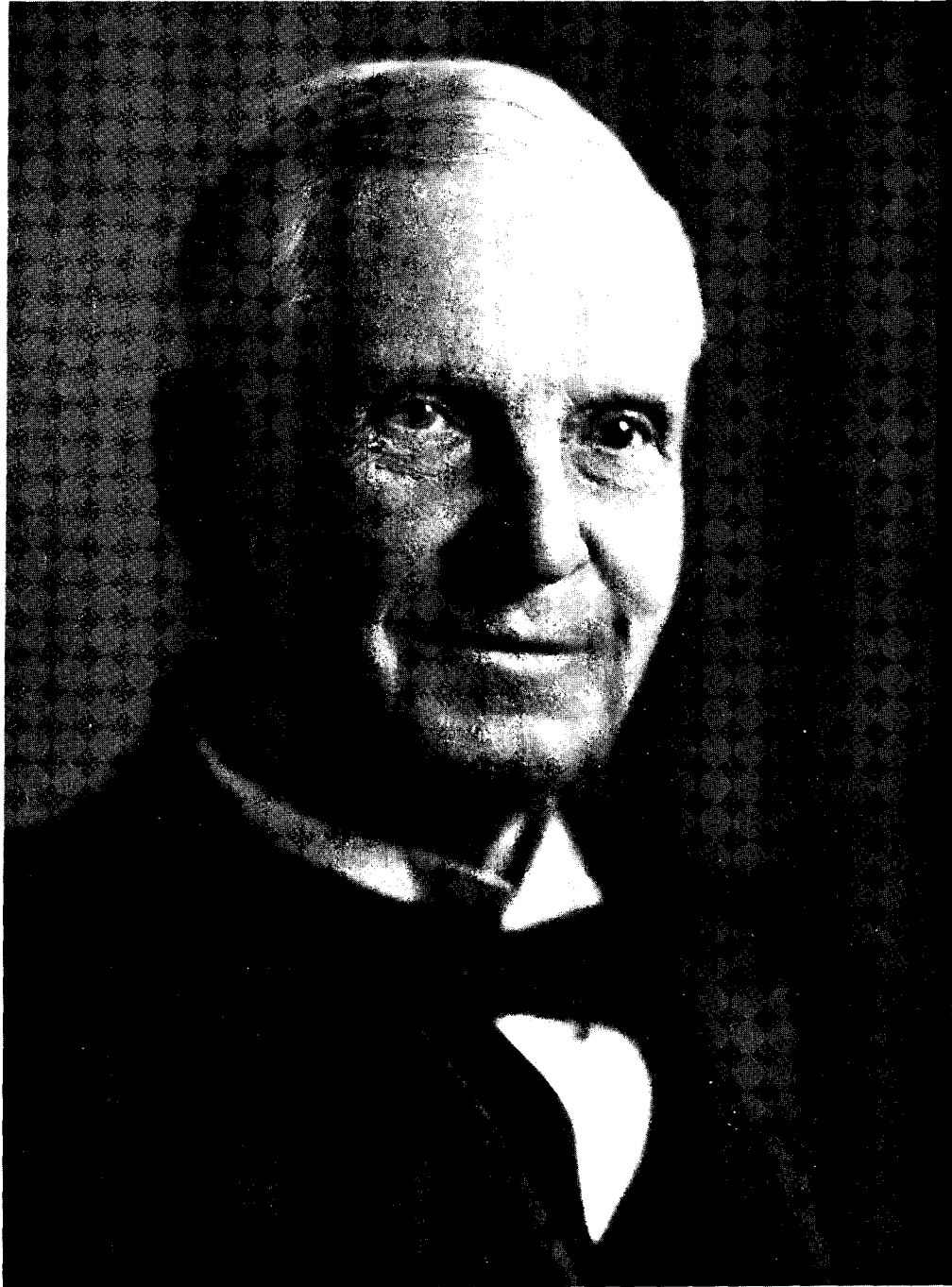
IN the autumn of the present year more than three hundred leading men of Minneapolis and elsewhere in Minnesota gathered at a banquet to do honor to William Henry Eustis, a resident of Minneapolis and a former mayor of the city, who a little while before had become eighty years of age.

WILLIAM Henry Eustis is the man who took account, two years ago, of the accumulations of a long life diligently lived in business and in his profession of the law, and made two gifts for the purpose of healing the bodies and brightening the lives of crippled children. One gift, including property and securities worth \$1,000,000, he made to the University of Minnesota for the erection and maintenance of an institution to be known as the Minnesota Hospital for Crippled Children. The other, a splendid tract of land, he gave to the City of Minneapolis as the site for its school for crippled children, the Michael Dowling School. Mr. Eustis subsequently made another gift of \$500,000 to the University of Minnesota to be used in the cause of healing.

THE following pages give verbatim expression to the opinions about Mr. Eustis and his gifts that are held by four of the leading citizens of Minnesota, Governor Theodore Christianson, the Honorable Fred B. Snyder, president of the Board of Regents of the University of Minnesota, Dr. Lotus D. Coffman, president of the University of Minnesota, and Dr. Charles H. Mayo of Rochester, Minnesota, the famous physician, co-donor with his brother, Dr. W. J. Mayo, of the Mayo Foundation, which is held by the University.

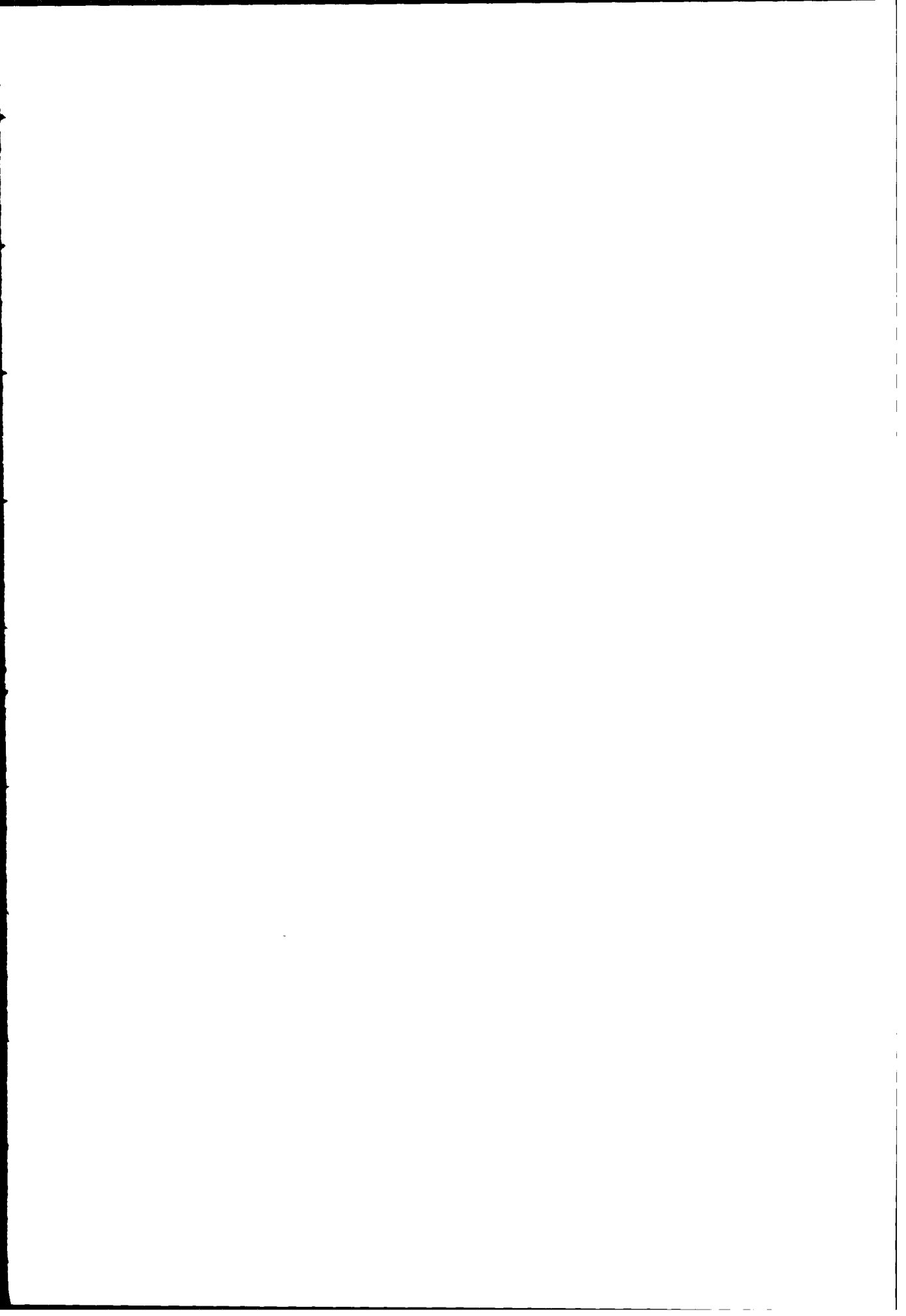
THE EDITOR





William Henry Eustis, LL.B.

Benefactor of Minnesota and of Humanity





The Honorable Theodore Christianson

Governor of Minnesota

Address by the Hon. Theodore Christianson

Governor of the State of Minnesota

JAMES M. BARRIE, the well-known dramatist, in a short play entitled "The Will," tells of a young couple who started their business and domestic career by going to a lawyer and making a will. The income of the young husband, Philip Ross, was only 150 pounds per year. He had 200 pounds saved up, and yet, from this small amount, the young couple desired to provide as generously as possible for indigent relatives and friends.

The years pass. Philip Ross becomes very prosperous and wealthy. His wife is no longer the shy and shrinking creature who with her husband sought out the lawyer forty years ago. Now she sails into the lawyer's office, says Mr. Barrie, like a galleon, not so much richly dressed as richly upholstered. Mr. and Mrs. Ross are now rich, but they are no longer generous. The wife is now afraid that she will not get all of the inheritance, and both agree that it is not wise to dower poor relatives or social institutions with very much money. So they cut in half the benevolent stipulations of their early will. Despite her worries of not having enough of the fortune, Mrs. Ross dies before her husband, and the play ends by Philip himself cutting off entirely his pampered, spoiled and wayward son and daughter.

Thus does the acute dramatist indicate that when one is young and has little or nothing to give, it is easy to be generous. The test comes when one is older and has an abundance to share. Too often the possession of wealth causes the hand to grip it tighter and the heart to forget its earlier impulses of generosity.

Mr. Barrie has here dramatized a common observation and pointed the moral of a common tragedy. Fortunately, in the modern world there have come to be exceptions to the old rule that possessions cause a hardening of the heart. This evening we are gathered here to honor a man whose generosity and vision have expanded and flowered as his means have increased.

Through the years he has entertained a dream of helpfulness to helpless and handicapped children. The dream was born out of his own experience, which he thus transforms into beneficent and tender service. In the spirit of the Man of Nazareth, William Henry Eustis says, "Suffer the little children to come unto me," unto the institutions I have built, and here they shall find greater health and strength to cope with life and its tasks. Can anyone imagine a finer gift than that which Mr. Eustis has made to the State, or one looking more directly to making the future better than the past?

Beyond blessing helpless children and building up in our midst a noble tradition of generosity, Mr. Eustis' service is a guide and inspiration to society in the solution of what is perhaps the greatest problem that confronts it. Just how this is true I want to suggest as briefly and simply as possible.

It is hardly necessary to remind you that our present system of private ownership of wealth and the private control and operation of industry has of late come in for serious questioning. Such well-known and able economists as Richard T. Ely and F. W. Tausig agree that the system of private ownership and capitalistic production, as we know it, is on trial for its life.

During the last twenty or thirty years, Collectivism has become less amorphous and much more clearly defined than it was in the past. A score of years ago there were such various and differing groups as the Utopian socialists, the Christian socialists and the Marxian socialists. From twenty years and more of discussion and sifting, the aims of the socialists have become clearer and better defined. It is now quite well agreed that they comprehend (1) the public ownership of nearly all the means of production, (2) the operation of those means by the State and its public officials, (3) the distribution of the income according to rules

determined by the community, and (4) the private ownership of the incomes so distributed.

Despite the historic character of private ownership of industry, and the undoubted fact that it has greatly stimulated private initiative and resulted in marvelous productivity, there are those who condemn it because of the inequality of rewards under it. They do not deny the productive efficiency of capitalism, but they assert that its efficiency is largely used to exploit the majority, who do not have the opportunity or the particular genius for organization, that enables them to get their fair share of the output.

So today we seem to face a dividing of the ways, an alternative so serious that sober-minded citizens should be giving it thought and consideration. Will the social and economic organization of the future be a continuation of private ownership of industry and wealth under a certain degree of social regulation, or will it be a system of social ownership and operation of wealth and production? Such ownership might take the form, either of ownership by the government or ownership by the workers within an industry. Whichever form it takes, its aims are now fairly well defined.

It is obvious that the majority, which eventually rules in a democratic society, constitutes the class that must reap the general rather than the special benefits and rewards of private ownership and control.

It seems clear, also, that the majority will ultimately establish the principle of social control of industry unless they become convinced of the superior advantages to them, of private ownership. It follows, then, that the benefits of private ownership must be combined with those of social ownership and control in any economic and social system that is likely to find permanent acceptance.

I submit to you that the trend of capitalism and private ownership promises to be such as to render resort to socialism unnecessary and futile. Experience has shown it to be unwise. Capitalism, as we know it, is so democratizing itself that we may hope that it will ultimately measure up to the social demands made upon it.

One notable way in which it is doing this is through the wider extension of capital own-

ership. Consider such great industries charged with a public function as the American Bell Telephone Company, the Pennsylvania Railroad system, and many of our electric light and power companies: these and many others that might be mentioned count their stockholders by the hundreds of thousands. It is now true that thousands of brain and brawn workers in our State and Nation have substantial and increasing stakes in the ownership and control of great industries. This promises to be an economic change as great in its way as the transition from shop to machine and large scale production. This movement has only begun, but it looks to the future and points to one way in which private industry may equip itself to function on a broader base and with more of social service. It may spell a democratization of industry which will parallel in significance the democratization century ago. At any rate, such notable economists as Thomas N. Carver of Harvard University believe that it is the only worthwhile economic revolution that has taken place since the advent of machine production.

Another way in which private ownership and capitalism seem to be equipping themselves to meet the new demands of the new day is through the greater social responsibility that attends the possession of wealth. This has flowered in many and various forms of social amelioration and service, from the Rockefeller Foundation, extending its ministry of health and research throughout the world, to the Mayo and Eustis Foundations, which have brought and will bring the world to Minnesota.

It is safe to say that such forms of ameliorative activity would suffer if they were compelled to rely for their support on public funds, for the benefits are too indirect and remote to appeal to any large body of the electorate. Men in the mass are never as far seeing as are individuals. The mass is always moved by immediate rather than remote incentives: while it is the remote incentive that is responsible for the greatest progress.

The immediate incentive is nearly always prompted by the necessity of making some adjustment, which could have been averted if the more remote incentive had been operative. It is a make-shift made necessary by the failure to

foresee development. The immediate incentive is generally concerned chiefly with ways and means of accomplishing a small end. The remote incentive is generally inspired by loftier ideals which would obviate the necessity of compromises and makeshifts.

The new view of philanthropic endeavor also reflects the way in which private ownership of wealth is adjusting itself to meet new demands and is rendering a resort to social ownership and control unnecessary. The new view of philanthropy seeks for the common welfare in all movements whether of research or of remedial action. The home, the factory, the school, the church, the hospital, the clinic, and the playground, are all within its range.

It was the old view, humane and considerate, that the sick must be tenderly cared for. It is the new view that disease and weakness must be understood and overcome, that hospitals, dispensaries, surgical and medical treatment, philanthropic and charitable endeavor, must be dovetailed into a general social scheme for the elimination of preventable disease and for the equalization of economic and social opportunity.

It was the old view that each agency of social betterment was a law unto itself. In the new view co-operation is the keynote. The old view of relief and amelioration was individualistic, isolated, dependent upon the one hand and condescending upon the other. The new view of philanthropy is democratic, co-operative, scientific and enthusiastic. It has no sympathy

with destructive radicalism and even less with that conservatism which is motivated by selfishness and serves as a cloak for special privilege and exploitation.

It is hardly necessary for me to point out in closing the significance of the life and service of William Henry Eustis in this connection. To individual citizens, what Mr. Eustis has achieved in the face of difficulty almost insurmountable, is an inspiration and a challenge. His generosity and foresight are also profoundly prophetic of a new view of life, of industrial and social forces and relations, of work and ownership, of misery, relief and happiness.

Prophetic as it is, it foregleams a social order in which ancient wrongs and inequalities shall be righted and more of opportunity and well-being established. In this better world to be, the individual will be rediscovered and re-appraised as the source of initiative and progressive variation, and also as the unit of sociality and co-operation.

So we see Mr. Eustis in the light of a new and promising day which he has helped to usher in and realize. If there is higher appreciation than this, I do not know of it. And this is only a slight suggestion of the gratitude we feel to our generous friend and benefactor of human beings in the present and in the future.

Mr. Eustis, we hail you. Your example will inspire others to greater generosity. The spirit that has actuated your achievements will justify our social order.



Dr. Lotus D. Coffman

President of the University of Minnesota

The Address by Dr. Lotus D. Coffman

President of the University of Minnesota

WHAT force is it that has induced more than three hundred of the most representative citizens of Minneapolis to leave their own firesides and to forego all other engagements that they might foregather here this evening? Was it the fact that a certain man has lived for many years in our midst and has devoted himself throughout this period to a life of public service? I do not believe so. Was it the fact that this man in the course of his lifetime has accumulated a large fortune? I do not believe so. Was it the fact that he gave a considerable share of this fortune to provide for the relief and care of crippled children? I do not believe that this is the reason why we are here. Was it the fact that this man is a true representative of the spirit of America—inheriting no property, struggling for an education and public recognition in the face of great physical handicaps, serving for years the people of his community through public office, acquiring a fortune and finally dedicating that fortune to human service? Certainly these things make an urgent appeal to us, and yet they do not seem to embody the real reason why we are here.

But the real reason is far deeper, far more fundamental, far more universal than any of these. We are here to pay honor and tribute to one who has found the magic alembic for which the ancients sought, the philosopher's stone which transmutes the baser metals of the world into fine gold. He has used this stone to transmute the gross material wealth of the world into the social gold of spiritual values. He gave his money to the schools and to the University to be used perpetually for the education and relief of physically handicapped children. How fine it was that he sensed the profound truth that education makes for culture, health for happiness, both for progress; and that wealth in and of itself, unless used to promote human welfare, is dross. The true values of life are measured by its intangibles, i.e., by its

ideals put to work. That modern business man who wins wealth and turns it to social uses, who directs it so that it adds to human happiness, is the long sought and greatly to be cherished philosopher's stone that transforms material possessions into spiritual returns.

It is this that Mr. Eustis has done. It is for this reason that we are here. Mr. Eustis gave and he gave as Dr. Folwell would say, "Like a prince." One of the fine things said about Columbus was that "an instinct of a continent stirred within him." And so it was with Mr. Eustis in the provision he made for his gift. The money gathered by one man will now be used for the benefit of hundreds and thousands of children year after year, decade after decade, generation after generation. The ancient alchemists sought a grand elixir which was to confer immortal youth upon the person who was brave enough to kiss and quaff the golden draught. Mr. Eustis has indeed gained immortal youth because his life's treasures will go on forever and ever ministering to youth.

A large share of his gift has been made to the University. While others tell of his public service, his courage or his kindness, it is fitting therefore that I should attempt to express a people's gratitude that he chose the University for the bestowal of his favor. In this choice he acted wisely. He did not tender this handsome gift to the University until after he had assured himself that there was no better way of providing for the relief, care, treatment and continued study of those whom he wished his fortune to serve. He learned that the Regents are empowered by law to accept gifts and to administer them in accordance with the terms of acceptance. He found that all of the investments of the University are made in thoroughly sound securities. He found that all stocks, bonds, and other valuable securities are kept in the vaults of the State Treasury. He found that all these papers are examined an-

nually by the State Examiner. All these facts were disposed to give him confidence that with the State and the University in partnership, this money would be used rightfully, intelligently and permanently for the purposes for which it was given.

Furthermore he realized that the Board of Regents for more than fifty years has been composed of high minded, public spirited citizens, and there is every reason to believe that public sentiment will always demand in the years to come that such a board will be continued. The Regents are animated by only one motive, that of rendering disinterested service to the State. In doing this they see that the funds, whether acquired by taxation or otherwise, are expended wisely and well in the interest of the educational advancement of the youth of the State and in the search for new truth.

These facts commended themselves to the sound judgment of Mr. Eustis. There can be no better or safer way of providing gifts, endowments, or bequests. It is only another evidence of his keen understanding that he discerned this as the most effective channel through which to provide for social betterment whether it be in the advancement of human culture, the discovery of new knowledge, the improvement of the methods of science, the training of a better citizenry and of more intelligent leadership, the treatment and care of disease, the housing of students, or in making a better equipped generation to take our places in the future.

Mr. Eustis made his money here. Here it will be left. He gives it for the benefit of this community but he does not limit its usefulness to those who reside in this community. Children deserving attention may come from anywhere for treatment in the hospital and care in the convalescent homes.

His name is now added to that growing list of persons who in dedicating their money to the service of humanity are helping to build a great university. We take a certain amount of pride when any citizen of this State gives money to some eastern university or to some one of the colleges of the State. We like to see them prosper. But every citizen of the State should have a special pride and common interest in the University of Minnesota. Founded by our grand-

fathers and perpetuated by our fathers during years of penury and hardship, it should now be the recipient of special favors during these years of comparative plenty and wealth.

We have a great university in the making. It is a State institution. There are those who think it should get all of its support from the State and there are those who groan somewhat when they think of the size of its appropriation, although the amount appropriated for the support of the University is much smaller than the amount appropriated by many of our neighboring states for the support of higher education. But even though the State be somewhat more liberal in the future than she has been in the past, if the University of Minnesota is to become truly great in literature, art and science, if she is to attract scholars from every corner of the world and hold them here in our midst, she must be placed beyond the point of competition with other institutions. This can be achieved. If Minnesota's gifts were half as numerous and amounted to half as much as those of Harvard or Yale or Princeton or Columbia and if the State were to continue her present generous policy, we should provide here in our midst the buildings, facilities and staff of the greatest university in the world. No other institution in America has a more wonderful opportunity than we, and unrestrained by hampering traditions and seated at the gateway of the Northwest with its enormous wealth, we can do what we wish. If we wish to have here a university unexcelled among the universities of the earth, we can. A decade, and this wonderful dream could be realized. William Henry Eustis is helping to provide the men and the conditions to make this dream a reality.

There is scarcely any one of us so deaf but that he sometimes hears an inner voice sounding the call to larger service. But human nature is so recalcitrant and inflexible that the voice does not always please us. There seems to be something unwelcome about what it says, something disturbing in its appeal. We shut the door of our minds. We prefer to go on as we are, undisturbed and unchanged, to live where ease and circumstances dictate. The things of yesterday are considered good enough and we do not wish to modify them. The older we get the more

our lives are controlled by habits, remembered circumstances and pleasant associations, and these are slow to change. We accept the day's routine with content and leave it to others to build a new civilization.

The voice, however, is not silenced. It breaks through our conservatism: it penetrates the walls of prejudice: it forces its way into one's inner consciousness. When night comes we do not sleep. We take a long ride or walk, alone: or sit and think: or we fall ill and find an occasional lucid hour to reflect. Perchance it is not until we reach that time in life when age itself constitutes the ground for solemn contemplation. Whatever the reasons on such occasions we go out from ourselves, so to speak, to the edge of the world and look. We see ourselves with a new interest. Then it is that we hear

the voice and for a little while turn a listening ear to it and try to understand its meaning. At such times we have a sense of compelling grandeur. A new vision impels us to action and a rekindled imagination urges us to new resolves and new performance.

William Henry Eustis heard the call of that inner voice and gave his fortune in the name of humanity. In giving to an educational institution whose primary function is that of discovering truth and of transmitting knowledge, he helps to set a people free, for it is knowledge, not law, that gives liberty: and it is knowledge and its accompanying catholicity that keeps a people free. What a beautiful thing it is that he can enter with us into the joys of his gift and that we are permitted to assemble here in praise and commendation of the man and deed.



The Honorable Fred B. Snyder

*President of the Board of Regents
University of Minnesota*

Address by the Hon. Fred B. Snyder

President of the Board of Regents

WILLIAM HENRY EUSTIS was born eighty years ago. His parents were worthy, but poor; his home a small farm; his father a wheelwright; he was a second child, one of a family of twelve; he was a strong and rugged youngster, destined by his father to be a blacksmith; until fifteen he did his full share of the work about the farm and the shop; for a time he worked in a tannery, grinding bark and earned 25c a day. He had early aspirations for an education; the Civil War was pending; he read the Lincoln and Douglas debates and resolved to be a lawyer and an orator. In a boyish way he practiced both in the barnyard on the pigs and cattle. In December, 1860, at the age of fifteen, while carrying a pail of water, he slipped, fell and could not rise. He called for help, was carried into the house, where he lay on his back in bed for one year.

He had injured his hip and for the want of proper medical and surgical services, was laid up not only in bed for one year, but for the period of five years was able to do but little else than to hobble on his crutches, helping his mother in her household duties. It is altogether likely that if he had received proper medical and surgical help, he would not have become a cripple for life. The Civil War was on, two of his brothers had gone into the Service, the household was in pinched circumstances and he felt that he was an over-burden. He still hoped to be a lawyer. For this he needed an education. He went to the Gouvenour Wesleyan Seminary, worked his way through by teaching, graduated with honors and was made a member of the faculty. He then went to the Connecticut Wesleyan University and while there took a year off and went to Columbia Law School. He did seven years' work in these two institutions in four years' time, earning his way by teaching and selling life insurance, and again graduated with honor, although in debt to the sum of \$1,000, and was admitted to the bar

at the age of 29 in 1874, and practiced law with Mr. Putnam in Saratoga, New York. In six years he paid his debt, saved \$10,000 and made a trip to Europe.

The call of the west appealed to him. He chose Minneapolis as a permanent home; practiced law, purchased real estate, made successful investments, helped to organize the Soo Railroad and the North American Telegraph Company; was always an enthusiastic booster of Minneapolis; was recognized throughout the State as a notable public speaker; was active in all movements to advance the civic development of the city and became its mayor.

At the age of 37 he resolved to make all the money he could to found and endow a hospital for the alleviation of crippled children. From that time on this dream never left him. He was thrifty, frugal, industrious, keen to business, saving and although at times in the minds of others, deemed to be close, he paid no attention to such carpings, having in mind always the big aim of his life. Two years ago he summoned to his office the head officials of the University of Minnesota and delivered to them a letter, bestowing upon that institution a gift, which he estimated with accumulations would in the year 1927, amount to one million dollars; and a few months later he supplemented this gift with other gifts, which will, it is estimated, in 1927 make the total amount the sum of \$1,500,000.

It will surely be of interest to know that the properties which Mr. Eustis has conveyed to the State of Minnesota consist of bonds, stocks and first mortgages, amounting in the aggregate to \$486,000.00, not a penny of which is in default; also a ninety-nine year leasehold estate on the Eustis Block at the corner of Hennepin and Fifth Street, yielding \$10,000 a year, and the deed to the fee of this property has been placed in escrow, not to be delivered or to take effect until the present lease expires; also a ninety-nine year lease on property on lower Fourth

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Dr. Charles H. Mayo
Of the Mayo Clinic, Rochester, Minn.

The Address of Dr. Charles H. Mayo

Donor, with Dr. W. J. Mayo, of the Mayo Foundation

IT IS indeed a privilege most highly esteemed to be present on this occasion to participate in these formalities and informalities and show our appreciation of a great citizen of Minnesota. His life has been full of activities, social, business and public service in spite of what to most men would be a handicap, but which is hardly appreciated by his friends as it has deterred him so little. It has been appreciated by him, however, and he is now, during his lifetime, to have the pleasure, denied to most men of wealth, of seeing the money earned and accumulated, begin to serve the world the way he desires. In the case of Mr. Eustis it is to maintain a hospital for the crippled children of our State, to give them at least an opportunity for development and perhaps restore them to a greater possibility of usefulness.

He has wisely turned this hospital over to the University of Minnesota which will insure the permanency of the institution, keep its management out of politics and guarantee an administration by the medical department of the University. However, it may be said that some crippling of the body, so long as the head is not affected, may have its compensations. It might be an advantage for a student to have certain physical defects of his own to study if they could be but corrected after he had acquired the fundamentals of professional education.

Our State University is continually growing in culture and in conformity with the demands of true education. Its administrators know that it must do more than instil knowledge: it must foster education in the State and put its stamp of approval on intellectual scope whether that is the fruit of years behind the plow or semesters in the lecture room. Thus will the educational principles of a university become a stimulus to learning, to culture, and to achievement. When our University conferred an honorary degree on its former president, another of our great citizens, it not only paid a tribute to intellectual worth regardless of the channels through which

it had been attained, but it also created a precedent, one which should have been set before the death of James J. Hill, the empire builder, and Knute Nelson, statesman, men who brought great honor to our State and who had developed in spite of limited opportunity. Unfortunately we do not generally profit by example, at least not as surely as the colored man about to be hanged.

Confidence in one's self is necessary to progress: this with ambition and energy creates opportunity without waiting for it. The consumption of energy depends on the thyroid gland, which controls the draft of the human stove, so to speak. Mr. Eustis passed his eightieth birthday in a hospital where he had a part of this energy gland removed, so that he could rest a bit like the rest of us, even late as it is in his case.

There must be all kinds of labor, "the high, the middle, and the low": we are still quite dependent on Europe for our labor. Our immigration law is now reducing the supply: this law, in spite of present troubles, is one of the greatest imports to our country of any passed in recent years. The great difficulty with our public school system is its lack of sympathy with workers, and the further the student progresses the less will he work. Sir Thomas Lipton, who provides the decoction of rest--Tea--in England, has for his motto, "There is no fun like work." We have, with superior intelligence, replaced the worker with machinery, and our manpower is amplified by 64 horsepower. The trouble with this country is that we have progressed so far and so fast that we have not caught up with ourselves or it, as we shall have to do, or our feet will not stay on the ground. We do not obey the laws of God or man, and we drive our legislative bodies to make more laws; many of us are only controlled by fear. Speed is the slogan, and all who deal with speed, be it railway transportation, automobile travel or machinery, must keep a clear brain for the gen-

eral safety. We cannot enjoy the present and live as we did in the past, and we cannot reverse our steps.

There has been much general discussion concerning the constitutional rights of individuals and their infringement. The rights of individuals to do as they please are acknowledged so long as they harm only themselves, but the rights of the community are always above those of the individual and those who cannot live a community life with safety to the community still have the desert, woods and many places where isolation rules supreme.

A generation ago about all that was left to a man of eighty, or even seventy, was to sit in

the chimney-corner and dream of the past. He was expected to be unsympathetic with the present and pessimistic about the future. Mr. Eustis is not the man to be content with any such negative existence. Though his hands may rest, his heart responds to the needs of the present, and his mind builds for future generations. Thus a man without children will be blessed by hundreds of those he has helped to recovery; all of them who have seen the other side of health will remember their benefactor and venerate his memory. So here is to our comrade—may he live as long as he desires and be comfortable and happy as long as he lives.

(Continued from page 13)

Street between Sixth and Seventh Avenues South, yielding \$2,100.00 per year. The deed of this property to the University has also been placed in escrow for future delivery; also 41 acres of land, worth not less than \$100,000.00, on the River Boulevard between the Dowling School and Sheltering Arms; an undivided four-fifths interest in fee in the two large office buildings known as the Flour and Corn Exchanges, at the corner of Third Street and Fifth Avenue South. This magnificent gift will build a hospital on the Campus at the University, and a convalescent home on the River Boulevard site, and support the same without financial aid from the State. When he delivered these properties to the University, he required that his name should not be attached to the hospital, but that it should be known as the "Minnesota Hospital for Crippled Children." In addition to these gifts, he has given to the city of Minneapolis 21 acres of land on the River Boulevard, adjoining the Convalescent Home site,

worth not less than \$40,000, for the Dowling School.

May I ask you now to rise and drink a toast to Mr. Eustis.

We drink, Mr. Eustis, to your past, with its acute sufferings, its doubts and misgivings, its dreams, its sacrifices and its heavy burden of toil, all triumphantly overcome by thrift and an indomitable will; to your present with its hosts of friends pouring out to you in unstinted measure their hearty greetings and cordial congratulations; to your future, when children whose crippled bodies have been mended and made straight at the Minnesota Hospital for Crippled Children, call you "blessed."

May you still have a long life to enjoy the happiness your benevolence will bring to others; and when at length, in what we hope is still the distant evening of your life, the sable wing of the Angel Azrael shall touch you, be assured there will be pronounced the encomium that your life was well lived for the good of others.

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MINNESOTA CHATS



For a Better
Minnesota

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Foreword

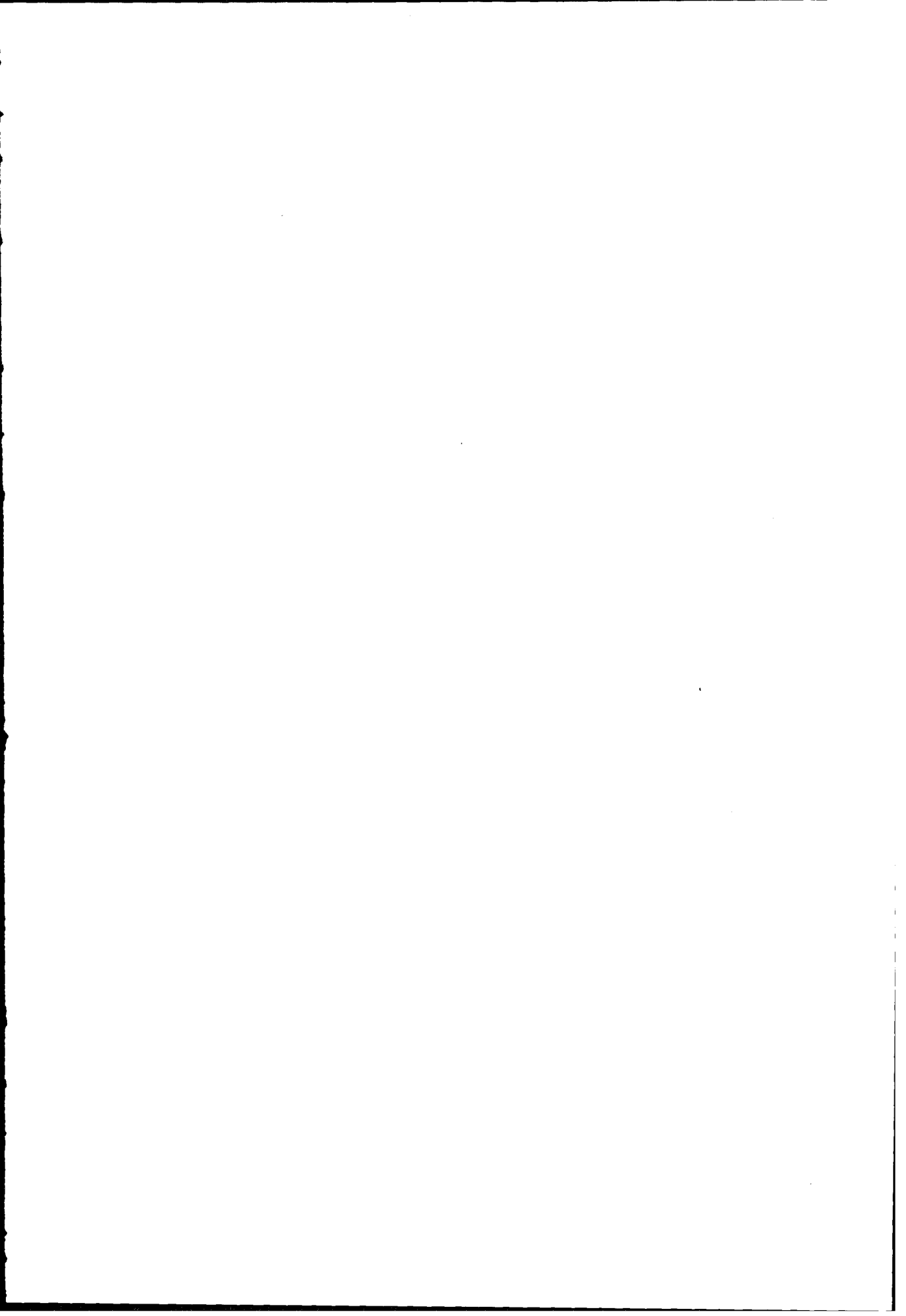
THE University of Minnesota begins the year 1926 with every prospect that the ensuing twelve months will be a period of marked success, one also in which the entire University organization will bend itself to perform the greatest possible service to the state which supports it and to the cause of education.

MONTHLY during the coming year, MINNESOTA CHATS will endeavor to explain to its readers some of the phases of University life and activity which are making the institution a leader in the development not only of material works but of a greater sensibility among Minnesotans of the good as opposed to the bad, the true as against the false, the worth-while as compared with petty and unimportant things.

ARTICLES printed this month discuss the present agricultural situation, the endeavors of the University of Minnesota's Engineering Experiment Laboratories, the methods by which the University Library obtains the volumes which enable teachers and students to keep abreast of the latest in learning, and the establishment of what may prove to be one of the University's most productive branches, the University of Minnesota Press.

IT is to be hoped that in each of these discussions readers of the magazine will find added assurance that the sum of approximately \$2 per person spent from taxes on the University by the people of the state yields an astonishing return on the investment.

THE EDITOR





The
Main
Engineering
Building
at
Minnesota

Book-Hunting in the World of Scholarship

University Maintain Contacts on Every Continent

BOOK hunting is something like duck hunting, and the man who is charged with the duty of obtaining from among the thousands of books published annually those that are wanted by the University of Minnesota Library must be a keen marksman, with a good supply of ammunition and a wide range of vision.

From every educational institution in the world, from national museums, learned societies, national libraries and from big publishing houses in the population centers swarms of books take wing each year and fly to the far corners of the earth. Thousands and thousands of different books and hundreds of copies of each go darting about. And as they come over the horizon in one nation after another the marksmen, who are the bookbuyers for libraries, get set and blaze away, bringing them down neatly.

Here a buyer is waiting for books on biology, and when such books come into view he bangs merrily away. Another university librarian is on the lookout for studies in eighteenth century English history, or perhaps books on the structure of metals. No sooner does one of these come winging over with plain markings and characteristic shrill cries than he lets it have both barrels and down it comes, neatly, into his stacks.

The ideas from which books spring seem to have no particularly favored habitat, and the books themselves nest and multiply freely in warm climates and cold, eastern or western, Nordic or Mediterranean. Likewise without artificial barriers they find their way freely over international boundaries, mountains and oceans until they reach the places where students who need them are waiting.

Now it so happens that this fancy and perhaps foolish figure of the hunted books can not be blamed on Harold Russell, head of the order department at the University of Minnesota Library, who is, nevertheless, responsible for most of the information on a book buyers'

problems and pleasures that is here to be set forth. Mr. Russell is kept too busy maintaining contact with the world's book production and with the needs of a large and book-hungry family of faculty members to do much thinking about duck hunting. Nevertheless, he is nominated for the post of official Nimrod at Minnesota.

Yearly Output of Books Is 85,000

The annual world output of books is approximately 85,000, and of that number the University Library yearly acquires something like 20,000 volumes. The world output of pamphlets, screeds, reports, catalogues and proceedings probably surpasses imagination and could better be set forth in tons of newsprint consumed than in itemized enumeration. The scholar, moreover, must have the best in his subject, and a large university has on its faculties scholars in a great many subjects. "The best" in this sense does not mean merely the best in English, but the best in that field of knowledge, without regard to the language in which it is printed. Because there are so many different countries, it follows that a university library, in the course of a year, acquires rather more books in foreign tongues than in its own. In some fields the total output is meager enough, and that part of it which comes from English speaking countries may be insignificant. Germany, France, Italy, the Scandinavian countries, Austria, Russia, the Netherlands, Belgium and Spain all contribute to the great world flight of learned books. For to the scholar, the common denominator is the subject matter, never the language, unless language happens to be the subject matter.

To an outsider the problem of selecting and obtaining the best books issued during a year appears particularly difficult in at least two aspects.—first, how to know what books and other publications are issued, and second, how to determine which ones to buy. Fortunately it is to the interest of certain groups to keep

the book buyer plentifully informed on both of these subjects. On the matter of production, it is to the advantage of the publishers to keep buyers informed, and this they do in no uncertain fashion, with a flood of catalogues and announcements that sometimes totals several pounds of printed matter a day, perhaps a pile four or five inches deep on Mr. Russell's desk. In addition to these there are issued some very remarkable publications devoted to information on where existing copies of certain learned works are owned. A well known publication of this kind is the Union List of Serials. If someone wishes to know where he can consult a series of papers on economics, or ecology or metabolism that had been issued by Harvard University, or the University of Leipzig, or Upsala, or by Oxford, he can turn to this and it will show exactly where known copies or sets or series may be found. Key numbers show them to be, or not to be, in the University of Minnesota Library, or the Michigan Library, or in that at Johns Hopkins.

As for the problem of knowing which works to buy,—

"That is simply no problem at all," says Mr. Russell, "for the faculty members are so eager to obtain the newest works in their fields that they usually have the order department flooded with more requests than we have money to fill. It is a characteristic of every librarian to want to have the best of everything on his shelves, but there are times when we wish we didn't know so well what books we should buy."

Most departments of a university like Minnesota have a certain part of their budget allotments set aside for the purchase of new books, and many departments order books to cover the entire budget allotment almost immediately after a new year begins. Later in the year these wish they had some ammunition left when some particularly plump and appetizing book comes whirring over from England or Austria, but if the appropriation has been used it is closed season for them.

General Funds Cover "Borderlines"

Besides the departmental allotments for book buying there are, of course, the library

book funds to be used for buying books of general interest or items of such outstanding importance that they become a general university matter. From this fund, also are purchased books and periodicals that cover "borderline" material between the specialized interests of the different departments. The departments, naturally, concern themselves first with the fields that are peculiarly their own.

For scholarly purposes many series of proceedings of learned societies, reports, bulletins and the like are quite as important as "books," and in this field the younger institutions, like Minnesota, face a problem from which the older ones are free. The old colleges and universities obtained these one by one as they came out, and had them as soon as they were issued. The younger institutions do this with material now appearing, but they must scramble for series that were published before they had been established. Thus any series published before the University of Minnesota Medical School was established in 1888 must be obtained by special purchase, and sometimes years pass before an institution has an opportunity to get just the volumes it needs. Every now and then one hears the research workers in some field gloating over the acquisition of some ancient-sounding series of learned bulletins. The reason for this often is that such a series contains important pioneer work in one of the many scientific subjects that have had tremendous development in the past century. Or perhaps it was a periodical issued during the lifetime of one of the great, outstanding figures in some field of science, a Darwin or a Faraday, and contained important contributions from the pen of such a man.

The Collectors Instinct Has Play

A set that has been the despair of many librarians is De Vow's Review, published in the American South for twenty years before the Civil War and for a few years after it. This was one of the original reviews of economic and business conditions, and it contained an immense amount of excellent matter relating to the economic and general social life of the South during the period when its economic

structure was based on slavery. It thus reflected a condition for which there is no parallel today, and students seek these articles eagerly.

Strangely, several numbers of De Vow's Review seem almost to have disappeared from the face of the globe. Mr. Russell thinks that it is because of these missing numbers that other numbers are scarce. He points out that a library or individual who had all the numbers but two or three would keep his collection unbound, hoping to come upon those two or three. As a consequence of keeping them unbound, all were susceptible to loss and a good many actually were lost. De Vow's is listed as a relative rarity and great is the rejoicing when a library gets one.

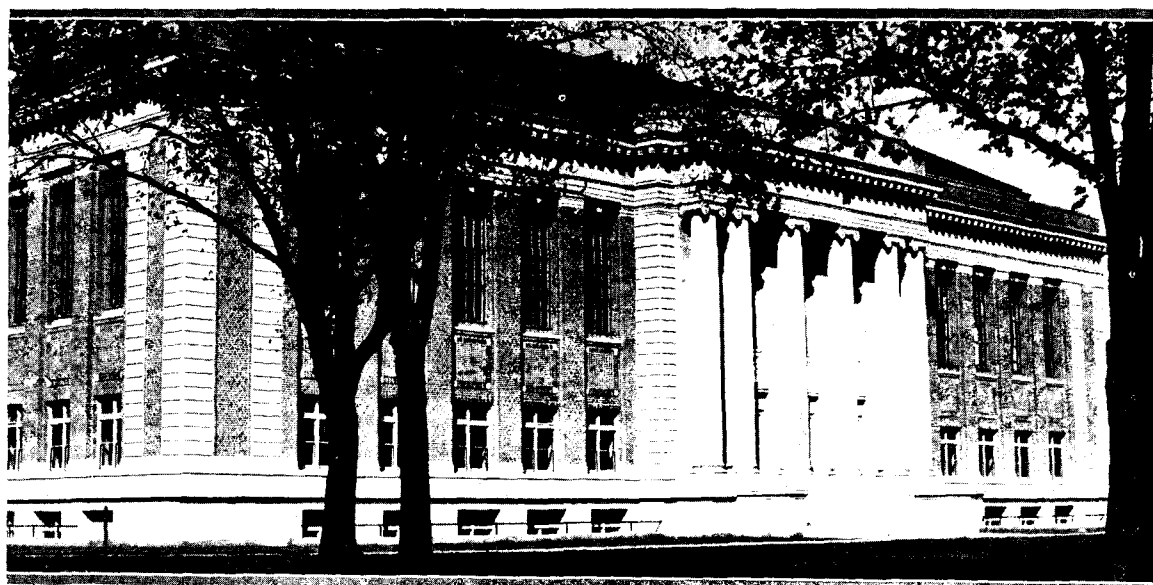
Books purchased in foreign countries are obtained either directly from dealers in those countries, who send catalogues, from the library's agent in the country in question, or through a general agent for foreign books with offices in New York. In ordering a book from a typical foreign country, the library expects to receive it at any time after four weeks have passed.

Ordering is somewhat complicated by the fact that books for educational institutions, such as the University of Minnesota, come in duty free. This makes it necessary for the

head of an order department, like Mr. Russell, to sign one affidavit if the order is a direct one, swearing that he is to keep the book at the institution, and two affidavits if the order is placed through an agent, the second one attesting that the University has actually received the book. This is as a safeguard against its remaining in the hands of the agent for public sale.

As an example of the world's book production in a given year may be given the complete figures for 1923, the last year for which all data have been compiled. The totals of books for that year are as follows: United States 8,600, Great Britain 10,800, France 9,432, Germany 35,859, Italy 6,336, Switzerland 1,419, Spain 1,096, Portugal 1,515, Norway 1,061, Sweden 2,693, Denmark 3,149, Holland 4,237. The United States ranks fourth and produces just about a tenth of the world's books, so it can be seen that there is nothing startling in the fact that the library purchases slightly more foreign than domestic books. Germany's figure is high because the Germans describe as "books" many items that other countries would not dignify by that term.

Quite recently the library has acquired a good many publications from the Far East and other distant places. Among these have been the



THE UNIVERSITY OF MINNESOTA LIBRARY

Transactions of the Royal Asiatic Society of Japan, the proceedings of the Bombay Natural History Society, a file of a Chinese newspaper, the North China Press, of a Japanese newspaper, the Japan Chronicle, reports from the Botanical Garden at Buitenzorg, Java and government reports from Paramaribo, in Suriname (Dutch New Guinea).

Valuable Works Got by Exchange

The libraries of educational institutions obtain their new items, referred to as acquisitions, in three ways,—by purchase, exchange and gift. In addition to the books and reports that are bought, a large number of acquisitions come through exchanges and gifts. The last named category, gifts, has been an increasingly productive source of new books at Minnesota in the past few years, and will increase still further in value as persons with valuable sets in their possession come to realize that these will mean more to the world at large and to scholars in particular if they are placed in a library for broad use than they possibly can if held in a small private library.

To handle the matter of exchanges there is a separate division of Mr. Russell's department, the exchange department, which is directed by Miss Bertha M. Hanson.

In every considerable nation of the world there are universities, colleges, museums, government agencies, learned societies, workers in observatories and the like, from all of which groups important scholarly works are constantly coming forth. It is the duty of the exchange department in the University of Minnesota Library to keep in touch with all such institutions, offer them copies of the results of research work published at Minnesota, and seek from them in return copies of such of their own reports as will be of use in the various fields of study and research here.

An idea of the extent of this work can be gained from Miss Hanson's statement that the University Library, besides subscribing to something like 1,800 periodicals of all sorts, maintains exchange relations with nearly 750 institutions of the kinds just enumerated. These relations are in three degrees, namely, institutions which get everything produced at

Minnesota and, in turn, send Minnesota everything they produce; second, institutions which obtain from Minnesota such of its publications as they want and send in return an approximately equivalent number of their own works, and third, institutions which receive the check list of Minnesota publications and purchase through the University of Minnesota Press those Minnesota publications that they find valuable. From these Minnesota obtains by purchase whatever they may publish that it deems valuable.

Typical of the universities with which Minnesota maintains an unrestricted system of exchange are the great American institutions of its own type, such as the Universities of Michigan, Chicago, Wisconsin and California.

In an impressive file Miss Hanson keeps cards of all the institutions in the world that are likely to want material from Minnesota or to produce material that Minnesota may want. Turning to this file one finds that the North of England Institute of Mining and Mechanical Engineers, situated at Newcastle upon Tyne, the famous center of the English shipbuilding industry, craves all publications of the Minnesota Geological Survey and the School of Mines Experiment Station Bulletin series. On a card somewhat farther along one comes on the fact that exactly the same publications are taken from Minnesota by the "Geological Committee" of Soviet Russia. Minnesota, on the other hand, has been the recipient lately of much valuable data on agriculture and forestry from the Institute for Agriculture and Forestry at Minsk, in White Russia.

Miss Hanson's work holds broad interest inasmuch as her department is a central contact point with the intellectual endeavor of the entire world. The amount of material acquired by exchange is great, and the distribution in return of Minnesota's scholarly publications carries the fame and spreads the influence of the University of Minnesota from Siberia to New Zealand and from Spitzbergen to Cape-town.

Language No Barrier to Scholars

Typical institutions with which Minnesota exchanges are the Natural History Museum in Buenos Aires, the National Library at Santiago,

capital city of the republic of Chile, with institutions in Esthonia, Finland and Czecho-Slovakia, with the National University of Greece, which has been unusually productive in recent years, with the state ministries and the Royal Academy at Rome and the National Library in Florence.

Much scholarly material is exchanged with Poland and Russia. From Perodeniya, Ceylon, important botanical publications of the Ceylon Department of Agriculture are received, and Japan sends a flood of important works in such subjects as engineering, mathematics and medicine. Others that might be mentioned are the Royal Society of South Australia, the Royal Society of Queensland, the Commonwealth Bureau of Census and Statistics at Melbourne, and reports from the Geological Society of South Africa and the Census and Statistics office, Union of South Africa. Jamaica is represented and exchange relations have been established recently with the Imperial College of Tropical Agriculture in Trinidad.

Books Gifts Gain in Numbers

Gifts by individuals to the University of Minnesota library as listed in the annual report

of President Coffman show a steady increase in number and importance to have taken place during the past few years. There has been, for instance, the collection of about 4,000 volumes of best literature in the Arthur Upson Memorial Room, a gift of many thousand important newspapers from the Minnesota Historical Society, the collection of material dealing with the subject of pediatrics, left to the University by the late Dr. J. P. Sedgwick and an important collection of philological writing turned over to the University during the past year by the Hertig family in Minneapolis. Professor F. K. Butters presented the library with an important collection of the volumes of the Curtis Botanical Magazine.

In the preceding year a gift of 30 volumes of the proceedings of the American Institute of Mining and Metallurgical Engineers was received from F. M. Warren and a total of 729 gifts from 143 sources were made to the library. Dr. John F. Downey, former dean of the Arts College and Alfred Owre, dean of the College of Dentistry are others mentioned as donors of books during 1923, when in all more than 2,000 volumes were received by gift.

The American Agricultural Situation

By Dr. John D. Black

Chief of the Division of Agricultural Economics, University of Minnesota

It wouldn't be in the least strange, would it, if many people had the notion these days that American agriculture was in a bad way? Agriculture has certainly had its share of knocking in the last five years. Think of all the "farm leaders" who have been proclaiming from every available rostrum that fuzzy dictum that "the farmers all these years and everywhere have been producing for less than the cost of production, and they are the only class of producers who keep on doing this, the reason for which is that they are the only class who have not been able to fix the price at which their products are sold". Think of our anxious political friends who have been telling us solemnly that the farmers of this country are headed straight toward peasantry--awful European peasantry with its low farm incomes and farm wages and rural standards of living--unless we vote the right ticket, or send the right representative to Congress. And of our "agricultural statesmen" who tell us with bated breath that the country stands at the turning point in its destiny, and the next few years will determine whether we are to be an agricultural or an industrial people, or that if we do not take the right steps, our agriculture will start subsidizing and presently will sink to third-rateness in the affairs of the nation. And, finally, think of those well-meaning souls who weep over "the depopulation of the country", the unceasing migration of people from farms to the city, due, of course, and necessary, to the awful conditions on the farm.

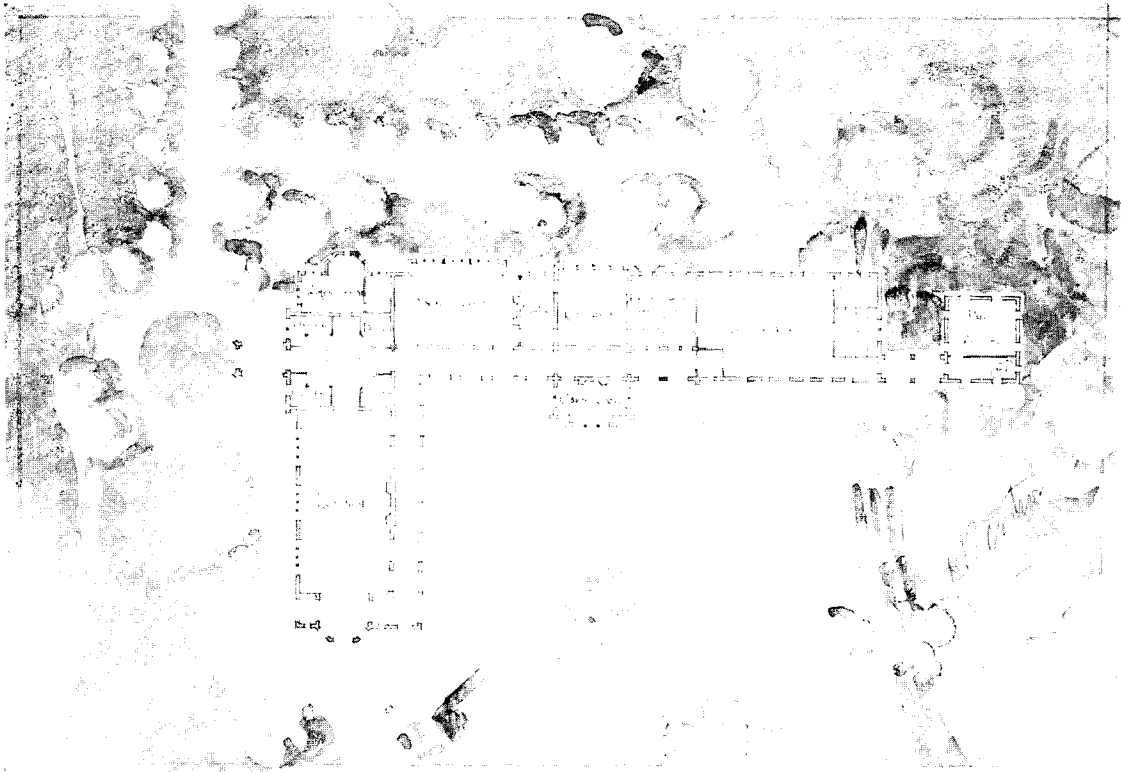
Woe, the Poor Husbandman

The picture is surely a sad one. Very fortunately, farm people themselves don't feel half so badly about it as their solicitous and somewhat distant friends. They have been having a hard time in the last five years, it is true; and they know it--far better than anybody else knows it. But they are not hopeless about the future. Back of them, taken as a class, are

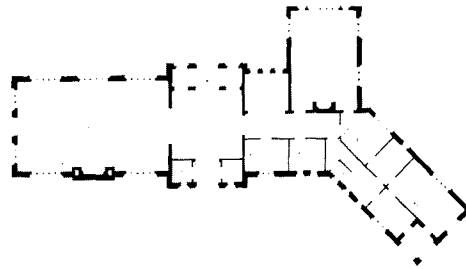
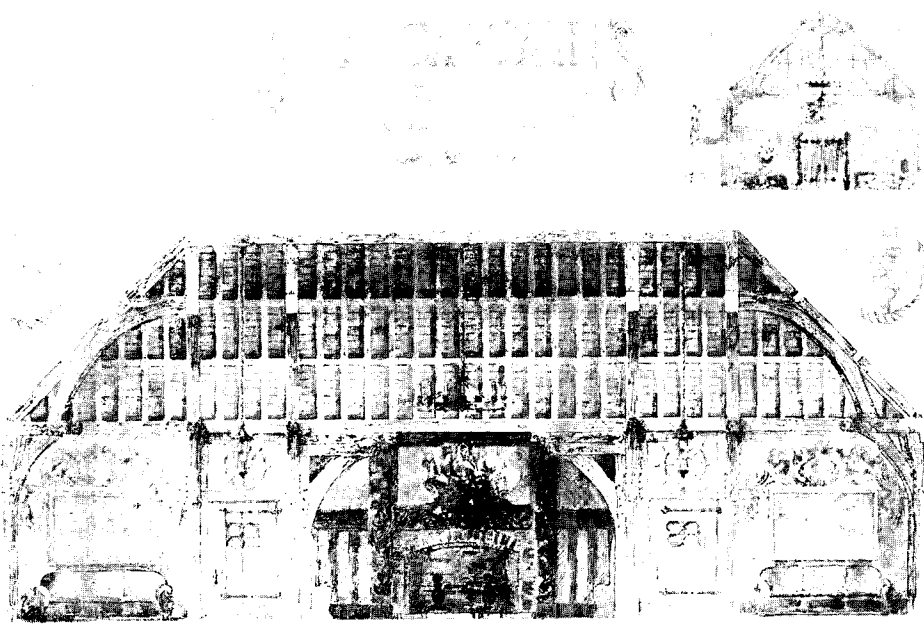
many generations of experience in farming. Agriculture always has come back in the past, and quickly, and they are expecting it to come back this time. Hence they are "sticking it out" in most cases. If the farming class ever really lost faith in its vocation at times like this, there would be a cityward migration such as the world has never seen. The ripe old wisdom of the masses is the greatest wisdom after all.

Somewhere about a hundred years ago Thomas Carlyle, I think it was, dubbed economics "the dismal science". The name still sticks to it--which is good proof that it must have fitted. And yet there are no prophets of the dismal science of economics who believe that agriculture will not come back. The most dismal of them believe that it will come back in the next ten or twenty years. Professor Warren of Cornell University in his recent book "The Agricultural Situation" takes this position. His principal reason for believing that it will take this long is experience following other wars in the United States and elsewhere. Other and more optimistic economists point to the fact that in the period between 1896 and 1913, prices of farm products rose twice as much as prices of other products, and argue that this was caused by the growing scarcity of good farm land in the United States and in the world at large. They therefore expect this influence to assert itself presently again. They even think, some of them, that it partly explains the higher prices of last year and this year. The judgment of persons of this school of thought is that within four or five years at the most, prices of farm products will be definitely above the price level. Unfortunately, there is no way of deciding which group is right. We do not have the information needed upon which to base such a conclusion. The data of past experience are not complete enough to permit the necessary analysis. Any statement given on the point is certain to be mostly a matter of opinion. But

Student Designs in Architecture



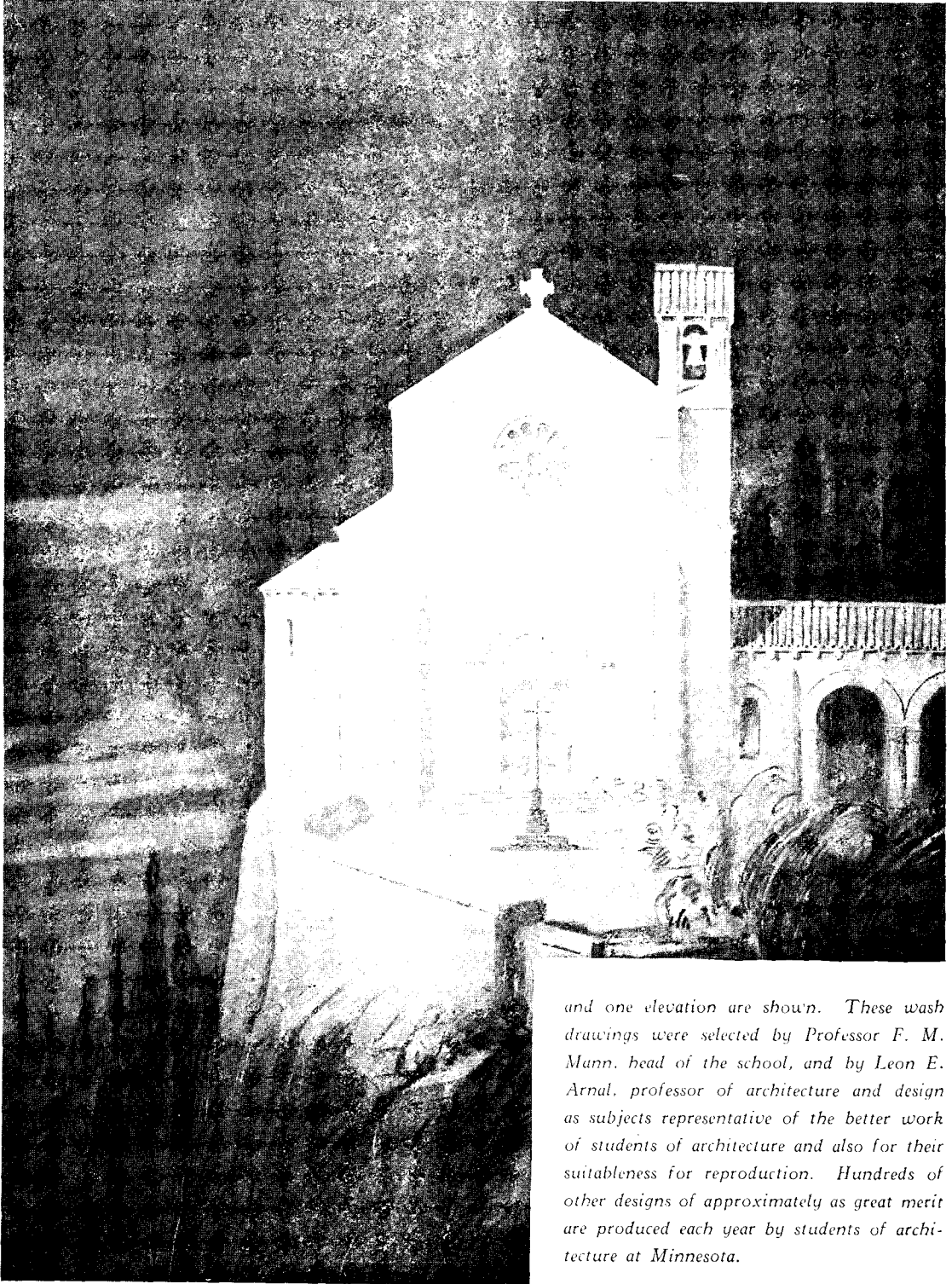
Student Designs in Architecture



EXAMPLES of the splendid work done by students of design in the classes of the School of Architecture at the University of Minnesota are reproduced this month on the four central pages of Minnesota Chats. They are, in order, designs for a country club and grounds, a home for a yacht club, a chapel on a promontory, and for an exhibition building, of which the floor plan

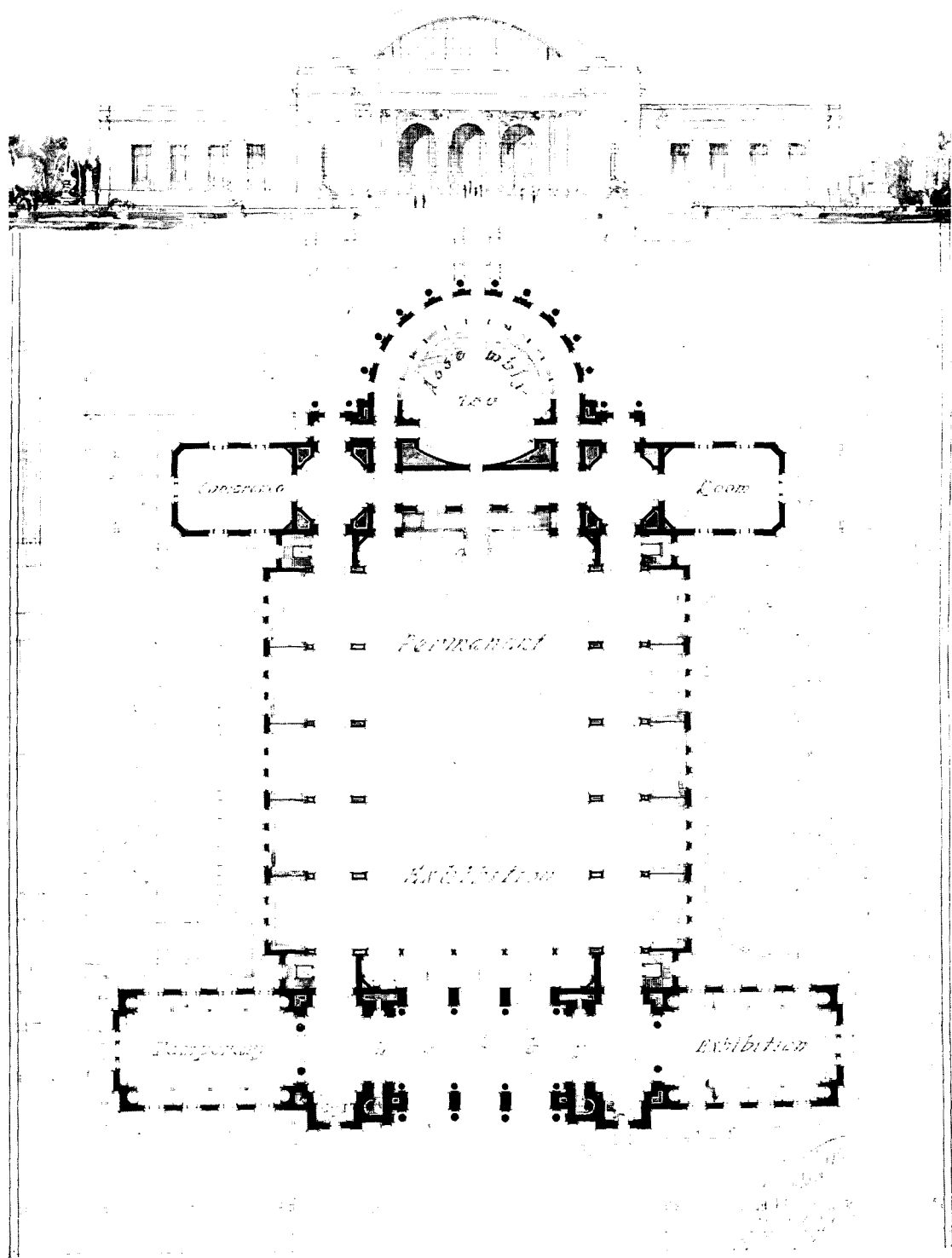


Student Designs in Architecture



and one elevation are shown. These wash drawings were selected by Professor F. M. Munn, head of the school, and by Leon E. Arnal, professor of architecture and design as subjects representative of the better work of students of architecture and also for their suitability for reproduction. Hundreds of other designs of approximately as great merit are produced each year by students of architecture at Minnesota.

Student Designs in Architecture



is it not highly significant that no group of economists, no matter how dismal, expects to see the agriculture of the United States depressed for very long? All of them, in fact, look forward to a period of prosperity for our agriculture such as it has never experienced before. The only difference is in the matter of how soon it will come. Probably the safest procedure in such a case is to split the difference between the two extreme positions and say that probably sometime within the next ten years the purchasing power of farm products will be above the pre-war level.

Couldn't Be Peasants if We Tried

Now about this "peasant" business. We aren't going to have any peasant agriculture in the United States. There isn't any country in the world that has a peasant agriculture that doesn't also have a class of workers in the cities that is no better off—and is frequently worse off. So-called peasant conditions in the country are merely the rural counterpart of low wages and low standards of living among city workers. Peasant agriculture means small farms, hand labor, and low incomes. As long as our farmers can keep their 80's and 120's and 160's, we need have no worry about their sinking to peasantry. As long as wages in cities remain from \$3 to \$5 per day for factory labor, and carpenters and plasterers earn a dollar an hour, we need not worry about farmers having to reduce their acres.

Large numbers of persons are leaving the country for the city all of the time. This is very much as it should be. If all the boys and girls growing up in the country should stay there, we would have to split our farms in two almost once each generation, which would be the surest way in the world to make peasants of our farmers; or else about half of them would have to remain farm laborers, which would be the best arrangement possible for reducing farm people's incomes. Hence a strong cityward drift is the healthiest sign possible of a progressive agriculture for the years just ahead.

There has been a bigger cityward movement than usual the past three years. This reflects

two things especially: a retreating of the over-expansion of the war years, and labor-saving on the farm, made necessary by the low prices of farm products. But this is nothing to worry over. It is just exactly what is needed—and it hasn't gone far enough yet. I think that in the future our agriculture will intensify, but that we will still use farm machinery; that we will probably use more farm machinery than we are now using. A little additional hand labor, aided by machinery, more fertilizer, and more good management, can greatly increase the output from an acre, and this is what I am expecting to happen. Farms will become smaller, but never so small that we will not farm with machinery. To illustrate what I have in mind, let us take the case of dairy farming. By means of silos and corn silage, supplemented by alfalfa and other clovers, an 80-acre farm can be made to support many more cows than it probably does at present, perhaps twice as many. This means more intensive agriculture. It means more output per acre. But it can be done with machinery as at present. The larger herds of cows will even make a milking machine a profitable investment. I am expecting more land to be planted to crops, and more intensive crops to be substituted for less intensive crops, and all crops to be better cared for, and more livestock to be kept, and all of this will take more labor; but the fertilizer and the machinery may be increased as rapidly as the labor, or nearly so. All this means that the per capita output of persons engaged in agriculture will not be decreased as the decades go by, but will probably be more than maintained. The American standard of living not only will be maintained, but in my judgment will be raised. If the standard of living on our farms is below that of the cities at present, this condition will not continue—in fact the situation will likely be reversed in the next fifty years. The automobile which came to our farmers generally in the period from 1910 to 1920 will prove to be but a beginning. It will be followed by better houses, better heating, and better lighting, and more kitchen conveniences. I hope it will also be followed by better schools, and more recreation and leisure.

Will Reorganize Country Life

We must also look forward to a considerable reorganization of rural life. The isolated country store, country creamery, country church, and even country schoolhouse, is rather generally doomed. Country life is going to be reorganized in larger units centered around cities and villages. The small isolated villages will pass away, and the larger village will grow enough to take their places. All this will mean better schools and better churches and better stores than we now have. The church in the open country and the schoolhouse in the cornfield, will become the church and the schoolhouse of the country village and city. It will be well for us to accept this change at once and fall in line with it.

You ask me about the immediate situation. In October, the U. S. Department of Agriculture thought that this year's crop would sell for as much as last year's crop. There have been important price recessions since. It seems that the prediction will hardly be fulfilled. Several crops are too large—oats, barley, corn, etc.—so large that some of them will sell for less money in the aggregate than the smaller crops of a year ago. But fortunately most of these are feed crops, and livestock and livestock products are higher than they were last year.

It is significant in this connection that the index of purchasing power of farm products has dropped from 93 to 87 since last August. The slump in prices of farm products has been accompanied by a rise in prices of other products.

The important thing, however, is that we have had two fairly good years. As a result the farmers in many sections are almost on their feet again. Even though we have somewhat worse times in the next two or three years than in the past two, as is likely to be the case, agriculture will not be badly off. Agriculture is not likely in the near future to be as prosperous relative to other industries as it was just before the war, but except for occasional crop failures, or large crop surpluses, it will do fairly well. A large majority of farmers will be able to meet their interest and tax payments, and

even to make some payments on their mortgages. They will also be able to repair their buildings, and replace worn-out machinery; but only gradually. New buildings will generally have to wait for a while; and no doubt local road-building and the like should proceed rather slowly. The building of the new schoolhouse and the new creamery ought to be postponed for a few years in most cases.

The fact of the matter is that agriculture is still somewhat overexpanded. The world's wheat acreage is still up, and our growers promise to increase their acreage again next year. Our cotton acreage was the highest in history this year. It appears that we shall have to wait until the world's food consumption catches up with the food production again.

Try More Garden and Less Field

In the meantime, a safe rule of procedure for any farm is "More for the family and less for the market." A little labor taken away from producing large crops to glut the market, and a little more spent on growing a better garden, will help tremendously. The family living can be improved a whole lot with very little expenditure of money if the family will only be content to grow a very little less corn and wheat. The money saved on grocery bills will amount to more than the net profits on extra wheat and corn. Furthermore, the extra wheat and corn would only depress the prices of an already over-stocked market. The members of the horticultural society have an opportunity for great service here. They are the ones to boost for a good old fashioned family garden with all kinds of vegetables, small fruits, and orchard fruits.

And lest I be misunderstood, let me explain in conclusion that I am not pleading for national self-sufficiency—that is, growing nothing for export and everything for domestic use. National self-sufficiency is a false lead. If we can grow cotton and pork better than any other country, let us grow them and export them. That is good sense as well as good economics. What I am pleading for is more individual farm self-sufficiency for the time being.

Furnace, Brakes, Boilers---or What Have You?

Engineering Station Gets Facts for the Public

EXPERIMENT should be almost a sacred word in the language. This is particularly true of the word as it is used in universities. Demagogues, when they say experiment, mean throwing the old aside unceremoniously and trusting to luck that the new will serve better. Scientists, in experiments, work to develop something new that shall be so much better than the old that it will automatically replace that which will so soon be found less satisfactory. They do not deride nor discard the old until they have built something better and proved that it is better.

Experiment represents the difference between a tow-path and a concrete surfaced state highway.

Experiment represents the difference between a yoke of oxen and an electric locomotive, or between a cave and a mansion.

Mankind also conducts experiments in the spiritual as well as the material realm, as a result of which he moves forward more or less steadily from savagery to something better. The line of his progress may waver and dip, but progress is made.

At the University of Minnesota experiments in many fields of knowledge are being carried on continually, and the institution has at least three divisions that are specifically named experiment stations. These are the Agricultural Experiment Station, the Mines Experiment Station, and the Engineering Experiment Laboratories. Though all three are of outstanding interest and value, less is heard about the last, the Engineering Experiment Laboratories, than about the others.

Yet this department is well enough known so that it receives an average of eight or ten letters a day all asking one of the many questions for which people are always seeking an answer from specialists, or to use an over-worked word, experts.

"What mixture in concrete will set best in cold weather?" "What kind of insulating ma-

terial will serve best to keep the heat inside my home in cold weather and outside it in summer?" "What paint shall be used on radiators to give the fullest benefit of the heating system?" "What type of automobile radiator is most effective?" "Are oil burners better than coal burners?" "Are heating systems that burn illuminating gas better than either of the others?"

These are all actual questions, more or less typical of the thousands that come every year to Professor F. B. Rowley, director of the Engineering Experiment Laboratories, to be answered either by him or by one of the other staff members to whom they may be referred. Answering the questions is in itself incidental. The important thing is that such a group of men is at all times at work obtaining the answers to new questions and making new determinations of truth. Already many of the station's discoveries are in use throughout the length and breadth of the state.

How to Put on Storm Windows

An experiment now going on under Professor Rowley's direction which should interest every person living where winters are cold is to determine the spacing between a window and the corresponding storm window which will give the greatest protection against loss of heat. It sounds like a minor matter, but in terms of percentage of fuel saved may point the way to important savings in the Northwest's fuel bill if the advice is followed. This experiment is still going on and here it can be only referred to. In general, however, the experimenters are finding that storm-sash are usually set too far away from the inner window. The low point of heat loss in work done up to now was located at a space of $\frac{3}{4}$ inch between window and storm window.

After concluding their experiments with window spacing they will go ahead with a study of other air spaces as they affect heat saving or loss. For example, they will deter-

mine the insulating value of the hollow spaces in tile and the measurement of the spaces which most effectively keep in the heat in winter and keep it out in summer.

Another recently conducted experiment of more than average interest had to do with the use of brake linings on street car brakes. Heretofore street car brake shoes have been "lined" with metal, which has squeaked terrifically when sudden braking force was applied. In an effort to reduce at least by one the number of noises that harass the poor city dweller, the Minneapolis Street Railway Company has been installing on some of its cars brakes with linings of the same type of material that is used

a few seconds at a time this statement seems astounding. Under actual conditions no brake lining could be used continuously for that long as it would heat and burn out. To prevent this the laboratory men fixed up a system of water cooling which held the temperature below the burning point. They also rigged up equipment that measured the amount of the power input and the load applied to the brakes. With these figures known they were able to reduce to figures the relative merits of several types of lining.

Public Asks About Its Hobbies

Inquiries received at the Engineering Experiment Laboratories indicate that there is usually



on automobiles. The lining is, of course, thicker and stronger than that used on automobiles, but it is otherwise much the same. These linings make the brakes practically noiseless. A number are now in use on Twin City Lines.

In conducting experiments to determine which type of brake lining would stand up against the weight of a heavy modern streetcar the Experiment Station workers found linings that would stand the equivalent of 40 hours of continuous braking. When one considers that the ordinary automobile brake is seldom under pressure for more than



Above: The Engineering Experiment Building, and (below) Dean O. M. Leland of the College of Engineering and Architecture.

some one type of machine that is commanding most public interest. For many years the tractor was the machine that led all others in interest among Northwest mechanics, business-men and investors. Then, as that industry became stabilized and as competition reduced the number of factories, interest shifted suddenly to the oil-burning type of home heating plant. For the past two years interest in oil burners has surpassed everything else as far as inquiries went. This year, however, it has dropped off sharply, and as yet no new public hobby has taken its place.

Professor Rowley predicts that if the price of ordinary illuminating gas can ever be got down to the neighborhood of 60 cents per thousand cubic feet it will become the most popular type of fuel for home and building heating. At that price, he says, it would have certain advantages, such as ease of delivery and constant heating values, that would give it great popularity.

Experiments have shown that the average efficiency of an oil burner in the University laboratories is about 70 per cent, while that of a coal burner is only about 60 per cent. These are the results obtained under laboratory conditions, which naturally are the best. Under ordinary or poor conditions oil efficiency is lower and the efficiency of coal burning equipment drops to the point where as little as 30 or 40 per cent of the heat units in the coal may actually be utilized.

Better Coal Combustion Needed

They have also proved that not all of the so-called loss is an actual loss. For example, a heating plant is sure to radiate some heat in the basement where it is located. This is not a true loss, for it heats a part of the house—the basement—and helps keep the floors warm. Also, about $2\frac{1}{2}$ per cent of the heat in the furnace fire is radiated into the basement floor through the ash-pit. This can not be blamed against the efficiency of the heating plant.

In the case of an oil burner, the true loss or the heat that goes up the chimney stack and wanders off into the great outdoors, amounts to about $21\frac{1}{2}$ per cent under good combustion. In furnaces of some types the gas that escapes up the chimney carries a temperature of 800 to 1,000 degrees, which is far too great a loss of heat units. Such escaping gas should be held as low in temperature as 600 degrees in truly efficient plants.

Studies conducted about a year ago in the efficiency of various types of material for insulating buildings, have been summarized in published form in the following statement:

"This work has been confined to the insulating properties of building materials and while the work and discussion has been along the lines of preventing heat losses from buildings

in cold weather, there are advantages to be gained in warm weather. A well insulated building is much cooler and more comfortable in warm weather than one which is not insulated, although the direct saving cannot be as readily calculated. No work has been attempted to determine the structural properties of the materials but it is recognized that several of the materials tested add greatly to the strength of the building.

"Some of the materials which may be used as a plaster base may be substituted for the sheathing as generally used. When so substituted a well insulated wall is obtained at a reduced expense over that which would be required for sheathing and metal lath. If a sheathing is required and but one thickness of insulation is to be used, the most effective method is to apply between the studding as this breaks up the air space. The amount of insulation which should be applied depends upon the money available for the construction.

"In all cases of house construction, some sort of insulation should be employed, one thickness making a fairly warm wall. In cases where it is permissible to substitute insulating materials in place of sheathing, a second thickness between the studding makes an excellent wall. The average insulating materials as now used is one half inch thick."

Station Was Built in 1911

The building which houses the Experimental Engineering Laboratories was erected in 1911. It stands directly behind the main engineering building. It is used by all engineering departments except electrical, the department of electrical engineering having moved into a new building of its own about a year ago. Even the "electricals," however, still do their heat engine and mechanical work in this laboratory. In all the building is used in the course of a year by between 600 and 700 students of engineering, among them the senior chemical engineers, senior and junior mining engineers, the mechanical engineers and the civil engineers.

Work is now under way on an addition to the laboratory building, to cost about \$70,000, which will house the highway engineering laboratory of the department of civil engineering,

and will also be used as headquarters of the tests and inspection department of the Minnesota State Highway Department.

From the beginning of unified state highway control in Minnesota, the tests and inspection work has been conducted by Professor F. C. Lang, who gives part of his time to teaching at the University of Minnesota and part to overseeing the tests and inspection work of the State Highway Department. This department examines and approves all the material that is to be used in highway work, including cement, steel, crushed rock and the like. It also inspects the job as it progresses, and is equipped with machines with which it can go out after a concrete road has been built and bite out a core through the bed of cement to be inspected and approved or criticised.

Besides these cores the inspection department receives casts of the road concrete in the form of cylinders 12 inches high and six broad. These are examined and tested in pressure machines to see whether they conform to the strength specifications which are laid down in all road contracts.

In the course of such work there are many valuable lessons to be learned, and the policy of carrying it on upon the University campus gives students of highway engineering the opportunity to study such operations under actual working conditions. Contact with the practical work also serves to keep the instructors' knowledge fresh and up-to-date, a requirement that can not be overlooked in professional courses.

When Professor Lang first began his joint duties for the State Highway Department and the University his work was carried on in the Engineering Experiment Laboratories, but the work grew so swiftly that it crowded itself out. For the past year or two it has been carried on in a nearby rented building. Completion of the building now under way will bring it back to the campus. This is part of

the department of civil engineering, of which Professor Frederic Bass is the head.

Equipment Is for Use, Not Show

A visitor who entered the Laboratory building of the College of Engineering might think for a moment that he was in a "machinery hall" or attending an exhibition of some kind. The large room is full of engines and machines of various kinds. But these things are not there merely to be seen. They are to be used. Here he will see a group of students in instructors gathered around a Diesel engine, which is being operated and explained. Elsewhere a steam turbine or one of the common types of steam engine will be the center of a group's attention, while another class will be conducting tests or measurements of some kind at the point where a stream of water is flowing out of a weir channel set up for the benefit of the students of hydraulics.

One can find almost anything in this interesting building. Downstairs in the basement there is, for example, a "cold room" inside of which almost any reasonable temperature can be maintained summer or winter for tests of the effect of cold on materials. Or a side of the cold room may be utilized as "outdoors" in tests on heat transmission, with apparatus erected beside it to give the temperature of "indoors" or any other temperature to the other side of the board or material of which the conductivity is to be tested. There are machines for testing the strain at which materials break or pull apart, there are rock crushers, concrete mixers, an airplane engine, various types of automobile engines, two and four cylinder gas engines, low compression oil engines and—others things. Yet all this is anything but a collection. It is the material with which the engineers of tomorrow are receiving some of their most practical training. These are the wheels that "go 'round" and they are the boys that make them do so, just as they must continue to do later when they are up against the justly celebrated real thing.

Life of President Northrop Offered to the Public

The University of Minnesota Establishes a "Press"

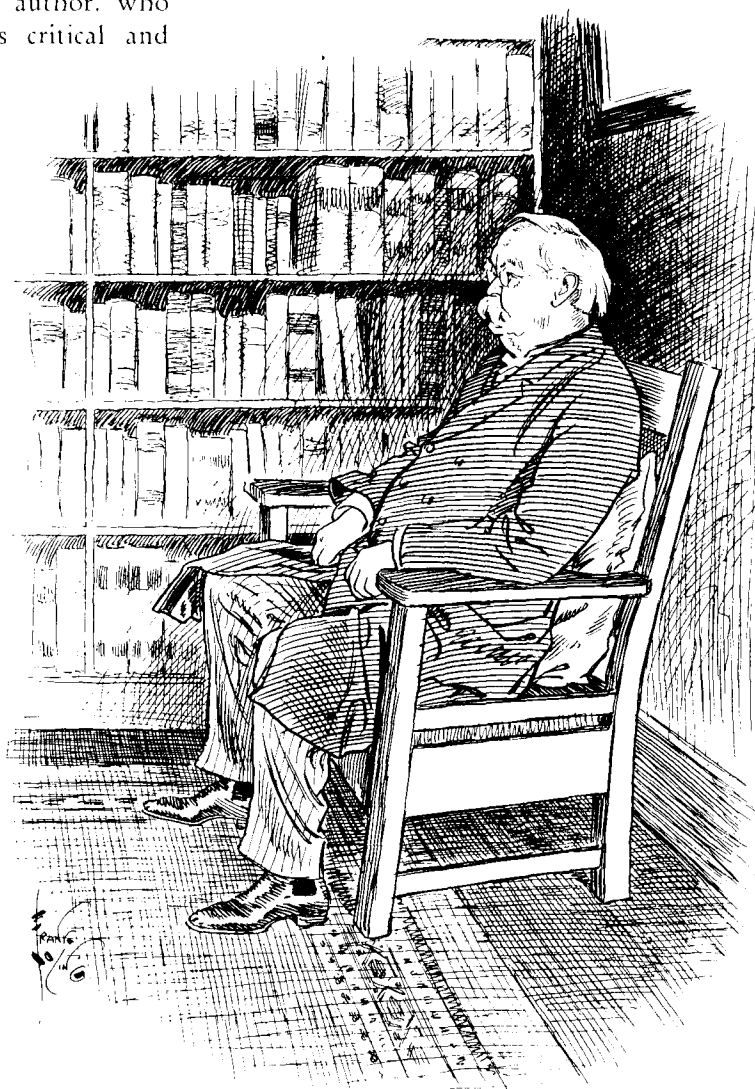
THE record of a life which has long interested many thousands of Minnesotans has been brought to completion by the University of Minnesota with the publication of "Cyrus Northrop: A Memoir", written by Professor Oscar W. Firkins and published by the University of Minnesota Press.

Besides its value as the record of a man so long prominent in the state, this book gains importance from the skill of its author, who is nationally recognized for his critical and scholarly ability. Professor Firkins' books on Emerson, Howells and Jane Austen have brought him fame, which has been supplemented by his critical writings on poetry and plays and by his lectures at the University.

Hardly less interesting is the fact that this is the first book actually published by the long-contemplated University of Minnesota Press, an organization for book publishing which the Board of Regents sanctioned last summer and which has been set in motion through the appointment by President L. D. Coffman of a Press committee, headed by Dean Guy Stanton Ford of the Graduate School. The Press is a publishing organization for the publication and sale of scholarly works produced at Minnesota. It will assume charge of all publications which the institution offers for sale, but not of those put forth for free distribution.

President Coffman's idea, heartily supported by Dean Ford, is that Minnesota has reached a period of such great

productivity in scholarly and research works that it should be able to develop a flourishing publishing department, such as those now maintained by Chicago, Columbia, Harvard, Yale, and California, to name a few of the more prominent university presses of the United States. Each year several Minnesota faculty members submit important books for publication by other university presses or by commer-



President Northrop—An Informal Study

cial publishing houses. It is the president's belief that, as the prestige of the Minnesota establishment grows and as its sales organization becomes perfected, many of these authors will offer their output to the University of Minnesota Press.

The book describing the life of Dr. Northrop has already attained a considerable popularity, and sales have been exceeding expectations, partly, no doubt, because of the relatively low price of \$4. at which it is being offered to the public. The volume is one of 630 pages, attractively bound. It contains a variety of excellent pictures of the late Dr. Northrop, as well as of members of his family.

The author spent nearly an entire year gathering the material. During that time he visited the old Northrop home in Connecticut and studied the period of Dr. Northrop's Yale professorship. Few realize that he had spent almost a lifetime as a professor at Yale before he ever came to Minnesota and that he was more than 50 years of age when he first ventured into the west to cast his lot with the young state institution in Minneapolis.

How the Book Is Being Sold

Partly because of its memorial character, "Cyrus Northrop: A Memoir" was first offered for sale at \$3.50 plus postage, but it has been found desirable to increase the price to \$4. plus postage. At that figure it is still somewhat below the price at which a corresponding book would ordinarily be sold. The mailing charge is 20 cents to points inside Minnesota, elsewhere 40 cents.

In line with its purpose, the University of Minnesota Press has assumed the sale of a large number of scholarly and practical works put out in years past by the University and sold, heretofore, on differing bases.

Of these the most interesting probably is the series of studies by the Minnesota Geological Survey. The series reached a high water mark in popular interest last spring when the director, Professor W. H. Emmons, published Bulletin 20 in the series, an inclusive report of practically all the natural phenomena to be witnessed over the entire length of State Highway No. 1, which runs from the Iowa boundary to the international border on the north shore of Lake Superior. The "Guidebook to Highway No. 1" was written by Professor George M. Schwartz, with a chapter on the trees, plants and flowers of the route, by Professors F. K. Butters and C. O. Rosendahl of the University's department of botany, and one on fish and game along the route, written by Dr. Thaddeus Surber of the Minnesota Department of Conservation.

Highway Bulletin Is Fascinating

Dr. Emmons reports that sales of the Guidebook to Highway No. 1 have been small by comparison with its rather unusual interest and value, for it is no exaggeration to say that a trip over this most famous of Minnesota motor roads would be increased in value 75 to 100 per cent by the descriptions of geology, communities, plants, animals, fish and natural wonders that are contained in the bulletin.

The sale price is 50 cents, postage paid. Orders may be sent to the Librarian's office, University of Minnesota.

Mail orders for "Cyrus Northrop: A Memoir", with check included at \$4. plus postage, should be sent to the University of Minnesota Press, temporarily situated at 216 Administration Building, Main Campus, Minneapolis.

Check lists of various series of University of Minnesota publications may be obtained by addressing the office of the University librarian.