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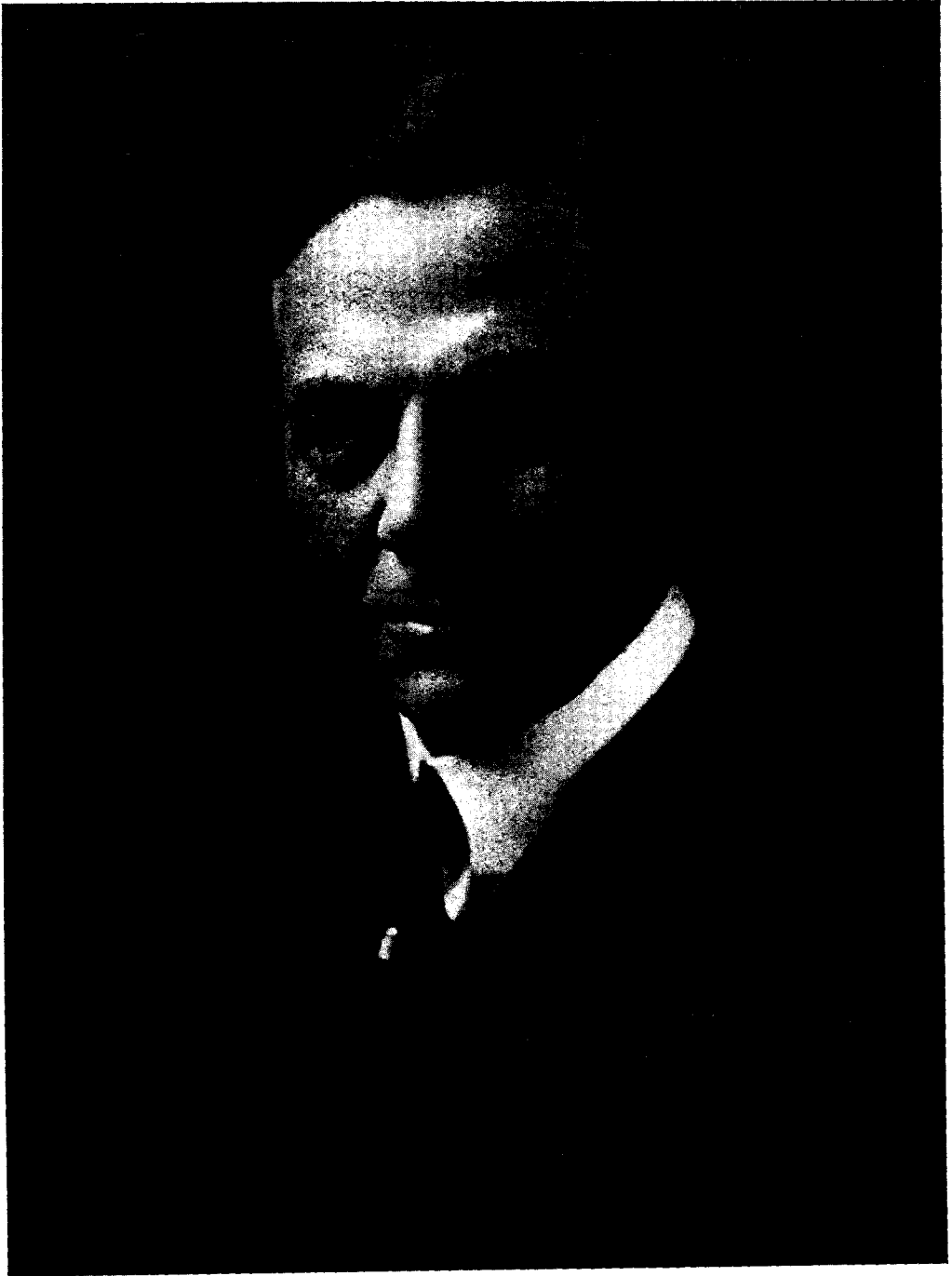
February, 1927

MINNESOTA CHATS



For a Better
Minnesota

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PRESIDENT L. D. COFFMAN

The Price of Democratic Education

Modern University Struggles Against Intolerance and Minority Dictation

By President L. D. Coffman

MINNESOTA CHATS reprints herewith the introductory portion of the annual report of President L. D. Coffman to the Board of Regents of the University. In it he points out the more pressing of the immediate problems of university administration and describes some of the progressive steps Minnesota has been taking during the past year.

GENTLEMEN: I have the honor to submit herewith my report including the reports of the various administrative officers of the University, for the year 1925-26. This report which deals largely with programs, policies, and achievements of the University during the year, does not reveal fully the major problem of the University. This problem is one which grows out of numbers. During the biennium the registration at the University has increased over 2,700. At the close of the current year there had been 14,410 students of collegiate grade registered in the University. An increase of 2,700 in a biennium is astonishing. It brings us face to face not only with the question of support, but with many difficult problems of administration.

During the current biennium some of the additional income from fees which the University has received by virtue of this increase in students has been used to purchase equipment, to erect buildings, and to expand the campus. By the close of the biennium all the remainder will have been put into salaries of the faculty. All of these things, that is the enlargement and improvement of the staff, the continuation of the building program, the purchase of equipment, and the expansion of the campus, must go forward simultaneously if the University is to serve its student body to the best advantage.

The amount of money which the University receives from tuition fees from the students does not pay the cost of education. It is now costing for teachers' salaries and educational supplies, \$137 per student per year in the College of Science, Literature, and the Arts, while the tuition fees collected from the students in that

college amount to \$60 per student per year. A similar situation exists in the other colleges of the University. This means that the University could not maintain its educational standard and move forward without additional support in the form of gifts, or from the state, or both. The coming of 2,700 new students requires an increase in the administrative staff, additional teachers, additional equipment, more classrooms, and, of course, complicates the number of existing administrative problems and raises many new ones.

The University has raised its standard of scholarship, it checks the abilities and attainments of the students more accurately than ever before, and it eliminates those who are unfit, or unable, or unwilling to do college work more quickly than heretofore. But this does not solve the major problem, for the reason that the percentage of students unable to do satisfactory college work is not nearly so large as many suspect. Those who cannot or will not do satisfactory work, however, are soon sent home from the University. We do not believe that we are serving the state as we should by sending those home who are able to profit by a college education and who attend with reasonable diligence to their studies.

The Problem of Size

There are more persons who fear that educational institutions may become too large. Not infrequently am I asked the question, "How large can the University be?" My answer is that if an institution of higher learning has a hundred students in it, and the staff are incompetent, it is too large. If it has a

hundred students with a very competent staff who have no interest in the personal welfare of the students, it is still too large. But if it has 20,000 students with a competent staff who are interested in the personal and individual welfare of the students, it is not too large. In other words, an institution is not to be measured by its size, but by the competency of its instruction, and the attitude of the institution toward the welfare of the students. Our aim should be to secure as competent instructors as it is humanly possible for us to secure, to provide them with favorable conditions for instruction, and to develop the attitude of interest in the students at all times.

The University of Minnesota has accomplished much in recent years in the organization of its system of advice for the students. With its Freshman Week, the system of psychological testing, physical examinations, the freshman dean, a social director in the office of the dean of women, vocational adviser, a personnel department which gives attention to special cases, orientation courses, and the upper classmen's advisory system, all working in harmony and with a given end in view, I am certain there never was a time in the history of the University when more attention was given to the welfare of the individual student than now.

We are trying at all times at the University to remember that its primary purpose is to promote learning; that everything about the institution should be thought of in terms of its contribution to learning; that all of the student activities are only accessories to the chief purpose of the students; that the faculty are not here primarily to make rules, devise systems of organization and administration, invent new methods of bookkeeping, set entrance requirements, or engage in any other extra-instructional activities. We appreciate the fact that these things may be so overemphasized by students or the faculty, or both, as to become ends in themselves. Whenever either faculty or students lose sight even for a moment of the basic reason for the existence of the University, learning suffers.

Education Not Only Intellectual

As one studies the problems of education he becomes more and more conscious that intel-

lectual training, certainly in this generation, is not the sole aim of education. Knowledge, when pursued for its own sake, may be a source of personal pleasure, but it is of no great practical value; when pursued as an intellectual exercise without reference to its social utility or to the obligations that accompany its acquisition, it is futile. Knowledge training, whatever the field, is presumed to provide a liberal and social type of mind. The college bred man presumably should be more tolerant, more open-minded, than the man who has not enjoyed college training. He should be more interested in everything. He should be more willing to hear every side of every question. He should be less controlled by prejudices and biases. He should have a more sensitive social conscience than the man who has not gone to college.

I often wonder whether we are realizing these aims to the extent that we should, for education works against heavy odds in its efforts to insure magnanimity and catholicity among its disciples. Historically and traditionally it has emphasized class education and has been controlled usually by the prevailing political theory. Even with the establishment of popular education in this country, we have not been able to free ourselves entirely from the conception of traditional control. Then, with the development of a powerful industrialism there has been an increasing demand, still growing more insistent, that the schools somehow or other, shall train for profit. Again, there is the demand of special groups who maintain that the schools shall be used to promote the species of reforms which they advocate. And finally, there is that innate quality of human selfishness, which expresses itself sometimes in opinionated, ignorant leadership and at other times in unthinking opposition, which seeks to bend education to its will. Every time one of these forces secures a new control over education, the schools to some extent, suffer or lose. They are no longer free agents engaged in the high calling of educating a generation to think freely, fairly, and sympathetically, and to act considerately in the interest of the common good. The schools should never become the creature of any particular group, the victims of any political doctrine, nor the servants of an industrial order. They should never be denied the

privilege of considering every phase of every important question or problem that relates to human welfare, and they should never become the abiding place of intolerance. They cannot operate in the interest of public good under duress of any kind.

Must Permit Youth to Learn

It is of little consequence whether a given teacher is permitted to teach freely what he desires to inculcate. It is a matter of genuine concern whether the youth of a democracy shall be permitted to learn freely on all subjects which affect their welfare as human beings and as citizens of a free country. It is of small moment whether a particular professional school trains its students with a view to increasing professional fees. It is a matter of extreme importance whether the graduates of professional schools generally shall recognize that their primary mission is to improve the ways of securing justice, of healing the sick, of instructing the youth, or of raising the ethics of business.

It is a matter of local concern whether a given class or group seeks to control the educational policy of an educational institution so as to make it serve partisan interest. It is a matter of vital concern whether the interests of that group are consonant with public interests and public welfare.

It makes little difference that an individual, a newspaper, a group here and there is able so to control the policies and programs of the University as to require it to teach certain things and to omit others. It makes a vast difference whether a generation is to be reared incompetent to read, study, and decide the questions of life and con-

duct free from the exercise of some kind of automatic control.

The Price of Education

These are the things which constitute the true price of democratic education. This price is the hardest to bear, the most difficult the social order has to pay, for against it are arrayed an old order and a multitude of fixed opinions. One has only to look to the fields of politics, religion, economics, and sociology, for abundant current evidence of the intolerance of present opinion. It is highly important, therefore, that from time to time higher institutions of learning conscientiously rededicate themselves to the service they are expected to render to a democratic society. With the presence of so much intolerance in the world, it is difficult for a university to hold fast to these fundamental principles. Pressure to deviate from a constituted course comes from every possible source. If we are to be intolerant against anything, it should be against intolerance. On the other hand, tolerance should never become a cloak to conceal shams, fakes, hypocrisies, or false reasons. The badge of scholarship, whether it be a degree, election to an honor society, or a prize, should be the badge of generous impulses, of fair-mindedness, and of a willingness to reach conclusions in terms of successful experience. It should carry with it an obligation to keep the universities what they were ordained to be—intellectual republics which search unceasingly for the truth and faithfully present it, where every important question receives a fair hearing and thoro consideration before a tribunal of unprejudiced minds.

Minnesota Geologists Find Opportunity Widespread

Many Pursue the Search for Oil, Metals, or Scientific Discovery Abroad

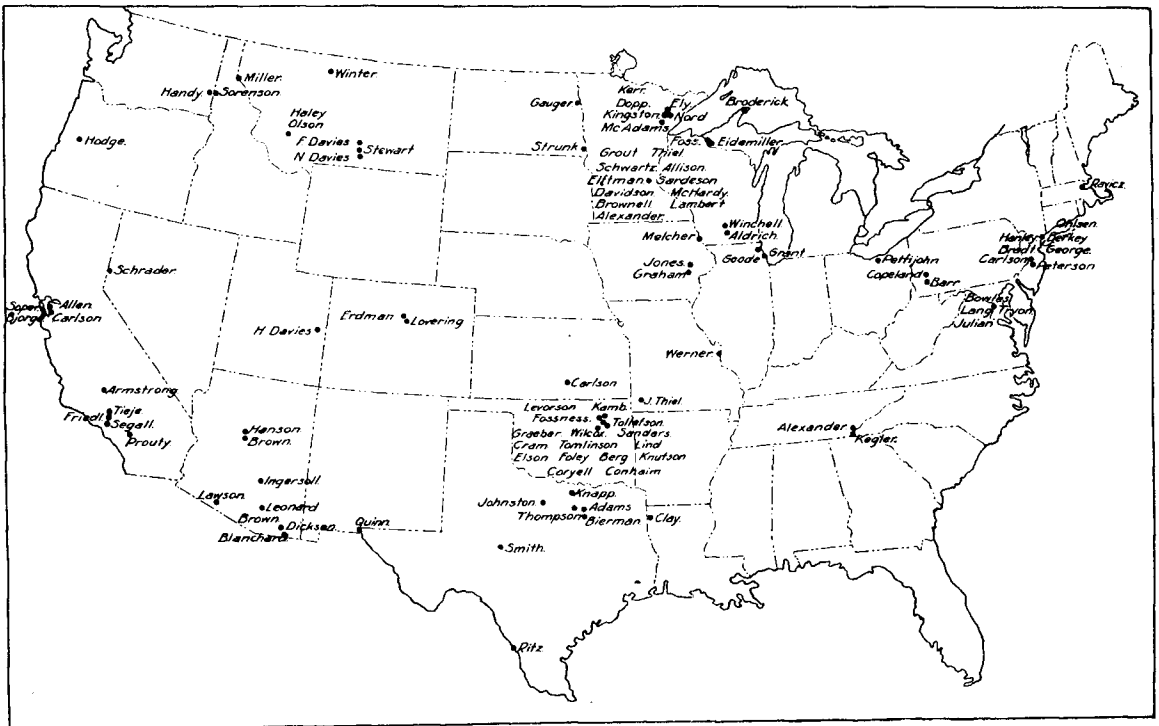
DELVING into the mountains and riverbeds of every continent but Australia, men who obtained their geological training at the University of Minnesota are finding a satisfying combination of remunerative employment and colorful variety in their jobs of seeking for the treasures of the earth or the answers to its unsolved scientific problems.

For more than a year the Department of Geology has been compiling statistics on its former students, first, to show all foreign points where they have been employed, and second, to show where those who are now in the United States are following their profession. These statistics have been shown graphically on maps, and the head of the department, Professor W. H. Emmons, has consented to the reproduction of these maps in "MINNESOTA CHATS."

In the United States there are 102 men and two women who are in professional work. The foreign map shows 71 locations where Minne-

sotans have been or are engaged in professional work. On this map several men are noted at two or three places where they have finished one or more foreign surveys. Some of the men noted on this map who have finished surveys, have returned to the United States and are not on the United States map. There are only 32 men at present engaged in foreign work. Subtracting for duplication, there are 135 Minnesota men and two women engaged in professional work in geology and in nearly related vocations. These include graduates of the College of Science, Literature, and Arts, mining students who are following geological and nearly related work other than mining and metallurgy, former students of the Graduate School, and a few students of other schools of the University who received their training in geology at Minnesota.

Of the 103 men in the United States 37 are engaged in petroleum geology, 28 are engaged in geology of metalliferous deposits, 28 are



Map of the United States showing where geologists who have received training at the University of Minnesota are now engaged in professional work.



Map of the world showing where geologists who have received training at Minnesota are now engaged or have been engaged in professional work.

in educational work in universities and colleges, and 8 are serving on government surveys and bureaus. The two women are in educational work.

These students are distributed in 28 states: Minnesota has 17, Oklahoma 17, California 9, Arizona 8, Montana 7, Texas 7, New York and New Jersey together have 7, Wisconsin 3, Missouri 2, Tennessee 2, Pennsylvania 2, Colorado 2. The map reflects the recent extensive development in oil fields of Oklahoma, Texas, southern California, and Montana, and the copper developments in Arizona.

The foreign map reflects the recent developments outside the United States in southern Canada, in Mexico and South America, and in central and southern Africa. Not much geological work is being done by Minnesota men in Europe and none in Siberia or Australia. There is a very considerable representation of Minnesota men in southern Asia and in Africa.

Of the 71 foreign surveys shown, 24 are connected with oil explorations, 15 were primarily scientific or regional surveys, and 32 were connected with metalliferous explorations. Unlike the map of the United States, the foreign map

shows work completed as well as that in progress. Only 32 men are now engaged in foreign work in geology.

The work done by geologists trained at Minnesota falls into 5 classes: (1) regional surveys and general exploration; (2) educational work; (3) explorations for petroleum; (4) explorations for metals and non-metals other than petroleum; (5) federal and state service. To some extent these classes overlap for there is no sharp line of cleavage between purely scientific work in geology and economic geological surveys.

It is only in recent years that the usefulness of geology has begun to be appreciated in many fields of work. A few years ago practically all geologists were employed by state or federal governments, or were connected with educational institutions. Today nearly all large mining companies have geological staffs. Of the 137 men represented on the two maps 132 have attended lectures at Minnesota since 1911.

New branches in applied geology and new fields for service in geology are continually being opened.

Minnesota's Protected Wild Flowers

Many of State's Chief Floral Beauties Are Endangered by Thoughtless Visitors to the Wilds

By Professor N. L. Huff
Department of Botany

MINNESOTA is a playground of the great Northwest. Thousands of tourists are pouring into our State every year because of the advantages we offer for pleasure and recreation. Our orchards, our gardens, our wheat fields are imposing, but the real beauty of scenery along our highways and canoe routes is due in no small measure to the native vegetation. What is a lake or a stream without vine-clad slopes and wooded shores? Who would enjoy the scenery of our northland were there no stately pines and towering spruce trees to clothe the bare rocks? How much less attractive would be our prairies, our meadows, our woodlands, without the Orchid, the Lily, or the Gentian, and what a crime it would be if we through carelessness or indifference should permit a single species to vanish from the earth.

Some of our most attractive wild flowers have completely disappeared in the vicinity of cities and unless wise precautions are taken are in danger of extermination. Several states have passed protective measures in regard to certain species and now Minnesota has joined the number by passing the following act for the protection of our Orchids, Lilies, Gentians, Trilliums, the American Lotus, and the Trailing Arbutus:

Minnesota Protection Law

SECTION 1. Protection for certain wild flowers. No person within the State of Minnesota knowingly shall buy, sell, offer or expose for sale, the state flower (*Cypripedium reginae*) or any species of lady slipper (*Cypripedae*) or any member of the orchid family, trillium of any species, lotus (*Nelumbo lutea*), gentian (*Gentiana*), arbutus (*Epigaea repens*), or any thereof, dug, pulled or gathered from any public land, or from the land of any private

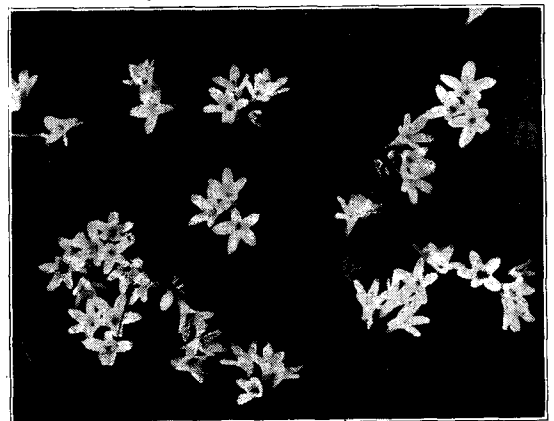
owner without the written consent of such owner or other occupant of the land.

SEC. 2. Any person who shall violate any of the provisions of this act shall be guilty of a misdemeanor.

Approved April 25, 1925.

While the Minnesota law does not prohibit the picking of flowers, it should be remembered that after all it is the picking or removing rather than the sale that threatens their extermination. Some of our Orchids and other attractive wild flowers are very slow in developing from seed. If flowering specimens are all removed, even though seeds and seedlings are left, a number of years may pass before the glen or meadow is again adorned with their lovely flowers. We should also bear in mind that half the charm of a wild flower is lost when it is removed from its native haunt in woods or meadow, and that when taken it may wither within an hour and is at best enjoyed by but few, while if left it may last for days and delight the eyes of many.

It is hoped that the illustrations and brief descriptions in the following pages may not

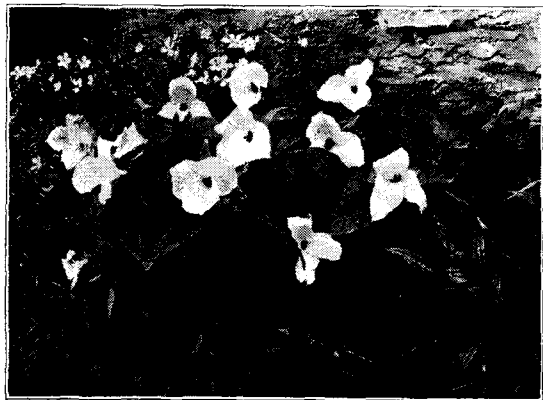


Trailing Arbutus

only serve a good purpose in directing attention to the principal species protected in Minnesota, but may also aid those interested, in the identification of these forms when seen in the woods and fields where they grow.

The State Flower of Minnesota

In 1893 upon petition of the Woman's Auxiliary of the State World's Fair Commission, the Yellow Lady's-slipper or Moccasin Flower (*Cypripedium calceolus*) was adopted by the legislature as the State flower of Minne-



Trillium

sota. It is evident that an error was made at that time in specifying this flower since the species designated, *Cypripedium calceolus* is the European Yellow Lady's-slipper and does not grow wild in Minnesota. Nine years later the St. Anthony Study Circle of Minneapolis in a petition to the legislature, called attention to this error and asked that the Pink and White Lady's-slipper be designated as the State flower. Complying with this request the legislature in February, 1902, adopted the Showy Pink and White Lady's-slipper (*Cypripedium reginae* now known as *Cypripedium hirsutum*) as the State flower or floral emblem of the State of Minnesota.

The Latin Names of Plants

It is unfortunate that common names of plants have only a local significance. Different languages spoken by different peoples of the world may be responsible for assigning several common names to a given species, but even among English-speaking peoples the common names of plants are not well established. The Mayflower in one locality may be the Trailing

Arbutus; in another it may be the Anemone or the Hepatica, while in a third it may be a plant very different from any of these. Furthermore the common names such as Lily and Lady's-slipper are too general to convey a definite conception of any particular species. To obviate these difficulties a Latin name has been assigned to every known species of plant and this name is accepted and is the same in all parts of the world regardless of the language spoken. The Latin name of a plant consists in reality of two names, the first or generic name being the more general, applying commonly to several or many closely related species, while the second or specific name defines the species and is often descriptive of some specific character. Thus while the name *Lilium* is the generic name and is applied to some 45 species of Lily, there is but one species known as *Lilium superbum*, and that is so known by botanists the world over. Likewise the generic name *Cypripedium* belongs to some 40 species of Lady's-slipper though there is but one species properly known as *Cypripedium acaule*, and no other species may ever receive this name. In spite of the objections often raised against Latin names of plants, it is only by an understanding and an appreciation of their significance that the confusion of one species with another can be avoided.

The Orchid Family

To many the name Orchid suggests only tropical plants with flowers large, odd-shaped



Showy Orchis

and beautifully colored. While it is true that the majority of larger and more showy forms are tropical they are not all confined to the warmer climates. In Minnesota we have about forty different species belonging to the Orchid Family, and curiously enough they do not seek the warmer sections of the State but many of them are confined to cold bogs where they associate with plants of a distinctly northern type.

No group of plants produces a greater variety of curious and beautifully colored flowers and no group has gone further in its specialization to insure cross pollination than have the Orchids. Some of them are adapted to a particular species of insect and depend wholly upon this insect for the transfer of pollen from stamens to stigma, a process necessary for seed formation. For this reason the geographical distribution of certain species of Orchids may be limited by the distribution of the insects upon which they rely for pollination.

In spite of the great variety in size, form and color of flowers there are certain family characteristics or resemblances in flower structure that can be recognized. The flowers of Orchids are always irregular and bilaterally symmetrical like a Pea or Snapdragon, and never regular and radially symmetrical like a Rose or Lily. They usually have three sepals (two of these are fused in some of the Lady's-slippers), and three petals, two of which resemble the sepals in texture and color. The third petal called the lip is commonly larger, more delicate in color and texture, flat and spreading or sac-like, and is often prolonged backward into a spur. In the Lady's-slippers there are two stamens but in other Orchids there is but a single functional stamen, and this is united with the style to form an unsymmetrical column the parts of which are sometimes difficult to interpret. The ovary is inferior and ripens into a 1-celled, 3-valved capsule, often twisted. The seeds are minute and very numerous.

Of our native Orchids the Lady's-slippers are largest, most showy and therefore in greatest danger of extermination through picking or removal for sale or transplanting. Besides these, however, we have many others that are

attractive and all are sufficiently rare and interesting to merit special protection.

The Showy Lady's-Slipper

Cypripedium hirsutum Mill.
(*Cypripedium reginae* Walt.)

The Showy Lady's-slipper is the largest of our Orchids. Its stem often two or more feet in height, is stout, hairy, and leafy to the top. The elliptic, pointed leaves are commonly five or six inches long, light green in color and many ribbed. The flowers are large and showy, usually solitary though, occasionally two or three may appear on a single stem. The sepals and petals are white except the balloon-like lip forming the slipper or moccasin which is blotched and streaked in front and around the edge with crimson-magenta.

Occasionally this lovely flower is found in low moist woods but it prefers the tamarack swamp or bog where the soil is covered with deep cushions of peat-moss with its sponge-like affinity for water. Here, where even the most ardent nature-lover may venture only occasionally, the Showy Lady's-slipper has for countless ages lived in wildness and seclusion. But now it is forced to yield to the influence of man, who is clearing and draining the swamps and creating intolerable conditions for its existence.

The Lady's-slipper is one of the most highly specialized of our insect-pollinated flowers. The whole structure of its interesting and curious flower form appears to be an adaptation or an adjustment to insure the transfer of pollen from the stamen of one flower to the stigma of another, a process essential for seed formation.

A bee in search of nectar enters the flower through the large opening in front, but the margin of this opening is turned inward, making exit here difficult or impossible. The only easy way of escape is back through a passage leading first by the stigma and then by the anther or pollen sac of the stamen. If the bee has visited a flower of another Lady's-slipper before entering this flower, and has pollen on his body, he may brush it off on the stigma as he passes. As he crawls further out to make his escape he brushes against the anther sac and his body is smeared with a new supply of pol-

len which he carries to the stigma of the next flower he enters.

The Smaller Yellow Lady's-Slipper

Cypripedium parviflorum Salisb.

The Smaller Yellow Lady's-slipper is an inhabitant of low wet woods and bogs, thriving best in tamarack swamps. The leafy stem varies from six inches to a foot or more in height and bears at its summit a single flower. The leaves are four or five inches long, elliptic or lance-shaped with tapering ends. The sepals, greenish or madder-purple in color are longer than the lip and the two slender lateral petals are twisted. The lip is inflated or sac-like, bright yellow, more or less marked with purplish stripes or blotches, and is commonly an inch or a little more in length. The characteristic heavy oily odor given off by the flower is considered unpleasant by some, but undoubtedly it plays an important part in attracting certain small bees which are essential for pollination.

This attractive Orchid has perhaps been our most common Lady's-slipper in Minnesota in the past, but with the destruction of its habitat by clearing out of forests and draining of swamps, and with the improvement of numerous highways bringing within easy reach of the flower vandal the once inaccessible swamps, it is becoming rare. Spare its flowers that it may bloom for future generations.

The Large Yellow Lady's-Slipper

Cypripedium parviflorum var. *pubescens* (Willd.) Knight.

Quite similar to the Smaller Yellow Lady's-slipper and often confused with it is this larger, more sturdy form, best considered, perhaps, as a variety of the smaller species. Its stem is stouter and taller, often two feet in height, and its flower is larger, the lip broader, not being laterally compressed as is that of the smaller-flowered form. The leaves are four or five inches long, oval or elliptic pointed, and have numerous parallel veins or ribs. A single flower is usually borne at the top of the leafy stem but it lacks much of the fragrance of the smaller-flowered species. The sepals are greenish or madder-purple, long and narrow, and the two lateral petals, resembling the sepals in form and texture, are twisted.

The third petal is an inflated delicate sac-like structure forming the yellow moccasin or slipper, sometimes two inches in length.

The Large Yellow Lady's-slipper may be found in swamps and meadows, but has a preference for low damp woods or wooded hillsides where there is plenty of moisture in the deep rich leaf mold. In some remote places it is still quite common, but is nowhere abundant. Its seeds though numerous are very rudimentary and exceedingly minute. A single flower may produce several thousand seeds and these to the unaided eye look like particles of dust. Because of their rudimentary nature and their specific requirements for germination and development, not one in ten thousand ever develops into a mature plant. Unmolested in the primeval forests our Lady's-slippers were barely able to hold their own in nature. Now with the destruction of their habitat and with the plucking of their flowers which prevents seed formation they are growing less common every year.

The Ram's Head Lady's-Slipper

Cypripedium arietinum R. Br.

This is the smallest, most delicate and rarest of our Lady's-slippers. Its slender stem, seldom more than a foot high, is leafy to the top and bears a single flower. The three or four leaves are broadly lance-shaped and about two inches in length. The three sepals are greenish or madder-purple, the upper broadly lance-shaped, the two lower and two petals very narrow, longer than the lip. The lower petal forming the lip is about one-half an inch in length, whitish, veined with crim-



Lotus

son; its prolonged apex and distended base give it a resemblance in form to a ram's head, whence the common name. This is a rare species in Minnesota but may occasionally be found in low damp woods or cold bogs of the North.

The Stemless Lady's-Slipper

Cypripedium acaule Alt.

This beautiful Pink Lady's-slipper has several characteristics by which it may be easily separated from its relatives. Its stem is short with two broad thick basal leaves, elliptic in outline with tapering ends. A leafless flower stock a foot or so in height bears at its summit a single odd-shaped flower. The sepals and petals are greenish-brown, lance-shaped, the latter rather narrow. The large crimson-pink lip or moccasin, often two inches in length, is streaked with darker lines and fissured down the front. Its color, its fissured lip, its long leafless flower stalk and its two basal leaves, are all marks of distinction.

This Orchid is commonly pollinated by bees. The natural entrance into the flower is through the fissured front, and with little effort the bee is able to force his way through the narrow cleft. The edges of the lip turn inward along the fissure, forming a valve which opens easily from without, but only closes more tightly with pressure from within. When the bee has devoured the sweet liquid that enticed him into the flower and wishes to pass on to another, he finds the only way of escape is through a narrow passage back of the large column formed by stamens and style and suspended in the orifice of the moccasin. This passage leads first by the sticky stigma where

any pollen the visitor has brought on his hairy body from another flower may be removed. As he passes on a little further and is about to leave the flower he is forced to squeeze by an anther with its mass of sticky pollen which may cling to his body and thus be transported to the stigma of the next flower he enters. It is one of the most interesting and ingenious natural devices known for insuring the transfer of pollen from one flower to another.

In Minnesota the Stemless Lady's-slipper is chiefly confined to moist hummocks of peat moss in tamarack swamps where it thrives along with the Smaller Yellow and the Showy Lady's-slippers. Northward, however, it occurs occasionally in the sandy lime-free soil among pine trees.

All of our Lady's-slippers may tolerate an acid soil and other species may thrive in the presence of lime, but not this one. It not only tolerates an acid soil but demands it. Lime to it is a poison and even in the best of garden soil it will perish within a few months.

If the flower of the Stemless Lady's-slipper were picked with care and intelligence no harm need result to the plant by such picking. The flower stalk is long and if cut so that the leaves are left undisturbed the plant suffers no serious consequences. If broken off by hand however the leaves and short stem may be taken and the roots now helpless to carry on life's activities quickly perish. The draining of our swamps in many sections of the State is threatening the very existence of this and some of our other rare and beautiful bog plants that demand an acid soil.

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March, 1927

MINNESOTA CHATS



For a Better
Minnesota



DEAN M. E. HAGGERTY

Whose announcement of Schoolmen's Week appears on page 8

The Place of the Senses in the Development of Science

By Dr. William J. Mayo

Rochester, Minnesota

The following address was delivered at the Charter Day convocation of the University of Minnesota, February 17, 1927. Dr. Mayo, of the Mayo Clinic, is a regent of the University of Minnesota.

ORTHODOXY has its value. Unless a person is deeply interested in a search for truth in a special field, it is better for him to keep an open mind and, with "a decent respect for the opinions of mankind," travel with the majority, that his energy may be conserved to develop the work in which he has been trained. If he wishes to devote his life to a study of so-called psychic phenomena, it is one thing, but as a side line, investigation of the occult carries distinct danger to integrity of thought. It loosens the mind from the moorings of fact, gives predominance to the lesser senses, and creates emotional disturbances which resemble the instinctive fear reactions of primitive man and the lower animals. One of these reactions was fear in the dark, which remains with us today as a source of emotional disturbance.

Man first recognized only enemies that were large enough to be seen and dangers that could be estimated visually, such as wild beasts, serpents, and tempests. Against phenomena which he could not understand he invoked the protection of his gods.

Through association of ideas the words *cult* and *occult* have become closely allied. The cultist devotes his energy to spread a special belief not recognized by the majority as resting on a sound foundation. The occultist devotes his time to an attempt to elucidate a belief in hidden and mysterious powers having their origin in a spirit world and to subject them to human control.

Anyone dabbling in the occult, deliberately depriving himself of vision, man's chief means of obtaining information, injures himself mentally. It is a curious ego that in the clear light

of reason will prompt one to say of a certain subject, "I do not understand this," and in the dark of suggested psychic influences to say of the same subject, "I believe this is occult," in the sense of a mysterious spirit force. I have known a number of men of great promise in medicine who in the *springtime* of their lives became interested in a cult or in occultism of the old-fashioned spiritualistic type, which led them to unproved or unprovable hypotheses, blind alleys of belief. As a result, they lost their keen perception of fact and made little progress in their profession.

Sir Conan Doyle in his masterly characterization of Sherlock Holmes intrigued the interest of hosts of readers and established a school of detective fiction. Sir William Crookes, the last of the great *all-around* physicists, made investigations which led to the discovery of the cathode ray, the basis of the X-ray. Sir Oliver Lodge, who so clearly placed before the interested but untrained student the fundamental facts in physics, has the gratitude of all. These are three outstanding men of science who interested themselves in psychic phenomena and believe in reincarnation of the dead. This interest, however, came in the *autumn* of an intense scientific life. Their great days were over. The new interest was a foil to the critical research of the early days, like the contemplative philosophy of the Orientals.

Discontent Leads to Progress

There is a divine discontent with the existing order of things which leads to progress. Youth is always insurgent, a builder of images, a dreamer of dreams. When guided by scientific imagination youth builds images to be compared with known facts, and dreams true dreams. Age carries mental scars left by experience which contract and shorten vision, but age carries wisdom. Youth and age should

travel together; each needs the other for orderly scientific advancement.

The man of 100 years ago who would have attempted to talk about the radio and the wireless would have been regarded as mentally deranged. Had he been able to produce these phenomena they would have been considered occult manifestations from the spirit world, and he probably would have been burned at the stake. Whenever we do not understand existing phenomena, let us lay the lack where it belongs, to a failure of understanding which the future may clear up, and not allow ourselves to prostitute intelligence by talking about fairies, ghosts, spirits, and reincarnation of the dead.

Science is organized knowledge of the physical world. Wisdom denotes a clear perception of facts and sound judgment in dealing with them. The man of science in searching for the truth must ever be guided by the cold logic of facts, and be animated by scientific imagination. Man's brain, the instrument devised to receive and interpret truth, depends on the senses, as its main avenues of approach through which come the raw materials of the truth. Only as the accuracy of these special senses in transmitting the materials out of which truth is made, can be relied upon, can the resulting truth be relied upon. Science, therefore, owes much to the special senses. It seems fitting to pause in these days of the supremacy of science, to consider these special senses.

I shall, therefore, devote the remainder of this address to two topics; first a consideration of the genesis and relative value of the special senses in obtaining information, and second the significance of vision in the evolution of one of the sciences, namely medicine.

The Special Senses

The brain of man, a social being, is dominant. It records and classifies impressions, analyzes experiences, and activates emotions.

Intellectual functions cannot be ascribed entirely to the special senses, but are rather the sum total of both external and internal sensory impressions woven into a complex mechanism controlling behavior.

The upper brain which contains the cerebral convolutions is the central organ which con-

nects man with the outside world. This part of the brain might be picturesquely described as an expansion of the primitive organ of the sense of smell, but this expansion has been devoted to vision whereas the sense of smell has diminished. The higher mammals, and especially man, have achieved direct pathways from the eyes to the cerebral convolutions, and the growth of the mind, so far as man is concerned, might be said to be coincidental with the development of vision. Stimuli of the sense of taste, of hearing, and of touch must figuratively pass through more relay centers to reach the brain, and therefore their interpretation may be inaccurate and misleading unless corrected by sight, just as a telephone message relayed through several stations may be garbled.

In the simplest forms of life external impressions are conveyed through the protective covering of the organism. In the invertebrate, the *Amphioxus*, all the sense organs other than tactile are rudimentary or absent. The sense of touch, a pressure sense, is the most primitive of the special senses. In common parlance, touch refers to the hands, which the upright position of the human body has freed for highly specialized training.

At the Victoria Hospital in Newcastle-on-Tyne that sound English surgeon, Rutherford Morison, whose observations have been characterized by vision and acumen, has printed on the wall of his operating room facing his students, five words: "Sight," in large letters; "Touch," in smaller letters; "Hearing," in still smaller letters; "Smell," in fine print, and last "Taste," in print so small as to be scarcely distinguishable across the room, thus indicating his estimation of the five special senses in relation to surgery.

The Sense of Taste

The sense of taste is a chemical sense and in man is the least important of the special senses and the most imperfect. This sense is closely associated with the sense of smell, and most of the qualities known as flavors, prized by the epicure, are distinguished by the sense of smell, rather than by the sense of taste. Without the sense of smell, the sense of taste cannot distinguish an onion from an apple. The sense of taste developed early, that the primitive organism might be able to recognize material

unfit for food as well as edible material, and in man this sense has so little discrimination that it can detect only four types of food: sweet, sour, salty, and bitter.

The Sense of Smell

The sense of smell is also a chemical sense, extraordinarily accurate and highly developed; it detects odors which are entirely beyond discovery by any known scientific apparatus. Gases, and vapors representing material in a molecular or colloid state not only can be recognized but also correctly classified by the trained sense of smell. This sense, however, does not give appreciation of time, place, or motion.

The sense of smell depends on certain cells which end in a hair. These cells are arranged in small bundles about the base of which are pigmented cells. Newer knowledge of physics in connection with the radio, little as it is, gives a clue to the purpose of the hair endings. These delicate hairs may be compared to the antennae of a radio, recognizing the impact of electronic vibrations of rapidly moving colloids and unstably oxidized molecular substances suspended in the air as odors, just as the eyes recognize various wave lengths of light as colors.

In man the organ of smell is situated deep and occupies a total area of only about one square inch. The relation of the sense of smell to the protection of the organism against poisonous contacts seems to depend on the pigmented cells at the base of the organ of smell. Sheepmen will not raise albino lambs but send them to the butcher, because they have no sense of smell and sooner or later would die from eating poisonous material.

The sense of smell, unlike the senses of sight and hearing, does not diminish with age, but often becomes more acute, and is keener in women than in men.

In the lower vertebrates smell is the only special sense that comes by direct pathways to the upper brain and is dominant in controlling behavior, meaning the relations of one animal to another of the same or a different species.

With the wind in the right direction, the distance at which a deer is able to detect danger by the characteristic odor of an enemy is almost incredible. And yet the infant deer dur-

ing the first days of life is without odor, protected in some curious way against its enemies in the stage of its innocence. Wild beasts passing near will not discover the fawn, but will trail the mother.

In certain breeds of dogs, as the hounds, the organs of smell are enormously developed but their sight is defective. The bird dog circles the object of his search, depending on the sense of smell for approximate location. He then points the cover of the game from the intensity of the odor, and finally secures sight of the object. A hound following a scent may run into a tree during the chase, and may bark at his master, unable to recognize him by sight at a distance of 100 feet.

The Sense of Hearing

The sense of hearing in man is inaccurate. Whereas the senses of sight and smell will telephone, so to speak, directly to the brain, a sound to reach consciousness must be relayed through a number of extra stations, with all the possibility of confusion and inaccuracy that the process necessarily entails.

Fish have a sixth sense, situated in the lateral line organ of Leydig, which gives the sense of pressure, depth, and equilibrium, and from this labyrinth organ of the water vertebrate the organ of hearing in land animals developed. The ear of land animals responds to sound waves and pressure changes in the air as the lateral line organ of water vertebrates does to waves and pressure changes in water.

The inaccuracy of hearing due to the relay system of transmission of sound to consciousness is illustrated by the difficulty in estimating the source of a sound. When a person hears a church bell ringing in an unknown locality, he is uncertain not only as to the direction but also as to the distance and volume. Is it a large bell ringing at a long distance, or a small bell ringing close by?

At one time some children at my house were playing a little game in which each child in turn was blindfolded and two coins were struck together about eighteen inches from the head. The children when blindfolded were almost totally unable to tell from what direction the sound came.

Helmholtz, sixty years ago, called attention to the hairs on the organ of Corti and expressed

his belief that their varying lengths might have to do with distinguishing tones. Little importance seems to have been attached to these hair endings. One is impressed with the modern radio and its antennae as a possible explanation of the hair endings of the organ of the sense of hearing as well as of the sense of smell, and the principles which underlie their function. One might say that these hairs are antennae acted on by electronic energy connected with changing air pressure which enables the individual to listen in, as the radio enthusiast would express it.

The Sense of Sight

In the higher mammals, among which man is dominant, vision has secured direct pathways to the upper brain, and the sense of sight, giving comprehension of space, time, and motion, has overborne the sense of smell. Pressure changes in the surroundings affect touch and hearing; changes in radiant energy affect the eyes. The mechanism of the human eye is in some respects inferior to that of the eye of some of the lower animals. With the telescopic vision of the eagle, man could read fine print at 500 feet.

Certain fishes in the depths of the sea radiate cold light, not necessarily connected with the eye, but emanating from specialized cells in various parts of the body, differing according to the habits and necessities of fish life, which makes possible a certain amount of vision. Cold light is also seen in the glowworm, the firefly, and other animals. Much research is being carried on to determine the nature of this light, in the hope that it may be used instead of the hot light obtained by present-day methods of oxidation.

The eyes of many of the lower vertebrates have separate vision, and in only two diameters, length and breadth. The higher mammals, for instance man, with binocular vision, see in three diameters—length, breadth, and depth.

One hardly need call attention to the fact that it is not the mechanism of the eye of man which is triumphant, but its relation to the intelligence of man.

While the sense of sight is dominant among the special senses, owing to its accuracy, it is remarkable that those who lose this sense in

infancy can, with training, substitute for it the senses of hearing and touch. Helen Keller is an example of an intelligence of high order developed largely from the sense of touch. We must remember, however, that in this training the teacher's sense of sight takes the place of that of the pupil. The intelligence is there, but it is not efficient until trained. The ear-trained and touch-trained blind man would not be so easily deceived in the dark by the faker as the eye-trained man suddenly placed in the dark, who would be more likely to be controlled by his ancient emotion of fear in the dark. Memory can be spoken of as mental photography.

The sight of man is not quick, and on this fact was based the old adage, "The hand is quicker than the eye." It must be borne in mind, however, that the hand in question is the hand of a prestidigitator educated by the eye.

Vision the Predominant Factor

In studying the history of medicine it is significant that in the 10,000 years of Egypt's history there were no less than eight complete relapses into barbarism, and there is little of value to scientific medicine in the meager records of those times.

Medicine began with the earliest peoples as an appeal to the emotions through occultism, and here originated the cults, which still abide with us. New cults come as the fraud of the old ones is exposed.

Scientific medicine had its beginning in the fourth century before the Christian era with Hippocrates, who founded clinical medicine, and with his near contemporary, Aristotle, who developed deductive reasoning and a primitive form of inductive logic, on which science rested securely for 2,000 years. The great school at Alexandria with its museum and library founded by the Ptolemies in the third century B.C., was the center of learning. Here the students of Aristotle developed and gave to the world the priceless gift of scientific methods. In the eleventh century Abélard founded scholastic education; in the thirteenth century the first university was established. In the sixteenth century Francis Bacon introduced into philosophy inductive reasoning. William

Harvey, contemporary of Bacon, applied inductive reasoning to medicine and by experimentation established physiology on a sound basis. In this great Elizabethan or Shakespearean century came also the first of the physician-chemists, John Mayow, whose investigations led to the discovery of oxygen. In 1590, the Janssens brought out the microscope, an invention which was to revolutionize science. The present day microscopic limit is $1/10$ micron or $1/250,000$ of an inch.

The invention of the microscope increased the power of vision and made possible the epochal work of Pasteur which led to the popular recognition of the rôle of micro-organisms in the causation of disease, with the result that the scourges of contagion, infection, and infectious diseases, which could be survived only by persons with natural or acquired immunity, have nearly disappeared. Scientific medicine has advanced more in the last fifty years through the extension of vision by means of the microscope than in all previous time. This is demonstrated by the illustrious work of Pasteur, Virchow, Lister, Gorgas, and other eminent men of science who have created, so to speak, health and prolongation of life.

Microscope Partially Opens Door

We see, as through a partially opened door, new gifts to man, through further extensions of vision into the submicroscopic field, which includes particles $1/1,000$ micron or $1/25,000,000$ inch in diameter. The romance and adventure of modern research lie in this ultramicroscopic realm.

In the years from 1803 to 1844 Dalton promulgated the atomic theory and investigated the constitution of the molecule, with so few instruments of precision that the exactness of his results bordered on the miraculous. As the result of the most extraordinary improvements in methods which are ultimately visual, knowledge has been gained of the field of colloids as well as the molecule and atom.

Sir William Bayliss has well said that there is no line of demarcation between physics and chemistry. In other words, it is only under certain physical conditions that those alterations in the atomic constitution of molecular bodies, which we speak of as chemical changes, take place.

The ray of light travels 186,000 miles a second. When the ray of light is refracted, as by colloid bodies, it is resolved into rays of various lengths and speeds which are recognized by the retina of the eye as colors. The longest ray appears as red, and in order of the length of the rays, orange, yellow, green, blue, and violet are seen. On the relative length of these rays the colorimetric system in medicine is based. With the X-ray the molecule and atom can be analyzed.

Photography plays a great part in fixing for deliberate study with the eye objects in rapid motion. One twelve-millionth of a second is sufficient to make a photograph which will show a bullet in flight at a muzzle velocity of 3,000 feet a second as though it were standing still.

A remarkable fact is that colloids, molecules, atoms, electrons, and protons, unlike particulate substances which are microscopically visible, remain in rapid motion more or less permanently suspended in their medium in spite of the force of gravity, although all are affected by pressure, temperature, and atmospheric conditions. Only under certain physical conditions can the electric exchange of electrons and protons in the atomic field of the molecule take place.

Moseley, Thompson, Bohr, Milliken, and other great men working in the field of pure science have developed methods of analysis which give new insight into the practice of medicine and have enabled a critical analysis of the functions of bodily organs. From colloidal chemistry there is now being built a new physiology of man and a better understanding of vital phenomena. Today, in certain instances, restoration of the sick can be as precisely accomplished in the living body as similar chemical changes in the test tube.

In the sixteenth century the average lifetime of man was 20 years. The microscope has given us knowledge of the cause, cure, and prevention of disease, thereby increasing the average lifetime of man to 58 years. Investigations of the ultramicroscopic field which we are now entering give promise of increasing the average lifetime to the scripture age of three score and ten.

Schoolmen's Week Will Begin April 11th

Dean M. E. Haggerty of the College of Education Announces Plans for the Yearly Spring Educational Conference

A GAIN the year has rolled around so that spring shows on the horizon, and with it, one of the most important events of the year at the University of Minnesota—Schoolmen's Week, with which is combined the annual Short Course for Superintendents and Principals of Minnesota school systems, together with a host of other meetings of educational bodies.

To bring to each Schoolmen's Week two or three outstanding men of American education so that their ideas and experiences may be brought to bear on Minnesota teachers, has been the policy of Dean Melvin E. Haggerty, of the College of Education. This year Schoolmen's Week will be that beginning April 11. The visiting speakers will be Dr. Otis Caldwell, director of the experimental Lincoln School in Teachers College, Columbia University; Dr. George Counts, of the University of Chicago, a specialist in educational psychology; and Milo Stuart, of Indianapolis, Indiana, principal of the Arsenal Technical High School of that city, which is probably the largest technical high school in the United States.

This school is housed in a building which originally was a United States arsenal, but which the federal authorities disposed of to the city of Indianapolis. It has attracted wide attention as a comprehensive high school, in which is conducted secondary education of practically every type.

Schoolmen's Week is conducted as a series of general convocations, usually addressed by the visiting speakers, together with a very large number of meetings of groups, sections, and specially organized societies. The yearly meetings of the Superintendents' Section, Minnesota Education Association, will take place on Thursday, April 14, and Friday, April 15, in the afternoons. This year Superintendent

George C. Brohaugh, of Willmar, is president of the section.

The Minnesota Society for the Study of Education, established during Schoolmen's Week a few years ago at the suggestion of President Coffman, will conduct its meetings during the week, following a program being prepared by Dr. L. J. Brueckner, of the University and the Minneapolis public school system.

Among the papers to be read at this year's meeting is one by Dr. C. M. Jackson, head of the Department of Anatomy, University of Minnesota; one by Dr. John E. Anderson, director of the Institute of Child Welfare, on "Some Results of Research at the University Child Welfare Station"; one by Dr. Brueckner on "Techniques for Measuring the Value of Supervision"; and a report by Professor H. A. Erikson on the costs of large and small classes. The last mentioned will give material worked out for the University's Committee on Educational Research.

Under the direction of the Hon. J. M. McConnell, state commissioner of education, the State Conference of County Superintendents will take place Tuesday, Wednesday, and Thursday afternoons, April 12 to 15.

Tuesday and Wednesday will be given over to high school conferences, divided into groups by subjects.

A report on the Minnesota State English Essentials contest will hold the stage in the English Section of the high school conferences Tuesday afternoon, before which also Professor O. W. Firkins of the University of Minnesota will discuss current plays on Broadway. A report on "Industrial Work in the Senior High Schools" will be made to the Industrial Section by E. M. Phillips, of the state department of education. Dr. Otis Caldwell, of Teachers College, will speak before the Science

Section of the High School Conference. The Social Studies Section will hear a discussion by Professor A. C. Krey of the report he recently made to the American Historical Association on a proposed reorganization of the social study curricula in elementary and secondary schools. The Home Economics Section will devote most of its time to a discussion of the content of the home economics course in the seventh and eighth grades.

At the general meeting of the conference on Wednesday, April 13, Dr. Counts will speak on "The General Status of the High School Curriculum."

Among the many other meetings of the week will be that of the Administrative Women in Education, under the chairmanship of Miss Helen B. Shove, principal of the Longfellow School, Minneapolis; the Elementary School Principals' Conference; the annual meeting of the Minnesota State High School Athletic Association, and the Deans of Women in Minnesota colleges.

Among the principal addresses by visiting speakers at general sessions will be "The Changing Conception of Secondary Education," by Dr. Counts; "The Work of an Experimental School," by Dr. Caldwell, and "The Comprehensive High School and the Individual," by Principal Stuart.

The Superintendents' and Principals' dinner will be served Thursday night.

The complete program of the Superintendents' Section, Minnesota Education Association, meeting on Thursday and Friday, is as follows:

Thursday, Superintendent George C. Brohaugh, of Willmar, presiding, 2 p.m.:

"Standard University Entrance Requirements," Superintendent C. C. Baker, Grand Rapids.

"Relations of High School Graduates and Teachers Colleges," Superintendent J. P. Vaughan, Chisholm.

"High School Entrance Requirements for Non-Residents," E. M. Phillips, State Department of Education.

Friday, Superintendent A. L. Winterquist, of Cloquet, presiding, 2 p.m.:

"Improving Methods for Recommending Candidates for Teaching Positions," Austin K. Turney, acting principal, University High School.

Report of the committee on a code of ethics, Superintendent C. W. Van Cleve, Springfield.

Report of the committee on school statistics, Superintendent E. B. Bergquist, Aurora.

Superintendent G. V. Kinney of Red Wing will preside at the meeting of the Minnesota State High School Athletic Association.

The Minnesota Schools of Agriculture

Unique Institutions Open the Door of Opportunity for Hundreds of Farm Boys and Girls

IN its four schools of agriculture at University Farm, Crookston, Morris, and Grand Rapids, the state of Minnesota, through the University, is meeting a unique educational situation which, seemingly, could have been met in no other way. If it is success to meet an urgent situation in the only possible way and to provide educational opportunities to more than 1,000 young men and women from Minnesota farms who, lacking these schools, would almost certainly go without further education, the University's schools of agriculture are entitled to a high rating in achievement.

Principal among the purposes of a school of agriculture of the Minnesota type is that of providing a school for the farm boy or girl in whose school history there is a gap. Assume that through force of circumstances a boy drops out of school at the age of twelve or thirteen. By the time he is sixteen, or eighteen, his situation has changed. He is again in a position to go to school, or has decided that it was a mistake to drop out. His former classmates have passed him. They are in the upper years of high school or in the University. What shall he do?

Obviously, such a boy, whose retardation in school has nothing to do with his mental ability, is unwilling to return to the seventh or eighth grade and support on his vest buttons a desk made for the knickerbockered youngsters of eleven and twelve years who would be his classmates. In such a schoolroom he would be not only unhappy but actually out of place. So the public school of his community fails to meet his needs.

Again, this young chap, usually a boy born and reared on a farm, interested and informed in matters of farming, and likely to return to the farm at the end of his planned foray into educational fields, is of a definitely practical turn of mind. His educational interest is almost certain to be a vocational one. Latin? No. Ancient history? He registers the most

tepid interest. French? Another self-answering query. To the extent that non-vocational elements in its curriculum fail to meet his needs, the local high school or that of the nearest sizable community holds little attraction for him.

Gives Chiefly Vocational Training

This big, ambitious, intelligent farm boy has the strength to shoe a horse but not the skill. He has the voice to hold an audience of neighboring farmers in any community discussion of stock breeding, dairying, crop rotation, seed testing, or marketing, but lacks the information and has not developed the self-assurance necessary for its presentation. Probably his desire for further education arises less from a sense of ignorance than from a realization that he already knows a great deal of many practical matters, and a comprehension that to know just enough more on these and other points would make the sum total of his information vastly more useful both to himself and to his community.

This boy needs a school in which the opportunity to learn self-discipline and better citizenship is combined with craft courses in the field of agriculture. He needs to learn about seed testing, crop rotation, the selection of varieties, stock raising, the use and repair of farm machinery, tiling and drainage, fruit growing, farm engineering, better barns and farm houses, up-to-date buildings for stock and poultry, the use of manures and fertilizers, marketing, creamery practice—the list could be extended.

It is for him and for his sister in a comparable situation that the state has provided the schools of agriculture and has made them part of the state-wide organization of the University of Minnesota. Since its establishment in 1888, the Central School of Agriculture at University Farm, St. Paul, has had an annual enrolment ranging between 400 and 1,200. This year, according to Principal D. D. Mayne,

it has 501 students. Last year there were 340 students at the West Central School, situated at Morris, Minnesota, and 289 at the Northwest School and Station, at Crookston. Last fall the North Central School was opened at the experiment farm near Grand Rapids, with an initial enrolment of 13.

"To make the future farm resident a better farmer and a better citizen" is the purpose of the School of Agriculture, according to the principal of the Central School, D. D. Mayne, who has been as much responsible as anyone for the development of the present Minnesota scheme. "The College of Agriculture leads some to farming and many to technical and professional work related to agriculture," he explains, "but the School of Agriculture leads directly back to the farm."

Half Time Study, Half Practice

In line with the general plan of the schools, the courses of study are so laid out that a student spends at least half of his time in shop or laboratory learning something of practical value which he will himself apply when he is operating a farm. English is a required subject for all freshmen. So are such subjects as farm arithmetic, hygiene, agricultural botany, drawing and farm buildings, and military drill. Cultural subjects, apart from English, are found among the electives, which include the elements of music, debating, dramatics, and a wide range of courses in vocal and instrumental music. Elective subjects in the advanced years include advanced English courses, elementary economics,

English literature, and the like, which round out the required list that includes American government and rural sociology.

The three-year school student may enroll in either general farming, crop production, farm mechanics, horticulture and nursery training, livestock production, or, for girls, home economics. In each of these major divisions the subjects vary to agree with the general three-year plan, but elective subjects are so arranged that the student in any of the first five may take some work in whatever other subject he may choose.

As an example of the range of studies offered, the elective list for the junior year in general farming provides algebra, geometry, industrial history, insect pests of plants, chemistry of plant and animal life, mechanics and water supply, parliamentary law, management of the laying flock, physiology and hygiene of breeding, orchard fruit growing, small fruit growing, elements of bacteriology, co-operative accounting, potato production, landscape gardening, beekeeping, farm motors, greenhouse construction and management, heat and electricity, and many other subjects.

In a somewhat different way, the schools of agriculture meet the needs of young women from farm homes who wish further education but may not desire to go to college.

"The girl who leaves school at the completion of the seventh or eighth grade probably will not marry for from five to eight years," Principal Mayne explains. "During this period



An Airplane View of University Farm

Where the Central School of Agriculture is situated, together with the College of Agriculture, Forestry, and Home Economics, and the Central Experiment Station of the University

she needs a wholesome, gainful occupation. Without special training she faces limited opportunities. She may learn stenography, become a saleswoman, or do housework at home. The range of choice is narrow. Such a girl, if she attends the School of Agriculture, may learn to teach music, a service for which there is always a demand in rural communities. If she prefers to learn stenography she may obtain the special training which will make her not only a stenographer but an important unit in such business offices as those of county agents, creameries, co-operative agencies, elevator companies, and the like.

"The training in home economics looks chiefly to those things with which the farm woman is concerned in the home and the community. There is instruction in home nursing, hygiene, house planning and furnishing, dress-making, millinery and home management. Some girls find nursing, dressmaking, or millinery work a more stimulating calling between the end of their school period and their marriage than work in an office or business establishment. The vocational training these receive helps them both at that time and in their later vocational work."

Among the many interesting facts that school authorities have dug up from the careful data they keep on their graduates is that no divorce has ever occurred in a marriage between two former students of the School of Agriculture who made their home after marriage on a farm. Principal Mayne is tremendously proud of this showing. He points out that it shows the adaptation of these young people to the environment and the duties which are theirs in later life and reflects a wholesome attitude for which the school deserves at least part credit.

Incidental to this revelation it develops that marriages between former students at the schools of agriculture are by no means rare. In these schools the young men and women find companions of their own age, with similar interests and background. More than that, they are also of the same type in their ambitions, their desire for advancement and self-betterment. Today in Minnesota there are hundreds of happy farm homes in which both partners received their final training in the

schools of agriculture.

Besides offering a three-year course rather than four, the schools of agriculture differ from the usual high schools in their dates of opening and closing. They are opened late in September, when some of the autumn work on the farms has been completed, and they close near the end of March, giving the young person from a farm the opportunity to return in time to help with seeding and the other spring work of the countryman.

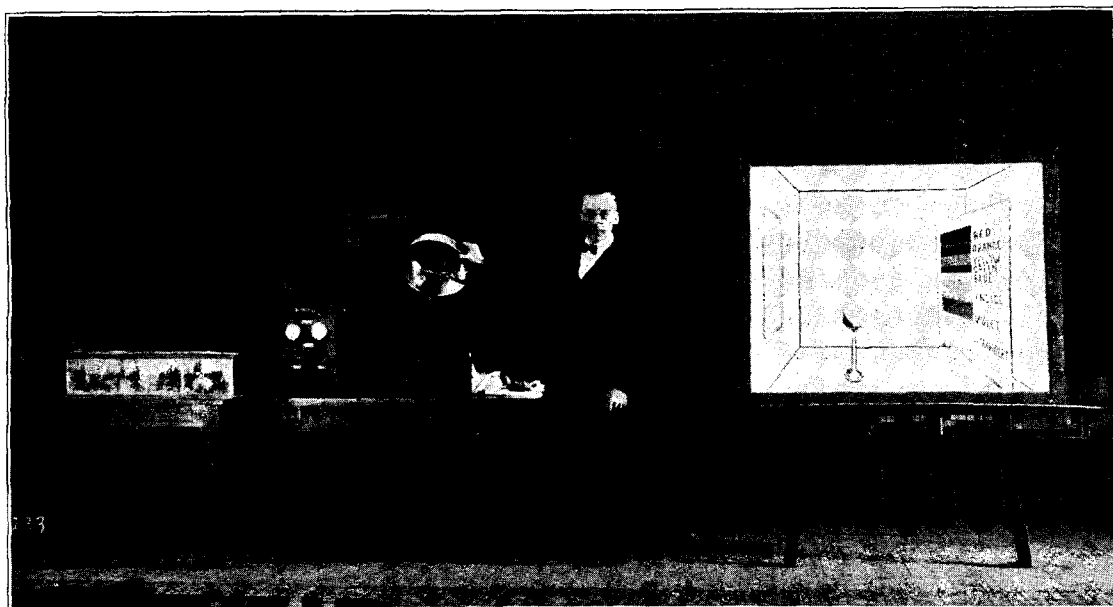
"Project" Plan Extends Course

This introduces another of their interesting methods, the home project plan, by which instruction is extended so that it really covers the entire six months of the vacation though the student's effort is put in away from the campus during the spring and summer period of no classes.

Before leaving the school campus in the spring, each student selects the projects on which he or she will work during the summer, and these are approved by the home projects committee of the school. Each selects a project in farming, one in community social improvement, and one in home life improvement. A record book is supplied, in which the young man or woman keeps a careful diary of the progress and success of each project.

A typical farm production project would be in seed disinfection, its object being the production of wheat free from smut, and clean potatoes. The student's part probably would be to disinfect the seed and observe any improvement in results from the planting. Perhaps he would disinfect 75 bushels of seed wheat with formaldehyde and dip a dozen bushels of potatoes in bichloride solution. Data on the resulting crop would complete the project record.

The arrangement of new home comforts or adornments, such as screening the porch, keeping a neater lawn, planting new shrubbery, painting buildings, or providing for the protection of the farm machinery would come under the heading of projects in making the home a better place in which to live. Community social improvement projects, designed to make the participant a better man or woman in the community, might be the organization of



Quartz Lamp Demonstration at Farm School Commencement

a baseball team, a community picnic, or an educational club. Some communities that have fallen into the doldrums are electrified into life by as simple a thing as a ball team. Again, it may be a community agricultural project, of which the formation of a cow testing association or a general movement for treating seed, culling poultry, or breeding up livestock would be a typical example.

By means of the projects the School of Agriculture student begins immediately the application of his practical school knowledge, continues a laboratory course by practicing the duties entailed by the project, and builds himself up in social outlook and usefulness, learning to meet people and discovering the thrill and value of service. Project work during a summer yields the equivalent of three school credits.

In the "Project Book" given each student, the following is a type project: Name of project, "Cow Testing Association"; co-operating agencies, "Neighboring dairymen, United States dairy extension leaders"; goal, "20 farmers with 300 cows in the association"; my part, "Make a list of farmers and number of cows. Write extension division and arrange for meeting with a leader. Take part in organization meeting"; Results, "Cow testing association

organized July 1. 200 cows on test."

Although the main body of students in the Minnesota schools of agriculture is made up of those who have fallen out of step with their fellows of the early grades, there also is an increasing number, especially of young men, who have completed a high school course at home, but who go to one of the schools to obtain the practical and laboratory work available there.

These students need not take the English, algebra, and like subjects, for they have completed this work in high school. Most of them select a specialty and take as much work in it and allied subjects as they can get. They specialize, and leave when they have covered the special field.

There is also an increasing number of students from the schools who enter the College of Agriculture at completion of the school. Although the school course runs for only three years, credits obtained by the project work during the summers make up the difference and qualify them for admission to college.

School Life Teaches Self-Reliance

Self-sufficiency is the keynote of student life in the schools of agriculture. There are dormitory rooms for 400 at the Central School, at University Farm. Each student

makes his own bed, does his own sweeping, and keeps the place in order.

Each fall a self-government organization is formed, under the supervision of the principal, D. D. Mayne, and with the co-operation of the matrons of both the girls and boys dormitories. Floor monitors are appointed, whose duty it is to see that tasks are performed and rooms in order. The matrons are particularly helpful in making suggestions for the improvement of the rooms and for the little added comforts or decorations that add so much to one's living quarters. School officers head the self-government system.

Most of the morning is devoted to class work, and each noon at 12:10 the general assembly is called. The general assemblies have proved one of the most worth-while elements in the school life. Whenever it is possible an outside speaker of importance is obtained, including in the course of each year, distinguished visitors, lecturers who come to the University for some other principal address, the president of the University, leading faculty members of the College of Agriculture and Central Experiment Station, state officials, and others.

Students are often called upon to speak at an assembly on important, practical subjects, such as the McNary-Haugen bill, military training, tolerance in religion or politics, or the relationship of agriculture to industry or of town to country. Students are required to deliver their addresses without manuscript.

Dinner on the "commons" plan, with all students eating together in the dining hall has proved an effective medium of social education and has added greatly to the good fellowship and thorough acquaintance of the student body.

Unique commencement exercises developed at

the Central School of Agriculture have attracted nation-wide interest and have been described in a number of educational and agricultural publications.

Instead of formal addresses, "valedictorian" or otherwise, the commencement is made up of a series of practical demonstrations, illustrating scientific procedures valuable on the farm, methods in housekeeping that yield better results and lighten the worker's burden, or, perhaps, experiments to show new and unfamiliar uses of some well-known product. Typical of the demonstration subjects are those from the 1926 commencement, when they were "Constructive Child Play," "Sawdust As Cattle Feed," "Winter Egg Production," "Thou Shalt Not Steal," "Pay Your Taxes Gladly," and "The Sun's Rays at Work."

By no means least of the factors which have made attendance at the School of Agriculture a lasting influence in the lives of the students in the close-knit system by which the alumni are held to the school after graduation. Principal Mayne shows with manifest pleasure a huge card index, the gift of the Class of 1916. The big cabinet holds cards on which are the records of every student who has attended the Central School, and on the sloping top of the index is a mammoth address book, supposed to be good for 70 years, in which are entered the names and addresses of all persons who visit the school, hundreds of them alumni.

The occupations entered beside the names of alumni show that success has attended the policy of training for the farm. There is a sprinkling of "legislator," "creamery manager," "business," and "teacher," but "farmer" and "farming" proudly lead all the rest.

Minnesota's Protected Wild Flowers

The Continuation and Conclusion of an Article Begun in the February Issue

By Professor N. L. Huff

Department of Botany

MINNESOTA CHATS herewith presents the remainder of a fascinating article on Minnesota wild flowers and the need for their protection and conservation.

Other Orchids of Minnesota

The Showy Orchis (*Orchis spectabilis* L.) is a conspicuous and beautiful little plant from four to eight inches high, with a pair of large ovate basal leaves, thick and shiny, and a spike of magenta-pink flowers with white lower lip. In May and June it may be found growing in the rich leaf mold of the basswood-maple forest.

The Habenarias or Rein Orchids are represented by a dozen different species varying greatly in size, color, and habitat. One of these, the Tall Green Orchis (*Habenaria hyperborea* (L.) R. Br.) with stems two or more feet in height and long spikes of greenish flowers, not fringed, is common in bogs and tamarack swamps. Similar to this but with white fringed flowers is the White Bog Orchis (*Habenaria dilatata* (Pursh.) Gray.). Hooker's Orchis (*Habenaria Hookeri* Torr.) with its two large fleshy orbicular basal leaves, and scapes a foot or more in height bearing from eight to twenty yellowish-green flowers is not uncommon in woods in the northern part of the State. In this group also belong the White Fringed Orchis (*Habenaria leucophaea* (Nutt.) Gray.) of wet meadows and prairies, and the Purple Fringed Orchis (*Habenaria psychodes* (L.) Sw.) of our open meadows and swamps.

The Rose Pogonia (*Pogonia ophioglossoides* (L.) Ker.) with two narrow grass-like leaves, and *Arethusa* (*Arethusa bulbosa* L.) whose single leaf develops after the flowering season, are two pretty little bog Orchids bearing each a single rose-colored flower at the top of a stem eight inches in height. One of the most handsome of our native Orchids is the Grass

Pink (*Calopogon pulchellus* (Sw.) R. Br.) a conspicuous plant of swamps, bogs and open meadows. The flower stalk, naked above, bears at its base a solitary grass-like leaf, and near its summit a cluster of several attractive crimson-magenta flowers.

The Ladies' Tresses (*Spiranthes*) are delicate waxy Orchids with slender solitary scapes, leafy at the base and bearing each a twisted spike of small white or yellowish flowers toward the summit. Some species grow in open meadows and bogs, others in rather dry soil and they are surviving well the changes brought about by civilization.

The Coral Roots (*Corallorhiza*) are curious humus plants, yellowish or madder-purple in color, destitute of green leaves and with much branched coral-like underground rootless stems. Each bears a solitary scape with a raceme of yellowish or lurid flowers. Being devoid of green leaves they are unable to manufacture food but are dependent upon the humus for materials which green plants are able to manufacture for themselves. The securing and elaboration of these materials from humus is undoubtedly facilitated by certain fungus filaments in the superficial layers of the coral-like rootstocks. One species (*C. trifida* Chatelain.) a slender yellowish plant is not uncommon in swamps. The larger species (*C. maculata* Raf. and *C. striata* Lindl.) straw colored or madder-purple, occur in upland woods in the northern part of the State, but are more rare.

The Rattlesnake Plantains (*Epipactis*) are represented by several species in the northeastern part of the State. They are plants with tufts of basal leaves, green or blotched with white, and grow in bogs or in upland pine or coniferous forests. The greenish-white flowers are borne on bracted scapes sometimes a foot or more in height.

The Twayblade (*Listera cordata* (L.) R. Br.) has a slender stem eight or ten inches high with two broadly oval leaves near the middle, and a loose cluster or raceme of several greenish-yellow or purplish flowers at the summit. It grows in moist woods, not infrequently in the hardwood forest. Another Orchid sometimes known as Twayblade belongs to the genus *Liparis* and bears two broad shining basal leaves and a low scape with small clusters of greenish or purplish flowers. It grows in damp woods and swamps.

The Adder's Mouth (*Microstylis*) a low herb whose stem a few inches in height bears a single oval leaf near the middle and a cluster or raceme of greenish flowers at the top, is found in bogs and woods in the northern and eastern parts of the State.

Calypso (*C. bulbosa* (L.) Oakes.) is one of the prettiest of our native Orchids but is exceedingly rare in Minnesota. The scape is usually less than six inches high and bears a single rounded stalked leaf at the base. The flower is variegated purple, pink, and yellow, the large lip resembling somewhat that of a small Lady's-slipper. It grows in deep mossy woods or bogs of the North.

An interesting little bog plant known as Malaxis (*Malaxis paludosa* (L.) Sw.) is without doubt the rarest Orchid in North America. Of the half dozen places where it has been found in the entire continent, two are in Minnesota, the others being in Alaska and Canada. The scape of this little plant is very delicate and slender, three or four inches high, with four or five small ovate basal leaves and a raceme of several minute greenish flowers. It grows on the mossy hummocks of the tamarack swamp.

Adam and Eve or the Putty-root (*Aplectrum hyemale* (Muhl.) Torr.) may be looked for in rich soil of our hardwood forests. The plant arises from a solid bulb or corm. Each year a slender rootstock gives rise to a new corm near the old. Late in summer from this new corm a leaf arises. The leaf is large, oval, many nerved and lasts through the winter. In May or June the following year the flower-stalk or scape a foot or so in height arises beside the solitary leaf. The flowers, several in a terminal raceme, are yellowish tinged with madder-purple.

The Lily Family

The Lily Family consists mostly of herbs whose leaves are parallel veined. The flowers are regular and symmetrical, their parts commonly arranged in threes. The sepals and petals, three each, are similar in form and color except in the Trilliums where the former are small and green and the latter large and white or purple. There are six stamens in two circles of three each and a 3-celled ovary which is wholly superior or free from the perianth. The fruit may be either a pod or berry with few or many seeds.

The Turk's Cap Lily *Lilium superbum* L.

Growing from a scaly bulb the tall stem of the Turk's Cap Lily often reaches a height of four or five feet. The leaves are smooth and lance-shaped, mostly arranged in whorls though the upper ones may be alternate. The nodding flowers are sometimes borne singly but more often in clusters of three or more. The six perianth segments, three or four inches long, are orange colored, spotted within with reddish brown, and strongly recurved. The six stamens with reddish-brown anthers and the long style with its three-lobed stigma, are conspicuous parts of the flower.

One of the most showy of our native wild flowers is this beautiful Turk's Cap Lily which comes into bloom in July. It grows in fields and damp woods, but its favorite haunt is the low open border-line between forest and meadow. Bold and fearless, never hiding, reaching upward its long leafy stem overtopping the tall meadow grasses, it flaunts its showy orange-red flowers in the breeze and the sunlight, a challenge to all who pass near it.

The Wood Lily *Lilium philadelphicum* L.

The stem of the Wood Lily is commonly about two feet tall, and bears several lance-shaped leaves, scattered or in whorls. The flowers bell-shaped, orange-red spotted, with purplish-brown, are borne singly or occasionally in two's or three's at the summit of the stem. The six perianth segments, about three inches long, are little or not at all recurved.

Unlike the Turk's Cap, the Wood Lily bears its blossoms erect. Although thriving in

dry or sandy soil of open woods it frequents the moist meadow and on the fertile prairie lands in the western part of the State is often a conspicuous feature of the vegetation.

The Large Flowered Trillium

Trillium grandiflorum (Michx.) Salsb.

The stem of the Large Flowered Trillium is usually a foot or more high and bears at its summit a whorl of three broadly ovate leaves with tapering ends. A single terminal flower two or three inches high is borne on an erect peduncle which usually equals or nearly equals the flower in length. The three sepals are green, the three petals white, turning rose color with age. There are six stamens, and a single ovary bearing three styles and ripening into a fleshy berry, dark purple or black in color.

This great white lily-like flower of the woods is one of the most attractive of our wild flowers. It thrives in the deep rich leaf mold of the bass-wood-maple forest in the "big-woods" region of the State. In more remote parts it is still abundant but in populous districts, especially in the vicinity of cities it is becoming uncommon or rare. This disappearance is due in part to the clearing off of forests that furnish suitable conditions for its growth, in part to pasturing of woodlands left uncut, but in no small measure its decrease is due to picking of the flowers by those who are quite ignorant of the part they are taking in its extermination. It does not lend itself to picking. One may pluck the flower of the common Violet, the Hepatica, or the Bloodroot and the plant continues to thrive, for the leaves are left to do their work and prepare for another year. Not so with the Trillium. It bears its leaves at the summit of the stem so that when the flower is picked its leaves

are taken too. It is the habit of a Trillium to manufacture and store in its underground stem a supply of food for next year's growth. This food is of course manufactured by the leaves, and the plant is able to produce but a single set of leaves each year. If these are removed at the flowering time, before food has been provided for next year's growth, the whole plant may perish, or if able to survive at all may require years to regain sufficient strength for blooming again.

The Nodding Trillium

Trillium cernuum L.

In the Nodding Trillium a single drooping flower an inch or less in length, hidden by the broad ovate leaves, is borne at the top of a stem a foot or so high. There are three tapering green sepals, three ovate petals, white or purplish, rolling backward, their margins more or less wavy. The filaments of the six stamens are about equal to the anthers in length. The pistil is somewhat six lobed and ripens into a purple berry.

While in our virgin hardwood forests the Large-flowered Trillium was undoubtedly the more common, the Nodding Trillium has demonstrated a greater ability to survive the ravages of civilization, and of the two is more frequently met in populous districts in the vicinity of cities. The flowers are not only smaller and less attractive than those of the large-flowered form but hang drooping beneath the large green leaves and are often quite invisible until the leaves have been pushed aside. The modest habit of concealing its flowers in this way may render the plant less attractive but serves a useful purpose of protecting pollen and nectar from the rain, and incidentally may save the whole plant from the destructive



A Type of the State Flower

hand of some vandal.

Very similar to the Nodding Trillium is the Declining-flowered Trillium (*Trillium declinatum* (Gray.) Gleason). Its flowers are larger and its flower-stalk usually horizontal instead of being recurved beneath the leaves as in the Nodding Trillium. The petals are white and the filaments are usually much shorter than the anthers. Like the Nodding Trillium it grows in moist woods and blooms in May and June.

The Dwarf White or Snow Trillium

Trillium nivale Riddell.

The Dwarf White or Snow Trillium is encountered occasionally in rich woods in the southeastern part of the State. Three oval leaves and a small white flower are borne at the top of a slender stem, seldom more than two or three inches in height.

This is the smallest of our Trilliums, but a pretty little flower of the early spring. In April as the snows disappear from the woods and the shaded hillsides it puts forth its delicate flowers covering the forest floor in patches like blankets of snow. As with many of our early spring bloomers its growing season is short and in a few weeks its flowers, stems, and leaves disappear and only its short tuberous rootstock hidden in the leaf mold, awaits the coming of another year.

The Water Lily Family

The Water Lily Family consists of aquatic herbs with long creeping horizontal rootstocks. The leaves are large and rounded, commonly floating, though sometimes immersed. The flowers are solitary, arising from the axils of the leaves. There are usually about four sepals and from five to many petals. The stamens and carpels are usually numerous, the latter either distinct or united, and sometimes sunken in the receptacle.

The American Lotus

Nelumbo lutea (Willd.) Pers.

The leaves of the American Lotus are large, rounded, and vary in diameter from one to two feet; some lifted high above the water have depressed or cupped centers so they resemble broad shallow funnels in form; others resting upon the surface of the water are perfectly

flat. All have their leaf-stalks attached near the center. The large pale yellow flowers are elevated two or three feet above the water. The sepals, four in number, are greenish in color and an inch or less in length. The petals are numerous, the outer greenish-yellow resembling the sepals in size and color, the inner pure pale yellow and much larger, often five inches long and three inches wide. The stamens are numerous and of a brilliant yellow color. In the center of the flower stands the curious large yellow top-shaped receptacle, very conspicuous, and in this the many pistils are sunken in pits so that only their stigmas are visible at the surface. Each pistil ripens into an acorn-like fruit, still sunken in the light spongy receptacle which when broken off serves as a float and so aids in the dissemination of seeds.

Growing in the shallow water of lakes and sluggish streams, this largest, most showy, yet one of the rarest of our Water Lilies is distributed from Massachusetts to Minnesota and southward. In Minnesota luxuriant growths may be found in occasional ponds or lakes in the southeastern section of the State and as far north as Hennepin county.

There is something fascinating about a pond of Water Lilies, and the American Lotus has a boldness, a beauty, and an individuality which place it in first rank among our aquatic decorative plants. Its large creamy-yellow wax-like flowers when fully expanded are eight or ten inches wide. Once established in a place it thrives and spreads by its tuberous rootstocks, and may develop dense and extensive beds. The difficulty with which new plants may be started or matured from seed is doubtless responsible for its local distribution and its absence in many seemingly suitable habitats within its range. It may exist and flourish for many years at one point along a lake shore, but fail completely to establish itself at other points, as it would were plants started easily from seed. The fact that both the large seeds and the tuberous rootstocks are edible and were used by the Indians for food may account for its occasional presence in isolated lakes throughout its range.

The Heath Family

The Heath Family is a large one and one whose characteristics vary a great deal in

the different groups. Most of the members of the family are shrubs though a few are herbs. The flowers are complete and regular or nearly so. The calyx commonly has four or five segments, sometimes merely toothed, in other forms cleft or parted nearly to the base. The corolla, often delicate and wax-like may have four or five lobes or may consist of four or five separate petals. There are from five to ten stamens. The ovary is compound and contains from three to ten cells. It is usually superior, ripening into a capsule or drupe, but in the blueberries, cranberries, and some others it is inferior and ripens into a berry.

The Trailing Arbutus

Epigaea repens L.

This is a trailing woody plant with branching stems bristling with rusty-brown hairs. The leaves are thick and leathery, evergreen, broadly oval in form with rounded or heart-shaped base. The flowers arising in clusters from the axils of the leaves are half an inch or more in width, rose colored and very fragrant. There are five sepals and a tubular corolla, its upper part expanded into a broad 5-lobed funnel. The ten stamens are attached to the base of the corolla tube. The ovary is 5-lobed and ripens into a 5-celled rounded edible berry.

Every locality has its "Mayflower" and many are the species that vie with each other for the honor of this title. Its many attractive characteristics, its early blooming, and its wide geographical distribution give the Trailing Arbutus the first claim to this honor in localities where it grows. From Florida to Newfoundland and west to Saskatchewan this lovely trailing vine with its evergreen leaves and fragrant waxy rose-colored flowers is one of the first of bold little blossoms to announce that winter is over and springtime has come. In Minnesota it is nowhere abundant but may be found occasionally in the northern part of the State. Among the rocks in the sandy lime-free loam in the partial shade of pines or other evergreens this modest little flower selects a home. It can brave the snows of winter and the chilling winds of March but a soil containing lime it cannot endure. In ordinary garden soil it may be given the most tender care, but it will weaken and die. It will thrive only in the upland peat or sandy

lime-free soil such as may be secured beneath the pines and the hemlocks of its native habitat.

The Gentian Family

Most of our Gentians bloom in late summer or autumn. In general their flowers are rather large, showy, blue or white, and may be borne either singly or in clusters. The leaves are opposite, sessile, entire, the corolla more or less funnel-form or bell-shaped with four or five lobes, often with folds or plaits between the lobes. The stamens are inserted upon the corolla, the style is very short or lacking and there are two stigmas. The seeds which are small and very numerous are borne in a pod or capsule with two valves.

The Fringed Gentian

Gentiana crinita Froel.

The Fringed Gentian bears its large solitary flower at the summit of a stem from one to two feet high. The leaves are broadly lance-shaped and opposite, the calyx 4-cleft with unequal segments. The deep-blue corolla often two inches in length is bell-shaped, the margins of its four lobes are beautifully fringed. Four stamens are inserted upon the corolla tube. The pistil bears two stigmas and ripens into an elongated pod or capsule with numerous small seeds.

Few of our American wild flowers, once common, are becoming more rare in the vicinity of cities and public highways than is this most lovely of our autumn flowers, the Fringed Gentian. It grows in low grounds and meadows and comes into bloom in September and October in company with Goldenrods, Asters, and Lobelias. It in some ways is a delicate plant, refined in its tastes and particular about its habitat and associates. Unlike the common weeds that grow in worn-out fields and waste places it seeks the fertile soil of low woodlands or open meadows, well lighted and airy, yet moist throughout the season. The seeds are wind-blown and those that fall by chance in places not suited to its liking are doomed to perish.

So rare and so attractive is this beautiful gem of the meadow that few can resist the temptation to pluck it. It is taken without consideration either for the survival of its kind or for the pleasure it might give to others if left. The

flower that is plucked produces no seeds, and the plant upon which it grows, being an annual or a biennial, has no way other than to seed, of perpetuating its kind. There can be no more certain way of exterminating the lovely Fringed Gentian than by picking its flowers.

The Closed Gentian

Gentiana Andrewsii Griesb.

Several flowers an inch or more in length are borne in clusters at or near the top of a smooth stout stem some two feet or so in height. The leaves are broadly lance-shaped. The corolla blue with white plaits, or occasionally all white is cylindrical in shape and closed at the mouth.

This curious Closed Gentian is certainly an anomaly among our flowers, with its bright showy corolla attracting the passing insects to partake of its store of nectar, but with closed doors to exclude them. Not all however are excluded, but only the horde of smaller forms that could remove the nectar without benefiting the flower by the transfer of pollen from stamen to stigma. It is a flower peculiarly adapted to the bumblebee and its closed tube is to him no barrier against the sweets stored within. He alone among the great host of insects has learned the combination and has the strength to swing the doors that guard the nectar and protect the pollen from marauders and the rain. Alighting upon a young unspoiled flower he passes at once to the summit where the corolla tube is neatly folded in five plaits closing the entrance to the chamber where stamens, pistil, and nectary are found. Inserting his proboscis or tongue where the folds meet and with skillful use of head and legs the plaits are quickly unfolded, he pushes his burly form into the tube and eagerly sucks up the nectar. In so doing he brushes against the stamens and when he withdraws carries on his hairy body much pollen dust, some of which is transferred to the stigma of the next flower he visits. Thus in return for the nectar supplied by the flower he has rendered a service which makes possible seed production and perpetuation of a plant which without such service would quickly perish from the earth.

In the late summer and autumn this flower may be found by brookside and lake, in meadows and low open woods. It begins to bloom in August and continues until October.

Other Gentians of Minnesota

In addition to the Fringed and Closed Gentians which perhaps are best known, we have several other species occurring within the State.

The Smaller Fringed Gentian (*G. procera* Holm.) is an annual or biennial with large solitary, funnel-form, 4-lobed sky-blue flowers an inch or more in length. The lobes of the corolla are toothed at the summit and fringed along the margins, the leaves are narrow, the basal ones paddle-shaped. It grows in moist ground.

The Stiff Gentian or Agueweed (*G. quinquefolia* L.) has slender branching stems with broadly lance-shaped leaves. The flowers are smaller, less than an inch in length, pale blue or yellowish-white and borne in clusters of about five each at the end of the branches. The corolla is somewhat funnel-form, the lobes entire and pointed.

The Downy Gentian (*G. puberula* Michx.) is found in the dry prairie regions of the State. The stems are usually solitary, rough and finely hairy above, the leaves rigid, narrowly lance-shaped and less than three inches long. The flowers are bright blue, bell-like or funnel-shaped, without fringe, and are borne in clusters near the summit of the stem.

The Yellowish Gentian (*G. flavida* Gray.) of woods and meadows has stout stems often two or three feet high. The leaves are broadly lance-like with heart-shaped clasping bases. The flowers, sometimes two inches long, cylindrical in form, white tinged with greenish or yellowish, are borne in dense terminal clusters.

The Narrow-leaved Gentian (*G. linearis* Froel.) is a slender-stemmed form growing in bogs and wet meadows. The leaves are narrowly lance-shaped with narrow bases. The flowers are funnel-form, blue or white, borne in terminal clusters.

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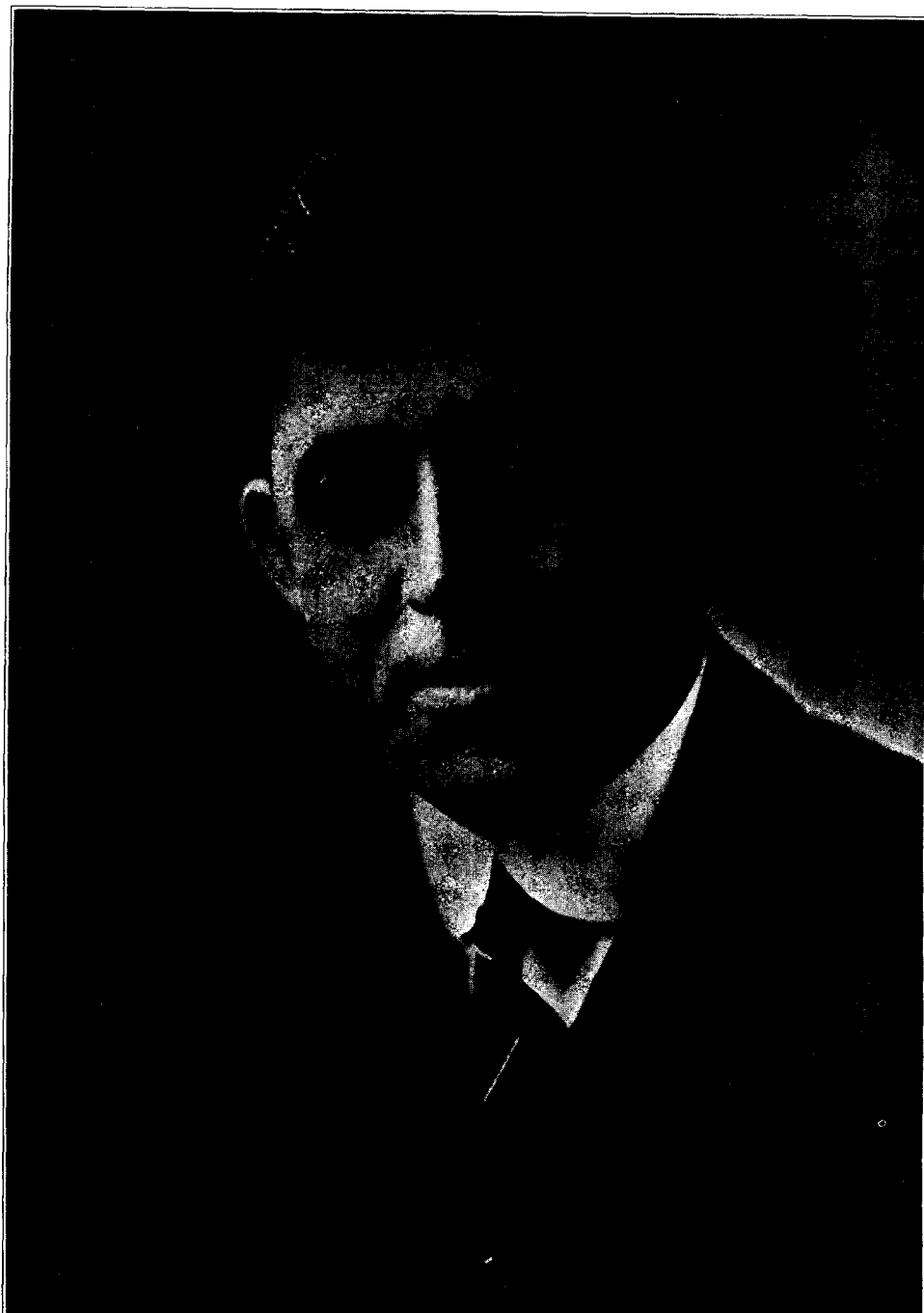
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MINNESOTA CHATS



For a Better
Minnesota

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Professor Earle G. Killeen

Who will conduct the outdoor performance of "Carmen"

“Carmen” Will Be Sung in Stadium June 11th

Now Famous Opera Once Seemed To Fail, and Its Composer, Bizet, Died of Grief

PASSAGE of time has dimmed remembrance of the tragedy, significant in the development of modern drama and music, that followed the first production in Paris 52 years ago of the opera *Carmen* by Georges Bizet, the French composer.

Carmen has been selected by the University of Minnesota for outdoor production in the Stadium the night of June 11, following the splendid artistic success attained last year with *Aida*. Stars from the Metropolitan and other opera companies of national reputation will again sing the leading rôles, directed by Earle G. Killeen, who also will rehearse and conduct the student choruses.

Condemnation of *Carmen* by the music critics of Paris in 1875, who joined almost to a man in giving it a “bad press,” has been held responsible by most students of that period for the death within that year of its famous composer. Bizet wrote nothing after the apparent failure of the opera which he had believed his master work. But to modern ears the reasons for that condemnation sound more startling than the revelation of its tragic consequences. Musical Paris turned against Bizet because his opera violated the ancient tradition of the happy ending and closed on a note of violent tragedy. *Carmen*'s lover, Don José, stabs her to death when she haughtily rejects his pleadings for a reconciliation.

Parisians of today may claim citizenship in the most sophisticated city of the world, but 50 years ago this violation of the Opera Comique's traditions seemed to warrant such a burst of hostility and criticism that the composer was unnerved by disappointment and chagrin, took sick, and died.

Commentators seem to believe that the “family” traditions of the Opera Comique, a state-supported amusement house, were partly responsible for the bitter reception accorded

Carmen. It was there that the well-to-do middle class French families went on many gala occasions, and especially to discuss and celebrate the marriage contract between members of the younger generation. That *Carmen*, the heroine of an elaborately produced opera, should have been a worker in a cigarette factory in Seville, that she smoked, flirted, jilted a series of lovers and, for a time, lived in the mountains with a brigand band, was medicine too strong for these placid folk. The realism that some say has become too pronounced in the third decade of the twentieth century was then sending only its first stalks up through the fertile seedbed of continental literature and drama. *Carmen* was one of these, and one that was smitten by the hails and frosts of wintry criticism.

At the première, a male member of the chorus, unused to tobacco, choked and became ill after a few puffs on the cigarette he was required to smoke.

The same critics who also condemned the music of *Carmen* at its first performance were loud in their praises when it was revived with tremendous success in 1883, eight years after it had “failed.”

Meilhac and Halévy, a pair of famous collaborators in the French theater of the nineteenth century, adapted the story of *Carmen* to operatic use from the well-known novel of the same name by Prosper Mérimée. Mérimée was a realist. Bizet approved his realism and gave it the support of music written in like vein. And the creator of the rôle, Mme. Galli-Marié, went through the performance in a manner that yielded nothing in degree of realism to any of her distinguished collaborators.

At the end of the first act the applause was generous. The audience had not yet discovered that parts of the action took place in a district that was none too savory; that characters now

and then said things which, however they might be translated into English, were not in the most polite vein of the Parisian seventies; and then, *Mon Dieu*, that awful stabbing! What an example to the well-dowered young lovers sitting with *mamman* in the boxes of the Opera Comique.

Newspaper Brought About Revival

A touch of humorous relief to this rather pathetic situation is introduced in the method by which the revival was accomplished eight years later. It is told that a young journalist, Maurice Lefèvre, finding himself in the mid-summer doldrums, when news was scarce and sensations far between, asked, by way of closing his comments on some mediocre performance at the Opera Comique, why *Carmen* had never again been heard. This idea appealed to the editor of his paper, *The Clarion*, as material with which he could build up a "cause" and provide some richly spiced reading for those dogdays of 1882. Interviews with Meilhac and Halévy and with the director of the opera, Carvalho, followed. The public became aroused, and it was eventually announced that the work would be revived in the following year; as it was, with great success.

When this trivial motive led to the resurrection of what has become one of the most popular of operas, Bizet, its composer, had been seven years in his grave.

Geraldine Farrar as Carmen with Caruso as Don José, her jilted lover, have formed one of the best known combinations among many famous artists to have sung those rôles. Calvé and Mary Garden have been other famous Carmens, Calvé perhaps the greatest of all. Mme. Patti and Mme. Zélie de Lussan have been others of world fame to sing to this rôle. Mme. Minnie Hauck was the first to sing it in the United States.

Last Year's Opera Splendidly Done

All doubt of the ability of the University of Minnesota's Music Department to produce thoroughly effective opera outdoors in the Memorial Stadium was removed a year ago when the performance of *Aïda*, perfect in its bizarre setting and brilliant music, made a

never to be forgotten impression on nearly 10,000 people who gathered to hear it. A June evening of unusual beauty and lighting effects that painted the fantastic Egyptian scene in bright contrast against the blue-black sky helped achieve a vivid and thrilling artistry for the performance. Singers of the leading rôles, such as Paul Althouse and Frances Peralta, of the Metropolitan Opera Company, and Cyrena Van Gordon, of the Chicago Opera Company, called it the finest outdoor production of *Aïda* they had ever known.

Professor Carlyle Scott, director of the Department of Music at Minnesota, has given a free hand to Professor Killeen, director of the University's choral work, in the selection of cast and choruses for *Carmen*. Mr. Killeen has announced that Ina Bourskaya, of the Metropolitan Opera Company, will be the Carmen. Edward Johnson, also of the Metropolitan, will sing Don José, the jealous lover, and William Gustafson, of the same company, Escamillo, the toreador. Gustafson's baritone is said to be especially suited to the popular strains of the famous *Toreador's Song*.

Zuniga will be sung by Lester Spring, Micaela by Queena Mario, of the Metropolitan Opera Company, Frasquita by Elizabeth Kerr, of the Chicago Opera Company, and Mercedes by Eulah Corner, of the Cincinnati Opera Company.

Two principal rôles will be sung by students in the Department of Music, Julian Neville as El Doncairo and Rudolph Goranson as El Remendado.

All of the characters in the opera, with one exception, were in the novel by Mérimée on which the scenario is based. Micaela was introduced by the librettists to meet the need for an effective feminine foil for Carmen.

Students Will Paint Scenery

Professor Killeen will have the assistance of many university departments in producing *Carmen*. As was done last year for *Aïda*, the staging, scenery, costumes, dancing, and accompaniments will all be prepared or provided by members of the university staff and student body. Ottilie Seybolt, dramatic coach, will direct the staging. S. Chatwood Burton, as-

sociate professor of painting and sculpture, will again design and oversee the painting of the setting and scenery. The costumes and properties will be prepared by classes in art education and home economics, directed by Professors Ruth Raymond and Wylle B. McNeal, chief of the Division of Home Economics. Miss Gertrude Baker, of the Department of Physical Education for Women, will train the dancers and help with the choruses. The University's concert master, Abe Pepinsky, will lead the orchestra, and Michael Jalma, bandmaster, the band. T. E. Steward, of the University News Service, is chairman of the publicity committee.

An orchestra of 50 players, many of them recruited from the membership of the Minneapolis Symphony Orchestra, will take part in the opera. Counting musicians, principals, and members of the choruses, something like 250 persons will take part in *Carmen*, a smaller number than was required for *Aida* with its masses of soldiery and attendants, but enough to produce some extremely effective stage groupings.

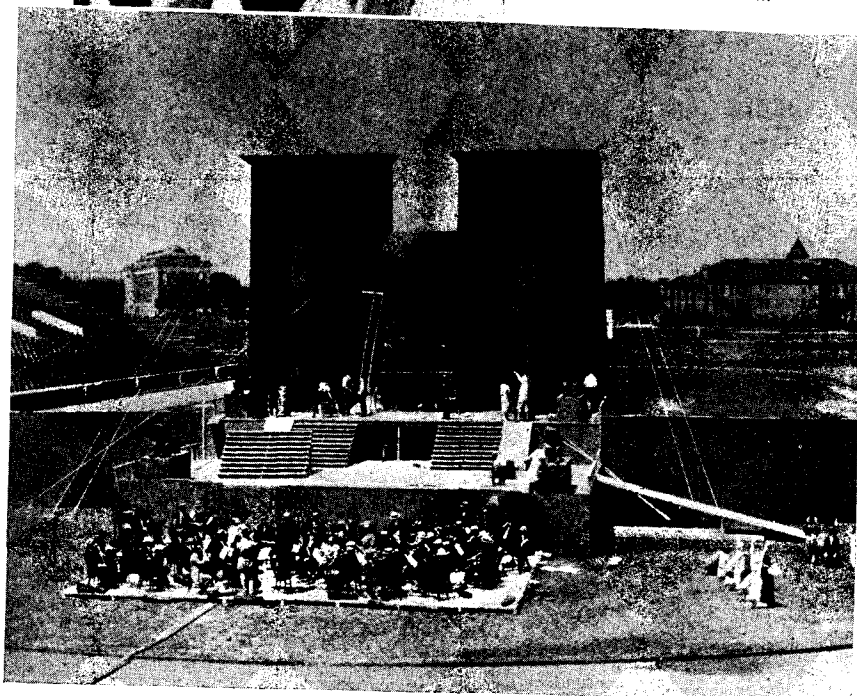
In line with the policy established a year ago of encouraging the widest popular attendance at a performance that will probably be the finest musical event of the summer in this part of the country, admission will be held to the modest sum of \$1.

President L. D. Coffman has been especially eager to hold the price low to draw the largest possible student attendance. He views the outdoor operas as performances chiefly for the benefit of the University of Minnesota's student body. President Coffman was disappointed last year to learn that there had actually been a greater attendance of the general public than of students. Unquestionably the success of last year's performance will bring a far greater outside attendance than that which heard *Aida*. The University sincerely hopes that this will be so, but it will also make an effort to arouse a keener interest among the students.

Carmen will be definitely part of the commencement exercises this year and has been scheduled as one of the special events among those of the week-end preceding the graduation ceremonies. This arrangement was made at the



Left: S. Chatwood Burton, art director of "Carmen"; below, a rehearsal for last year's production of "Aida."



request of the All-University Student Council, headed by Ellis Sherman. Commencement exercises will be conducted on Monday, June 13, preceded on Sunday by the baccalaureate sermon and by *Carmen* Saturday evening, June 11.

The production of *Carmen* will involve one difficulty not encountered in last year's opera, namely, that of presenting scenes in both the city of Seville and the nearby mountainside, where the gypsies are encamped. This may require almost a double amount of scene painting, but there is every reason to suppose that the talents of the committee on scenery will be equal to the occasion.

Incidentally, Professor S. Chatwood Burton, who will direct the preparation of scenery, has specialized in etchings of Spanish scenes and is intimately familiar with Seville and the regions in Spain where the action takes place.

Carmen abounds in action, bright color, the bustle of a vivid Spanish town, and develops the keen interest inherent in a story of love, jealousy, and revenge among characters of fiery temperament. Its music combines passion and a warm colorfulness. Some of its best known

passages are so popular that practically everyone can place them.

The business department of the University will again take out rain insurance as a protection against loss in case bad weather makes it impossible to present the opera out of doors. Two years ago, when *The Children's Crusade* was to have been sung in the Stadium, rain fell throughout the day and evening and only by its insurance was the University protected from a dead loss of all that had been invested in preparation. A year ago, fortunately, the evening was perfect for the production of *Aida*.

It was with a view to selecting a date as far as possible into the month of June that the Saturday before commencement was chosen. Hitherto the performances have been in late May or at the very first of June, and records show that the likelihood of rainfall diminishes as the month advances, while late May is a period of unusually frequent rains.

Professor Killeen, who has been chiefly responsible for the development of outdoor opera at Minnesota, will not only direct and rehearse the cast in preparation for the main performance, but will conduct the entire opera.

University Freshman Scholarships

*A Special Opportunity for High School Students Is Announced by
Dean J. B. Johnston of the College of Liberal Arts*

ON April 28 and 29 the University expects a notable gathering of high school seniors on the campus. They will be some of the best students in their schools. They will come from cities, villages, and farms all over the state. They are coming to try their intellectual gifts and their acquired skill in friendly competition in examinations for fifty scholarships offered by the University for freshmen.

The examinations and other information which will be collected are intended to measure the aptitude of these students for university work. The scholarships will be awarded to those who in the judgment of the examining committee give the highest promise of achievement.

Why is the University doing this? Why does it invite the most promising young people to take these examinations? Why does it propose to expend a part of its income in gifts to fifty freshmen?

The University's main purpose is to impress upon high school students, their parents, and the general public the importance of having the best students avail themselves of the higher education offered by the state. By "best students" is meant those who have received the highest intellectual and moral endowments by nature; those whose experience and efforts have made them the most capable; those whose interests and zeal will lead them to put forth their best efforts to develop the powers they possess. Those we call the best students are the most gifted, the most intelligent workers, and the most ambitious. In general these students are near the head of their high school classes. In general, too, these are the persons who will make the best use of the accumulated human knowledge to improve the organization of industrial and political society and to secure for our people greater comfort and happiness. At the present time only a small part of these best students are taking advantage of the opportunities offered by the University. It is the first purpose of the University to implant

in the minds of young people and the general public the idea that larger numbers of those most promising students should accept the higher training offered by the state for the good of its people.

When the students come to the University for the examinations they will have a chance to see for themselves the University and the facilities it has to offer. They will see students and faculty going about their daily work. They will see the great University Library with its 465,000 books and reading rooms seating more than 1,000 students; they will see the buildings specially constructed for the laboratory sciences, and all the provisions for social activities, games, recreation, and health of a group of 10,000 to 12,000 young men and women enrolled at one time as students. Even two days' acquaintance will give these boys and girls of the high schools a better means of deciding whether they want to join those already here in the pursuit of knowledge.

It will be the highest honor the University can show to a freshman to give him one of these scholarships. It accounts the honor of far greater moment than the \$100 that go with the scholarship. By this recognition of gifts and achievement already won, the University says to its whole student body: the type of work which these students appear capable of doing and the development and training of students of such capacities, we consider the finest service which the University can render the state. These students will be listed as university freshman scholars. If they live up to expectations they will be enrolled with many others each year as the honor students of their respective classes. These honor students may look forward to election to Phi Beta Kappa, Sigma Xi, or other honorary societies and to graduation with honors at the end of their course. It is from among students of this sort that come the leaders in the professions, conspicuous men of science, and scholars, and the teachers who in time must train later generations.

Minnesota Faculty Scholars Will Study Abroad

The Backgrounds of Swedish Immigration, Plant Resistance to Cold, and Catalysts in Chemistry Are the Subjects

THREE professors at the University of Minnesota are among the 63 American scholars to whom have been awarded fellowships for study abroad, under the John Simon Guggenheim Memorial Foundation. Two of the three are in the field of natural science, and one in a social science, history.

Dr. Rodney Beecher Harvey, associate professor of botany, will spend most of next year at Cambridge University, England, investigating the effects of low temperatures on plants. Much of Dr. Harvey's work has been widely recognized, including his discovery that ethylene gas will hasten the ripening of fruits and vegetables. By injecting less than 40 cents worth of gas into a carload of green bananas he has ripened them within 48 hours.

Dr. Lloyd Hilton Reyerson, associate professor of chemistry, will spend most of the coming year in Berlin, studying at the Kaiser Wilhelm Institut under Dr. Herbert Freundlich, the noted exponent of colloid chemistry who was the principal guest lecturer at the National Colloid Symposium at Minnesota two years ago. His investigations will be in the field of contact catalysis, studying those mysterious elements in chemical reactions, the catalysts, whose presence causes a change in the rate of chemical reactions, though chemists have been able to find out for the most part only that catalysts do change reactions, not why they change them.

Dr. Reyerson is a native of Minnesota, who was born at Dawson, May 1, 1893. He attended Carleton College, graduating in the class of 1915, took his Master's degree at the University of Illinois and came to Minnesota in 1919 after completing resident work for his doctorate of philosophy at Johns Hopkins University, which bestowed the Ph.D. degree on him in 1920. He has recently published a number of papers on the properties of catalysts,

and has one now in press on "The catalytic activity of metallized silica gels," written with Vlon L. Morris of the department of chemistry. Mr. Morris presented at the recent meeting of the American Chemical Society at Richmond, Virginia, a paper prepared by himself and Dr. Reyerson on an allied subject.

Will Study Swedish Immigration

Of his plans to spend next year in Sweden, studying the causes and history of the great Swedish immigration into the United States, Dr. George M. Stephenson, of the Department of History, writes:

"I first became interested in the history of immigration to the United States in 1912 when as a graduate student in history at Harvard I began to prepare my doctor's thesis on the public lands under the direction of Professor Frederick Jackson Turner, whose studies in the influence of the frontier in American history have revolutionized the interpretation of American history. Although not at that time primarily interested in that phase of the subject, my researches indicated very clearly the vital relation between the vast public domain in the United States and the great exodus from the countries of northern and western Europe. I was fortunate enough to come into the possession of a number of immigrant letters—the so-called 'American letters'—written by my grandfather and parents in the years from 1849 to 1870, which revealed the human side of the immigration movement. A number of these letters have been translated and published in the Yearbooks of the Swedish Historical Society of America.

"One aspect of the immigration movement which has interested me very much is the European background, which involves an intensive study of the economic, cultural, political, religious, and social development of indi-



Top to bottom: Professors L. H. Reyerson, R. B. Harvey, and Geo. M. Stephenson.

vidual countries as a proper basis for an understanding of the causes that impelled the emigrants to cast loose from the old moorings and of the reactions of the immigrants to the American environment. In an article on 'The Background of the Beginnings of Swedish Immigration,' published in the *American Historical Review* for July, 1926, an effort was made to correlate some of the conditions and events which set in motion and accelerated the migration from Sweden to the United States during the formative years of the great exodus. Accepting the commonplace doctrine that the principal cause of the movement was the immigrants' desire to get a 'better living,' it set forth the contributing factors which, taken together, offer a more satisfactory explanation.

"In 1926 I published a book on the *History of American Immigration*, which was prompted by the fact that the part the immigrants and immigrant stocks have played in the political development and activity of America has been largely neglected by historians. This book gives a brief survey of the European back-

ground, the various 'nativistic' movements, the immigrants in politics, the political history of immigration legislation, the influence of the World War on immigration and the immigrants, and Oriental immigration. An article on 'Nativism in the Forties and Fifties, with Special Reference to the Mississippi Valley' in the *Mississippi Valley Historical Review* for December, 1922, sets forth the part immigration played in shaping the politics of that period of American history.

"At present a book on *The Founding of the Augustana Synod*, the Swedish Lutheran church organization in the United States, is in press and will be published this spring.

"During my year's stay in Sweden my headquarters will be in Stockholm, where I will have access to the rich collections of material in the libraries and archives. The collection of Swedish-American newspapers in Stockholm is the finest and most complete in the world. Augustana College at Rock Island, Illinois, has the next best collection. I have made four trips to Rock Island within the last six years to work that material, as well as the manu-



scripts in the Norelius collection, which is the property of the Augustana Book Concern. In Sweden it is my intention to visit various provinces in order to explore the local archives and to absorb what the environment may yield. In view of the fact that there is in this country considerable material on the Swedish-Americans, my main interest in Sweden will be to explore the material relating to the various aspects of the background of immigration."

Dr. Harvey Will Travel Widely

Dr. Harvey's program of study is aimed at direct service to mankind through adding to its knowledge of those plants, especially vegetables and fruits, that may be produced profitably in cold regions. Preliminary to some of the practical studies he has in mind, however, will be further search for basic information as to low temperature effects on plants, and these he plans to pursue at the Low Temperature Station for Research in Biochemistry and Biophysics at the University of Cambridge.

Following perhaps six months' study at Cambridge, he will go to the Bromberg Station in Germany, where studies in the low temperature resistance of plants are being conducted. If conditions in Russia warrant at that time, he plans also to go to the Botanic Garden at Petrograd to consult with Dr. N. A. Maximow on phases of this problem that are under investigation there. Later he will enter the interior of Russia, he hopes, and will visit the Universities of Tomsk, Tobolsk, and Kazan to survey the boreal floras of Asia and establish exchange relations with these localities for the Department of Botany at the University of Minnesota.

Dr. Harvey will carry with him letters of introduction from Dr. Raphael Zon, head of the Lakes States Forest Experiment Station, who is a graduate of the University of Kazan, and from Dr. Helen Sorokin, wife of Professor Sorokin of the Department of Sociology, who is well acquainted at the University of Tomsk.

Specimens collected in the northern regions of Russia will be turned over to the botanical department at the University.

One Study Leads to Another

In an outline of proposed studies written by

Dr. Harvey it is revealed that his success in ripening fruits and vegetables with ethylene gas came as a by-product of his experiments in growing plants under artificial light, a natural sequence inasmuch as the green color in plants comes from the chlorophyll created in them by sunlight.

"This work," (upon chlorophyll-light relations) he writes, "led to the growth of plants in artificial light from seed to seed for the first time. It makes possible the accurate control of that most difficult factor in plant growth, the illumination. Temperature, humidity, and other factors have been controlled for years in experimentation, but results on the control of light intensity and duration in plant growth followed from this work.

"Another phase of the light-chlorophyll relations was undertaken as a result of inquiries from greenhouse men on the effects of ethylene and illuminating gas on the loss of color in the leaves of greenhouse plants. This led to work on the relations of ethylene to chlorophyll decomposition. One practical application was discovered in the use of ethylene gas in blanching celery. This is now a commercial practice.

"Observations on the effects of ethylene on the production of sugars in celery led to trials of its effects upon other vegetables and fruits. This line of work has been prosecuted to the limit in the last three years, for it was discovered that tomatoes, bananas, and other fruits ripened quickly and with excellent flavor under treatment with this gas. Tomatoes, celery, and bananas have been treated with ethylene in carload lots with much saving in time and improvement in flavor. One fruit dealer in Minneapolis treats three to four carloads of bananas each week at negligible cost, yet with great improvement in quality and with great speeding up of the ripening. Bananas can be ripened from a very green state to fine flavor in forty-eight hours as a result of this discovery."

Although he is but 36 years old, Dr. Harvey has published between 50 and 60 scientific papers and has about ready for publication two textbooks in his fields of science.

The work by Dr. Reyerson which led up to his researches on contact catalysis began with the discovery that hydrogen, adsorbed in porous

materials such as silica gel, would reduce on these surfaces such metals as platinum, silver, and palladium. Metals in a fine state of division have the property of catalyzing chemical reactions, which is to say, changing the rate at which they take place. Some of the most important of modern chemical operations are made possible by the use of catalysts. Noteworthy among such operations is the achievement of Professor Haber, of Berlin, in fixing the nitrogen of the air. This is done by making ammonia from nitrogen and hydrogen in the presence of an iron catalyst. This discovery is said to have made it possible for the Germans to carry on in the late war. The catalysts produced by Dr. Reyerson have been patented, and in the laboratory experiments have been found very active in such chemical reactions as the hydrogenation of ethylene and acetylene and the oxidation of hydrogen at low temperatures.

The experimental work supports the modern view of active centers in catalytic materials.

In Germany with Dr. Freundlich he proposes to study experimentally the rôle of these surfaces in the catalytic process and find, if possible, what is the mechanism that renders the molecules reactive. The Kaiser Wilhelm Institut is a very logical place to do this work because Professor Haber is there as well as Professor Freundlich, the latter, one of the leading authorities in the world on the chemistry of surfaces.

Will Investigate Catalytic Action

Dr. Reyerson expects to do some work in England during periods of inactivity at the Berlin laboratories, and also to travel in Europe during the four weeks' vacation period that is permitted to fellows under the Guggenheim endowment.

Summer Sessions Appeal To Thousands

Regular and Special Courses for 1927 Terms Offer a Splendid Range of Opportunities

A COMPLETE series of courses in practically every field of college work and, in addition, a splendid program of recreation, including lectures, concerts, plays, social gatherings, excursions, and opportunities for athletic diversions, have been announced for the 1927 Summer Session of the University of Minnesota by the director, Dean F. J. Kelly. The first term will run from June 17 to July 30 and the second from July 30 to September 3.

By attending both terms of the Summer Session a student can complete the equivalent of more than a quarter's university work by taking the full program permitted, nine credits or two five-credit courses each term. No minimum restriction on the amount of work to be taken is applied, and students may attend the Summer Session to take a single course and enjoy the recreational opportunities if that is preferred.

Several hundred members of the regular faculty of the University of Minnesota will teach in the Summer Session. There will be, also, a number of well-known visiting teachers. Among these will be, in educational administration, Dr. Joseph C. Brown, president of the State Teachers College, St. Cloud, and Dr. J. Orin Powers, of George Washington University; in history of education, Dr. C. C. Peters, of Ohio Wesleyan University, and O. B. Griffin, of Teachers College, Columbia University; in history, Dr. Henry S. Lucas, University of Washington, Dr. Eugene M. Violette, University of Louisiana, and Dr. Carl A. Melby, St. Olaf College; in library training, Clara F. Baldwin, director of libraries for the Minnesota State Department of Education, and Harriet A. Wood, assistant director of libraries in that department; in biology, Ethelbert W. Stafford, of the Mississippi College of Agriculture and Mechanic Arts.

Minnesota maintains one of the best attended university summer schools in the United States.

Last year's first session was attended by 3,982 students, and the second session by 1,400 more, a total of nearly 5,400. Many hundreds of these are teachers in Minnesota and other western states who seek to improve their training and add to their informational equipment by studying during the summer months. The sessions also are attended by a considerable number of undergraduates who find it necessary to obtain extra credits, and by former students who desire to complete enough work to obtain a degree.

To Study Journalism Abroad

Two courses unique in the history of Minnesota summer sessions are to be offered this year. Professor E. Marion Johnson, head of the Department of Journalism, will conduct his second European Journalism Tour, visiting many important foreign centers of culture. En route formal courses in "Special Feature Articles" and in "Foreign News Sources" will be offered. The University has agreed to give credit for these to successful students who enter them with the necessary prerequisites. Professor Johnson will have as assistants Professor Eric W. Allen, dean of the School of Journalism in the University of Oregon, and Professor Henry E. Birdsong, who directs the work in journalism at Butler University, Indianapolis, Indiana.

A "travel-study" course in geology, designed especially for teachers, will be offered by the Summer Session in co-operation with I. S. Allison, instructor in geology. The party will leave St. Paul on Monday, June 13, and follow the route of the Northern Pacific Railway, making 10 stops at points of special geological interest in North Dakota, Montana, Idaho, and Washington, reaching Seattle on July 4. The Dakota "badlands," Montana coal fields, Yellowstone Park, the mining and smelting district at Butte and the many interesting effects

of glaciers, ancient lava flows, and sedimentation in the region of the Cascade Mountains will be studied.

A Special Course for Merchants

For the first time in several years practical courses for merchants will be offered in the 1927 Summer Session. Dean Russell A. Stevenson, of the School of Business Administration, has placed these in the second term of the Summer Session, July 30 to September 3, and has engaged as their director H. H. Maynard, professor of marketing in Ohio State University.

There will be a course in Sales Administration, meeting daily at 10 a.m. and one in Merchandising, meeting at 11 a.m. The former is described as a "course for sales managers, whether active or prospective, designed to give the necessary understanding of the relation of the sales department to other parts of a business. In addition it will deal with many of the problems of personnel in the sales department. Problems and cases taken directly from sales experience will be used as a basis of discussion. By weeks the course will divide into consideration of "the relation of sales departments to production, credit, and other departments within a business," "qualifications and duties of a sales manager," "organization of the sales department," "personnel problems: selection, training, supervision, payment," "sales policies, sales methods, sales strategy."

"Merchandising" is described as "a practical course in the management of retail stores, especially designed to help retail merchants solve their problems." Week by week this course will take up: "Consumer demand and the consumer's point of view;" "types of store and tendencies in retailing;" "meeting competition, store location and store layout;" "where, when and how to buy, inventory methods, stock control and stock turn;" "retail salesmanship, advertising, and display;" "price policies, merchandising policies."

The School of Business Administration will also offer the usual courses in economics, money and banking, corporation finance, labor problems, commercial policies, accounting, statistics, marketing, investments, business cycles, and the like.

Leaflets announcing some of the many other fields of study in which work will be offered, contain the following suggestions:

Animal Biology: Teachers and others who cannot attend the University during the longer quarters of the year will be afforded opportunity to obtain a broad preparation along biological lines and to complete the requirements for the Master's degree during the Summer Session. The work is so planned and scheduled that a definite program of work covering three or more terms of six weeks each can be outlined.

Botany: The courses in botany are designed to meet the needs of teachers, university students, and graduate investigators.

The best time to study plants is during their period of growth, the summer season. The lakes, streams, woods, and swamps in the vicinity of the University offer a wide range of habitat and make field work very interesting and satisfactory in results.

The department now occupies the new Botany Building, adjacent to the greenhouses, and the laboratories, facing north and east, are cool and comfortable even on warm days. The University Library offers ample and convenient facilities for reading along lines of special research problems.

Offer Courses for Librarians

Library Training: The courses in library training are offered as introductory to, and not as a substitute for, a complete course of training in library procedure. They constitute an integral part of the summer session program, and students registered for them may elect courses in any of the colleges or departments to supplement the work in library training. Not more than nine credits' work should be attempted.

No one with less than a four-year high school preparation, or its equivalent, will be admitted to these courses.

Credits towards a Bachelor's degree will be given to students with at least two years' credit of approved college or university work who satisfactorily complete the above courses. Students with less than two years of college or university credit, but who are employed in regular public or school library work, or who are

under appointment to such positions, may be admitted as "no credit" students on presentation of satisfactory evidence of ability.

Education: The full university offering in the organized curricula in Administration and Supervision is again made available during the Summer Session for superintendents of schools, elementary school principals, junior and senior high school principals, counselors, deans, advisers, and general and special supervisors, as well as administrative officers and staff members of junior colleges, normal schools, and colleges.

In addition, courses in the junior college, normal school administration, educational publicity, and other subjects have been arranged specifically to meet the needs of men and women in these professional fields.

The members of the regular college staff, in association with other specialists, will be on hand thus providing the summer school students with unusual advantages for undergraduate and graduate work.

Courses in allied subjects (such as psychology) and in the subject-matter of the various teaching departments (English, science, history, and the like) are offered in large numbers in other colleges.

Mathematics: The co-operation of the several colleges makes available the study of the entire field of mathematics, both for mathematical content and for application to technical processes.

Attention, particularly that of teachers, is called to the course in the History of Ancient and Modern Mathematics. This is introduced for the benefit of those who may have all requisite preparation in mathematics but are desirous of broadening their viewpoint in the field.

Music: The Department of Music desires to call the attention of all interested in either specialized or cultural training in music to the courses offered this summer in the theory and practice of the art. The department is specially equipped with an excellent faculty, practically all of whom are in residence this summer, and a fine new modern building, which provides all facilities for practice as well as for instruction.

Minneapolis is a recognized center of musical culture, and opportunities for musical contacts are available in addition to those offered at the

University. The city library specializes in its service to music students, with a complete collection of standard music as well as books about music. Fine concert programs may be heard in the summer.

May Study in Child Institute

Because of the widespread interest in the young child and the field of parental education, the Institute of Child Welfare is offering a full program of courses in the summer quarter both for students seeking undergraduate and graduate credit.

The institute was organized in July, 1925, with the aid of a grant from the Laura Spelman Rockefeller Memorial. Its purposes are: the study of the development of the young child from as many aspects as possible, training of future workers in the field of child welfare, and carrying to the people of the state through its teaching and extension services the information accumulated in its own and other research centers. Co-operating with the institute in its research and extension program are a number of university departments: Anatomy, Education, Home Economics, Nervous and Mental Diseases, Pediatrics, Psychology, Public Health Nursing, Sociology, and the General Extension and Agricultural Extension divisions. The institute maintains a nursery school for children between the ages of two and five, which will be in session during the first term.

Home Economics: During the Summer Session of 1927 the Home Economics Division will offer courses for three types of students. Elementary courses in home economics and related subjects are offered to those who wish to begin a home economics course. More advanced courses are offered for the regular student body or transfer students and any others who may wish advanced courses toward a B.S. degree in home economics. A considerable number of graduate courses are available for persons desiring to do graduate work in the field of home economics, and who expect to major or minor in home economics, for either a Master's or a Doctor's degree. Especial attention is given to transfer students. Those persons transferring from other institutions who are interested in securing either an undergraduate or a gradu-

ate degree should transmit a record of training in order that it may be evaluated before the opening of the Summer Session. Prompt attention will be given to such inquiries.

Rich Program in Chemistry

The School of Chemistry is offering during the Summer Session a broad series of courses and many opportunities for research for both graduate and undergraduate students. Many of the regular advanced courses, as well as elementary courses, will be offered during the first term. For the second term, only elementary courses have been scheduled. The Department of Physics is also offering many summer courses, some of them of particular interest to students of chemistry. Among these may be mentioned radioactivity and X-rays, conduction through gases, modern physics, dealing with recent theories and research, heat and pyrometry, optics,

and electrical measurements. Courses will also be offered in agricultural biochemistry, chemical engineering, and, in the Medical School, by members of the Departments of Bacteriology and Physiology.

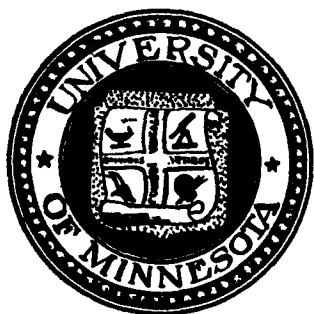
Dr. Harold S. Diehl, head of the Department of Preventive Medicine and Public Health, has announced a series of five courses in that field, with which will be combined field work in infant welfare, school nursing, rural nursing, the work of the visiting nurse, and studies at the Glen Lake Tuberculosis Sanatorium. The university courses in public health nursing also will be offered in the Summer Session.

Among many other courses will be rich programs in geography, history, political science, sociology, English, modern languages, agriculture, forestry, and home economics, and physical education.

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MINNESOTA CHATS



For a Better
Minnesota

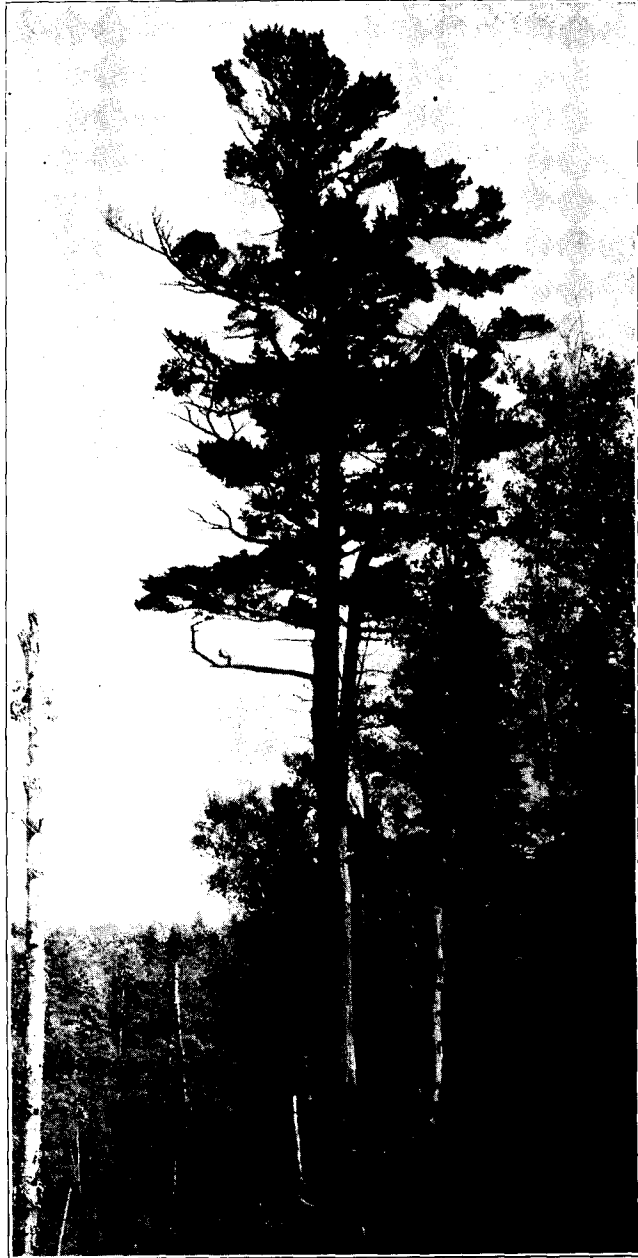
FOREWORD

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MINNESOTA CHATS, although not a weekly, is pleased to devote part of its May issue to material in line with that used by more than 200 other Minnesota publications during "Minnesota Week" to point out the attractions and advantages of the state of Minnesota. President L. D. Coffman's article lays emphasis on some important points not always mentioned in discussions of a state's assets. The article describing the work of Professors F. K. Butters and C. O. Rosendahl in compiling an authoritative book on *Minnesota Trees and Shrubs* is intended to inform and interest the thousands who are delighted each year by the abundant and varied tree species of the "State of Ten Thousand Lakes."

DESPITE the emphasis on these articles, it is to be hoped that the reader will find equal interest in the article by Mr. F. K. Walter, university librarian, on the place of the library in the community.

MINNESOTA CHATS presents this month's issue with a feeling that all of the material included is of rather more than usual interest.



The White Pine

What Minnesota Means To Me

By President L. D. Coffman

“WHAT MINNESOTA MEANS TO ME” is a question that cannot be answered in a single breath. It would be easy to choose some one thing and to emphasize that to the exclusion of many other important things. One could point with pride to the fact that Minnesota is a state of varied agricultural interests, and that through the diversification of these interests it is gradually but nevertheless effectually solving its economic problems. One could call attention to the cosmopolitan character of its population; to the distribution of this population throughout the various sections of the state; to the patriotism and high-minded character of this population, and to the fact that there is being created here from the races drawn from every European country, a new race adapted by disposition and endowed by nature for life in the Northwest. One might call attention to the youth and vigor of our people, for after all, Minnesota is one of the youngest states in the Union. Here we are not bound by tradition or tied by caste. We feel free to consider any problem unhampered and untrammelled by conservatism or inflexible custom.

Minnesota to me, is not an area bounded by geographical lines or covered with certain topographical features. It is not a population engaged in certain pursuits. When I think of the state, although I may mention these features, I do not feel that I am advertising it to the best advantage when I exploit its industries, its agriculture, or its physical features. Highways, corporations, manufacturing establishments, industries, agriculture, are all essential to the welfare of a state. But after all they are not the things that endure. Things that endure are things of the spirit,—art, literature, religion,

education, neighborliness. Give me a state that emphasizes these things and I will show you a state that has all of the industry that it needs. Give me a state that exalts religion and education, science and culture, and I will show you a state where industry and agriculture are conducted on a high plane. When I choose a state in which to live and people with whom to associate, I want them to be controlled not by materialism but by idealism. I want them to be concerned not with the counting of their money but with the uses that they make of it.

I have the feeling that we can realize these ideals more nearly here in the Northwest than in any other part of this country, partly because of our youth and vigor; partly because of the cosmopolitan character of our population; partly because we do not feel that our problems are solved; partly because of the traditions which have been brought by many of the people of our state from their fatherland; and partly because of the ideals which have permeated our population from the pioneers who founded this commonwealth of ours. Indeed, Minnesota is a place of hope, a state in which we can afford to dream dreams for the building of a commonwealth which will be bound together by its spiritual relationships. I think of Minnesota as a place to live, a place to work, a place to play. Minnesota means to me an opportunity to achieve something in the way of neighborliness, home life, religion, and education, and to achieve it better than it is being achieved anywhere else throughout all the broad world. This calls for mutual good will, mutual respect, mutual confidence, rather than criticism, dissension, and a consideration of the material aspects of life.



The Trees and Shrubs of Minnesota

University Botanists Complete a Study of These Most Beautiful and Useful State Assets

HOW many have ever seen a beech tree growing wild in Minnesota?

How common in Minnesota is that well-known evergreen, the hemlock?

How many kinds of wild nuts may be found in the state?

Such questions are more or less incidental to the purposes of the new and rewritten book on *Minnesota Trees and Shrubs* which has been prepared by members of the Department of Botany at the University of Minnesota and will

covers everything with woody stem and root, ranging from the state's largest trees, white pine and cottonwood, down to the wild rose, fragrant wintergreen, and shunned poison ivy.

Knowledge accumulated during a lifetime of studying the plant life of Minnesota together with reference to all known works on the subject has gone into the production of the new book, which will be of especial value to school and public libraries and college and high school

be ready for distribution in the late summer or fall. But they represent one type of interesting information it will bring to non-scientific readers in the general public.

The answers may not have been written down in the book in so many words by the authors, Professors F. K. Butters and C. O. Rosendahl, but somewhere in the text and tables replies to almost every conceivable question regarding Minnesota vegetable life of the woody-stemmed varieties can be found. For this book



Hard Maple



White Oak

botany classes, as well as to all who take a warm interest in the plant life, trees, forests, and forestry problems of Minnesota.

Drs. Butters and Rosendahl are also the botanists who co-operated to produce the splendid chapter on Minnesota plants and flowers that appears in the *Guidebook to Highway No. 1*, published by the Minnesota Geological Survey as Bulletin No. 20, a book which everyone interested in the state's natural attractions should have in his library and everyone who tours over the country traversed by Highway No. 1 should carry.

According to Dr. Butters there is no authenticated instance of a beech tree growing as a native of the Minnesota forests. In Warren Upham's *Flora of Minnesota* there is reference to a mammoth beech which once grew at the upper end of Grey Cloud Island, in the Mississippi River below St. Paul. The tree is said to have been worshipped by the Indians as something magnificent and unusual. Dr. Butters believes it barely possible that this may actually have been a beech, possibly sprung from a nut dropped on the island by one of the early voyageurs from eastern Canada. It hardly could have been a result of natural planting.

Hemlock invades Minnesota at only one point, in eastern Carlton County, where it has passed over the state line from the Wisconsin hemlock forests. Otherwise the conifers of Minnesota are the white, Norway, and jack pines, the black and white spruces, the tamarack (a larch), balsam fir, white and red cedar, dwarf cedar, juniper, and dwarf yew. Generally speaking, this collection represents all of the conifers of the northeastern United States with the exception of the red spruce. Many

conifers of the southern, southern Appalachian, and western regions are missing from Minnesota forests.

Five varieties of nuts grow wild in Minnesota woods, including the bitter hickory, or pignut. The four good varieties are the shag-bark hickory, butter-nut, black walnut, and hazel-nut.

The new book will list twelve species of blackberries and raspberries, mostly native to the state, two species of wild grape, the wild plum, wild crab apple, pin cherry, black cherry, and choke cherry. Among the maples are the hard maple, black maple, soft maple, mountain maple, red maple, and box elder. The three elms are the white elm, the species usually encountered, slippery elm, and rock elm. Eight oaks are noted, the most common being the red and bur oaks. The white oak is abundant in the southeastern section. Five poplars and about 20 willows are recorded.

The family *Rosaceae*, including the wild roses, thorn apples, wild crab apple, blackberries, and raspberries, will take up a larger part of the volume than any other family to be described. Twelve species of hawthorn, including the thorn apples, will be included, one of them a cultivated variety. Fifteen species of rose will be enumerated, of which five are natives.

The authors are including in their lists not only native plants but those which have been planted so generally that many will have seen them and may be curious to know their exact identity.

They are of the opinion that in the Minnesota of today the white elm may be the most numerous tree, especially when one includes the thousands that have been planted by man.

Other notable Minnesota trees include the



basswood, which with the hard maple made up about two thirds of the stand in the famed Minnesota "Big Woods," and the green ash and black ash, both common in southern Minnesota.

About the hardest group to classify was that of the willows. When all work on this group had been finished the manuscript was sent to Dr. Carlton R. Ball, of the United States Department of Agriculture, Washington, D.C., for him to check. The study of the American willows is Dr. Ball's hobby and he is considered the national authority on that family of trees.

Minnesota woody vines, this book says, are the Virginia creeper, two varieties of wild grape, the bitter-sweet, three species of honeysuckle, the white and purple clematis, and the moonseed.

Minnesota Forests Described

The following pages are a reprint of one chapter from the forthcoming book:



Thorn Apple

From the standpoint of vegetation Minnesota may be divided into three great regions, occupied originally by the evergreen forest, the deciduous forest, and the prairies, respectively. Each of these regions has its characteristic plants, while comparatively few of the trees or shrubs of the state are equally at home in all three of them, although some occur in all.

The Evergreen Forests

The evergreen forest originally covered the northeastern one third of the state, extending south to a line about half way between Duluth and Minneapolis, and west nearly to the Red River Valley. These evergreen forests were



Juniper

continuous with those of Ontario on the northeast, and with those of Wisconsin and upper Michigan on the east. The characteristic trees of the mature upland forests of this region are the three native pines, white spruce, balsam fir, and white birch, while the swamps are filled with black spruce, tamarack, and white cedar. Deciduous trees, other than the white birch are generally minor or temporary factors in the vegetation. Throughout the region such trees as the balsam, poplar, aspen, red maple, pin cherry, black ash, yellow birch, and mountain ash are more or

less frequent, but, except where there has been interference with natural conditions, they form a quite subsidiary part of the vegetation. The destruction of the coniferous forests by fire or lumbering is usually followed by a rapid growth of poplars and birches, which for a time form the dominant vegetation. If there is no further interference this growth is in time replaced by a

return of the conifers except where the original destruction has been thorough and so widespread that there is no available source for seed. However in many places in the northern part of the state, fires have been so frequent as to keep the vegetation more or less permanently in the birch-poplar stage, and finally, by consuming most of the soil, so to limit the growth that it is reduced to mere thickets of these species.

Here and there, throughout the region of coniferous forest there are definite inclusions of genuine hard-wood forest, characterized by the dominance of such trees as the hard maple, basswood, American elm, and red oak. These patches of hardwood timber are usually found on rich morainal soil, and in situations which are relatively free from late spring forests, adjacent to large lakes, or on ridges where there is free air drainage. They are sometimes quite without admixture of evergreens, but frequently contain some large white pines mingled with the deciduous trees. This type of forest is particularly well developed in the vicinity of Mille Lacs, and between that lake and Aitkin.

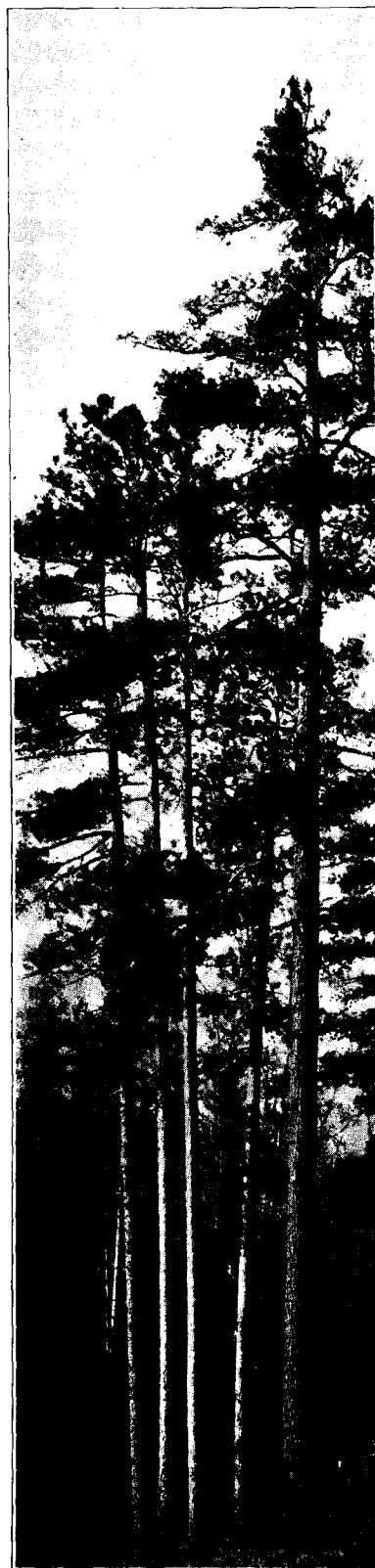
The shrubs as well as the trees of the evergreen forests are, many of them, characteristic. Here are found the white-flowered thimbleberry, the mountain maple, dwarf birches, elders, sweet-fern, several kinds of bush honeysuckle and the hairy climbing honeysuckle, high-bush cranberry, *Rosa acicularis*, and most characteristic of all, numerous heaths such as Featherleaf, Labrador tea, trailing arbutus, winter-green, dwarf Kalmia, and several kinds of blueberries and cranberries.

The Deciduous Forests

The deciduous forest occupied a strip extending across the state from southeast to northwest and forming an almost complete barrier between the evergreen forest and the prairies. Throughout this region the number of species of trees steadily diminishes from southeast to northwest. It falls naturally into several rather distinct subregions.

(1.) *The forests of the southeast corner of the state.*

The bottom lands and bluffs of the Mississippi were well forested, and in the southern counties the forests extended back twenty or thirty miles across the broken upland lying west of the river. A large part of this woodland is still standing in a more or less modified form. These are the most varied forests in the state. Besides the trees which also occur further north, there are found here such characteristic species as the black oak, shell-bark hickory and black walnut on the uplands, and the river birch, swamp white oak, Kentucky coffee tree, and black maple in the bottom lands. Throughout this district white pines are fairly common on north-facing bluffs, and several natural groups of other northern conifers are known, such as a grove of jack pine



near Rushford, a tamarack swamp in the vicinity of La Crescent, a small group of white cedars on Guin's Bluff between Winona and La Crescent, and the dwarf savin on a number of sandy bluffs. Red cedar and juniper are common on dry bluffs throughout the district.

To the westward these forests merge gradually into the prairies, through a region of prairie groves and savannas, while to the northward the strip of forest becomes very narrow until in the vicinity of Lake Pepin it scarcely extends beyond the bluffs on the river and the short deep side ravines.

(2.) *The "Big Woods."*

The great tract of pure deciduous forest known to the early settlers as the "big woods," occupied a region of rich calcareous clays in the south central part of the state. It was bounded on the east by a line running through Faribault and Northfield, thence northerly, passing about fifteen miles west of Minneapolis, and northwesterly, along the Mississippi river to the vicinity of St. Cloud. The westerly boundary extended somewhat irregularly from Mankato to St. Cloud. The area thus defined is about 100 miles long from north to south, and 40 miles wide at its southern end. All this area was occupied by heavy forests except the bottom lands of the Minnesota river, and occasional marshes. In the less thickly settled parts of this region considerable patches of the original forest are still standing, but in general the land is very fertile, and there has been more clearing of the forest here than in the more rugged southeastern counties. Throughout the big woods the dominant trees were the hard maple, basswood, white and red elms, and red oak. Other oaks are relatively rare, though the occasional specimens of bur oak reach larger size than in the next described area where they are much more abundant. There are no conifers except some red cedars on the banks of the numerous lakes, and the tamaracks in the swamps of the northeastern part of the area.

The commonest tree of secondary size throughout the big woods is the iron-wood, and the most abundant shrubs are dog-woods (especially *Cornus paniculata* and *Cornus circinata*), sumacs, thorn apples, black haw and *Rosa blanda*.

On the west, south and southeast the big woods end abruptly along the line of the prairies, while on the northeast they pass more gradually into the following region.

(3.) *The region of open woods, groves and savannas about the Twin Cities.*

The Twin Cities lie in a region of very mixed soils due to the overlapping of the earlier (non-calcareous) and later (calcareous) sheets of glacial drift of the Wisconsin age. In addition there are extensive sandy and gravelly outwash plains, and to the northward extensive areas of dune sand.

In this region there was much prairie, particularly on gravelly subsoils, with groves of various sizes and some rather large areas of forest. The dominant trees are oaks,—bur oak in the more calcareous soils, white oak in great abundance on the heavier acid soils, and scarlet and northern pin oaks on the sandier areas. In some cases these oaks reach good size, but often, over considerable areas, they are small and scarcely more than large shrubs. Around some of the lakes, and along the bluffs of the Mississippi, forest of better type obtains, and locally it may approximate that found in the big woods. Northwesterly this country of savanna and poorly developed woodlands extends up the valley of the Mississippi especially on the east side of the river, nearly to the edge of the coniferous forest.

In the area now under discussion, conifers are rare, but somewhat more abundant than in the region of the big woods. Red cedar and less frequently juniper and yew occur around lakes, and on the bluffs of the Mississippi and St. Croix rivers. White pine is fairly common along the St. Croix, and occurs in a few situations on the bluffs of the Mississippi. Tamarack swamps are frequent, and may be regarded as local islands of northeastern forest, surrounded by the more southern general vegetation. Finally a larger inclusion of northern forest occurs in northeastern Anoka County, in the vicinity of Coon Lake where there is a considerable area of typical coniferous forest completely isolated from the main body of that formation.

(4.) *A sample of the "Big Woods."*

North and especially northeast of the district

just discussed, a small body of heavy deciduous forest intervenes between this region of open woods and the coniferous forest. This tract reaches its best development in southern Chisago County, where the forest closely resembles the "Big woods" in character, but with a considerable amount of white oak mingled with the maples, basswoods, elms and red oaks. This difference seems to be due to the less calcareous character of the soils in the area now under discussion.

(5.) *The deciduous forests of northwestern Minnesota.*

Northwest of the big woods the forests are of mixed type, often with dominance of oaks over considerable tracts. Both westward and northward the growth is less luxuriant, and finally in the region bordering the northern Red River Valley the deciduous trees are scarcely more than shrubs, and the country is locally known as "Brush-prairie." For the most part this is composed of bur oak, choke cherry, black cherry, aspen, elm, balsam poplar, pin cherry, plum, and willows.

(6.) *The Bottom Land Forests.*

Throughout the general region of deciduous forests a special type of vegetation is found on the bottom lands of the larger streams. In the most unstable situations, subject to frequent overflow the chief trees are willows and the cottonwood. On slightly higher land the white elm and soft maple are abundant along with such trees as the hackberry, green ash and box elder. Such woody vines as the grape and Virginia creeper also occur on the less frequently flooded part of the bottom lands, and often reach great size in such situations.

The bottom land forests of the larger rivers such as the Mississippi, the St. Croix, and the Minnesota, which are subject to long-continued flooding, are generally poorer in species than the bottom lands of smaller streams. As in all other parts of the deciduous forests, the number of species found in the bottom land forests diminishes pretty regularly from the southeast corner of the state towards the north and west.

The Prairie Region

The prairies occupied much of southern and western Minnesota. The native woody vege-

tation in the prairie region may be considered under three heads: prairie groves, bottom land and stream forests, and the shrubby plants of the open prairie.

(1.) *Prairie groves.* These are really detached portions of the general deciduous forests. They are usually found in the vicinity of lakes, or where a meandering stream protects a part of the upland. When they are abundant, as in the district about the Twin Cities, or in the region between the big woods and the Iowa line the country partakes of the nature of savanna rather than of true prairie, and there is often but not always such a savanna-like region between the continuous forests and the open prairie.

The prairie groves partake largely of the character of the adjacent forests, but usually show a greatly diminished number of species both of woody and herbaceous plants. The outer fringe of such groves is usually occupied by bur oaks which straggle out into the surrounding prairie often as small trees, and even as dwarf shrubs. Generally speaking, the larger the grove, the more species it is likely to display, and even the "big woods" may be considered to be a prairie grove on an unprecedentedly large scale and with a corresponding diversity of flora. It bears something the same relation to the beech-maple forests of the eastern United States that the ordinary prairie grove bears to the adjacent continuous forests.

(2.) *The bottom land woods of the prairie regions* are not essentially different from those of the deciduous forests, though here again the number of species is apt to be smaller. Willows and the cottonwood are the commonest trees and shrubs along the smaller streams, with the white elm persisting throughout the state along the larger streams, and the box elder fairly constant in occurrence.

(3.) *Woody vegetation of the prairie proper.* Certain shrubs are characteristically found in clumps, or scattered through the open prairie. As most of the prairie districts of the state are now under cultivation, these shrubs are now to be found chiefly as roadside plants, and particularly along railroad rights-of-way. The most characteristic of these are the prairie wild rose, the wolfberry and *Amorpha canescens*.

Your Town and Its Library

Should We Adopt "More and Better Reading" As a Slogan?

By Frank K. Walter

University of Minnesota Librarian

EVERY progressive community has one. On the circulars and booklets of the Chamber of Commerce or the Boosters' Club it is almost certain to be listed among the "Educational Advantages." Its picture is likely to appear on civic circulars along with those of the court house, the new hotel, the post-office, and the public park. Most of the children and teachers and many of the women use it, and a goodly number of the men have been in it,—at least on special occasions.

More than one thoughtful European has pointed to the spread of the public library as the most significant feature of the mental development of the United States. Since the World War many foreign countries have carefully studied its ideals and its methods with a view to adapting it to their own national uses. A few years ago, President Hibben, of Princeton, referred to it as the one really democratic feature in American life. And yet, of all the major features of American life it is doubtful whether there is any other so little understood or of which relatively so little advantage is taken as the public library.

There were, roughly, about 6,000 public libraries in the United States in 1920, spending \$35,347,156 and owning sixty-five and a half million volumes. The total number of volumes lent outside the libraries was 226,142,926, or 2.13 volumes per person of population.

This library use was not as general as it seems. A careful study made by the American Library Association in 1926 on the basis of the census of 1920, indicates that nearly fifty and one-half million people were without direct public library service. More than forty-seven million were rural people.

The people of the United States usually manage to get what they want. They are confident that public education is a good thing and in 1920 they spent \$1,580,671,296 for public

schools and \$128,117,243 for higher education at public expense. In 1925 these expenditures had increased to about two billions. The people of the United States want automobiles, and in 1925 they spent more than three billions of dollars for them. In 1925 they spent a billion dollars for candy and four hundred millions for soda and other soft drinks.

Beside these amounts the public library expenditures and those for higher education seem small. There must be many who believe in libraries or they would not be so plentiful. There must be many more who ignore or do not believe in them, or libraries would be more plentiful and much more used. They would not only be architectural landmarks and suitable subjects for picture postal cards, but active community centers, as indeed in many cases they already are.

What Is the Library's Real Purpose?

It is an interesting and relatively harmless amusement to get at random popular ideas regarding the real purpose of a library. In any town of considerable size it is rather common to find residents who do not even know where the library is. It is still more common to find persons who are not at all sure of what is in the library or of what use it could be to them.

The library workers and officials are not entirely to blame for this ignorance. There are other public institutions whose purpose is rather generally a matter of doubt. There are excellent reasons for believing that many boys and girls attend and finish school without any clear idea of what the school should be expected to do for them. Many mistake government in general as something to be enforced by officials rather than something to be made effective through the active help of all good citizens. We do not close our schools and disband our

government because they are not fully understood.

The purpose of the public library is to give to all the people of its community an opportunity to read as many of the best books and periodicals as the funds of the library will buy. We flatter ourselves that we are a reading nation and, as far as quantity goes, we are. In 1921, the latest year for which general statistics are available, three hundred and twenty-five millions of books and pamphlets were published. Twenty-two thousand periodicals are listed in *Ayer's American Newspaper Annual* for 1927. Most of these are published with the expectation that they will sell. There is no village large enough for a soda fountain which is not likely also to have a news stand. Those who are remote from a news stand have printed matter poured upon them by the postman and rural delivery carrier.

Reading Habits Are Imperfect

The public schools have reduced illiteracy almost to the vanishing point. Nearly everybody can read and nearly everybody thinks he does read—and, in a way, he does. And yet, when reading habits of any group are analysed one finds a rather deplorable lack of variety. Periodical circulations of a million or more and sales of books in the tens of thousands are not built up except on the basis of making many people read the same thing. The average American buys few books, especially of a serious nature. There is evidence that he buys more than his father did and many more than his grandfather did, but the family library does not take any very important place in most American homes. To be sure, few houses are without books, but it is not always safe to assume that these books are constantly read. If ever the family library does become universal it will probably be because people, by using many books, have learned to value a few enough to buy them and use them.

The public library is a very necessary aid in helping in the selection of the books one needs and wants as private possessions. Most books, like most people, can never be more than acquaintances. These are the books which the public library very properly provides. Most of us have neither the money to buy them nor

the room to house them if we could buy them. And yet, if a community or any citizen of it is to keep up with the times, it or he must know what the ruling ideas of the times are, and these are shown best in book and newspaper and magazine.

For a long, long time teachers and thinkers have been trying to decide what education is. On one thing they agree—at least in theory. The professional educationist and the self-made man who rather more than adequately boasts of his course "in the school of hard knocks," alike recognize that everything which increases aptitude and develops character at any time and in any place, is really education. The completion of a school course is not education. More wisely than they know, the prospective graduates speak of their commencement. More accurately yet they would speak of continuation. School and so-called real life should be recognized as merely two phases of the same life experience.

Helps After-School Education

It is unfortunate that this is not recognized more often. I am aware of no careful extensive study that has been made of the after-school attempts at education by graduates of school and college. Casual observation indicates that such attempts are entirely too few. Many a college graduate stops all systematic attempt to learn after his school days are over. Even the graduate of the professional school is inclined to limit his efforts to the particular parts of his profession which are easiest or most lucrative and to dismiss the rest almost entirely from his mind.

It looks as if a day of reckoning has already arrived for many of us who fail to realize that improvement must be continuous if we would not drop behind. Whatever other meaning the past two decades may have for future students, it is quite clear that things have moved so fast as to make many of us mentally dizzy. Dr. William Mayo is reported as saying (I am unable to verify the report) that mechanical invention has left us lagging so far behind in our mental habits that society at large may be fifty years in catching up to its machines.

Some try to adjust themselves through restless change of occupation or place. But occu-

pations are becoming specialized and change from one to another is becoming more difficult. Change of place does not help much when the stages of the journey are measured by filling stations which display similar oil and gasoline signs or by roadhouses with the same sad dances and the same wild discords from the same kinds of complaining saxophones and fiddles.

Thinking men and women are beginning to come to the conclusion that more and better reading is one of the best means of meeting the situation. To a greater degree than the news stands indicate, there is an increase in reading for something more than amusement.

Extension courses in colleges and universities, and correspondence courses, as well as rather desultory reading, have increased with great rapidity. The University of Minnesota in the academic year, 1925-26 had 8,315 enrolled in its extension classes, 415 in its short courses, and 2,654 in its correspondence courses. It is estimated that considerably more than 150,000 students are enrolled in this country in correspondence courses given by colleges and universities of recognized standing and that perhaps two or three times as many are taking work with commercial correspondence schools. Simple guides to somewhat systematic individual reading are popular.

Desire for Education Spreads

There is no doubt that a desire for more education is widespread. In many cases, especially in the case of grown men and women, this cannot satisfactorily be given or taken in formal classes. In most cases, it is not possible for the would-be student to select or buy the books he needs for this purpose. The smallest public library, if wisely directed, can be of the greatest help in this direction. On its shelves are many times as many volumes as most of its readers privately own. Even with scanty funds, it can almost always buy a few books of value which are too expensive for most of its public.

In the field of direct help in trades or professions, or in home management, its value is most easily seen and often most audibly appreciated. Books of plans for small houses are in constant demand. The files of magazines which

deal with trades or applied science are practically worn out in many libraries.

When the working men and women of a community learn what value recent books on their occupations have for them, it is almost always impossible to meet the demand for these books. This demand comes usually from a comparatively small number, but they are often the leaders who give quality to the product and stability to the industry. Even for selfish reasons, the business men of a community ought to stand behind the public library.

It is significant in states like Minnesota and its neighbors, in which agriculture is prominent, that in very many cases the farm agents, the health officers, and others whom the community employs to help conserve and develop its resources, are the staunchest friends of the public library.

There are not many Abraham Lincolns today who would walk miles to borrow a book or Benjamin Franklins who would go without meat to provide themselves with reading. Books are now so plentiful that such sacrifices are seldom necessary. There are, however, many still who find in books their most direct aid to a better understanding and fuller conception of life. They are often not the best advertisers nor the most conspicuous speakers at public affairs. They are users rather than boosters and they are often in a minority.

Nevertheless, it is on the growing number of people like these that any real community or national progress depends. The determined conservative is already on the road to oblivion as far as influence is concerned. The radical who does not change his mind will soon be a reactionary when social progress either causes his views to be adopted or sweeps them aside as untenable. Any institution which helps increase the number of people who are willing to look at both sides of a question, to grant to others the same freedom of thought and conscience they ask for themselves, is worth supporting.

Some Library Misunderstandings

The public library to many is chiefly a place where fiction and books and periodicals of a popular character are to be found. It is to

them a place for children or for those who want pastime in reading. This is part of its work. It is for the people and it must give the people the best they will use. If it is merely a place for entertainment, this condition may be quite as much an indictment of the people as of the library.

Granting that much of its work must be recreational rather than educational, it may still be of service. The trend of all modern industry and even of agriculture is toward shorter work hours. The twelve-hour day of our fathers and the ten-hour day some of us remember are practically unknown in workshops. It is no longer considered necessary that the day of farm work shall begin and end in darkness. Men and women of all classes, except some long-suffering mothers, have had their leisure greatly increased.

In the opinion of many, one of the greatest problems of the day is the education of the mass of the American people in the profitable as well as the pleasurable use of leisure. A recent writer states the problem this way: "With the removal of the inhibitions due to longer periods of employment, the individual is tending toward activities which are none the less anti-social because engaged in in the professed interests of self-expression." An older authority put it:

"Satan finds some mischief still
For idle hands to do."

Just how this education in the right use of leisure is to be brought about is not clear even to the many educators and social workers and other intelligent minority groups who are working hard to find a solution.

The tendency to use leisure in groups does not necessarily show interest in citizenship. It is not for this reason that the dance halls and the motion picture houses are thronged. The countless fleets of automobiles dashing at random up and down the streets and highways are not all driven in the interests of social service. If you ask the average citizen why he is always "going somewhere" he will probably admit—if he does not tell you it is none of your business—that it is because he does not care to be alone. His own society bores him. He does not even have the philosophy of the

oft quoted Southern negro who was asked how he spent his spare time: "I jest set and think," he said, "and sometimes I jest set."

Do We Think for Ourselves?

Topics for common conversation, aside from baseball, golf, bridge, the latest murder or divorce scandal, and a few other major items, are hard to find in a mixed company. As suggested before, even the adoption of second-hand opinions, digested and simply presented, is becoming standardized. We do not read the McNary-Haugen Bill, but we quote what editors have said about the Associated Press accounts of what senators, experimental presidential candidates, or the White House spokesman have said about it. In most communities where it is probable that the majority read only a few newspapers at most, this does not tend either to adequate knowledge or deep conviction. The public library can do much at least to give an opportunity to vary one's reading and to form one's own conclusions.

Libraries are one of our oldest institutions. They existed before formal schools or schooling were known. They were at first jealously guarded by authorities who felt that the chances for gaining knowledge from them would be dangerous if given to the common people. They were gradually made more and more accessible as the idea of democracy developed and the need of popular education as an assurance of the stability of the state became recognized. This is the chief reason why public libraries for the whole community have been supported by public funds and why they have flourished in the United States, and in all other countries with democratic ideals.

They supplement every other educational activity. They furnish a means of continuing self-education long after the most advanced course in school or college or professional school is over. They promote tolerance by giving anyone a chance to get both sides of questions in controversy. They offer aid in trade or profession, they brighten and improve leisure time by giving everyone a chance to cultivate acquaintance with the thoughts and the ideals and the personalities that have survived the acid test of time.

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MINNESOTA CHATS



For a Better
Minnesota

FOREWORD

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AS an assistant in the office of the late Dr. F. A. Dunsmoor who was then dean of the "Minnesota College Hospital," Alfred Owre performed the registration of the first young man who ever entered upon the study of dentistry in the state of Minnesota. Later young Owre completed both the dental and medical courses which were established in the University of Minnesota, and in 1893, in his junior year, he became an assistant in operative dentistry, his first faculty connection. Twelve years later, in 1905, Dr. Owre was made dean of the College of Dentistry, a position he has held during the ensuing 22 years. In that period he has raised the dental college of the University of Minnesota to an undisputed place among the few leading dental colleges of the world. He has made associations and friendships throughout the state and nation, in the Orient and in Europe.

DEAN OWRE'S acceptance of the call to become dean of the School of Dental and Oral Surgery in the new Columbia Medical Center in New York City deprives the University of Minnesota of a campus figure who has been a leader in the truest and best sense of that word, both a professional and a personal leader, whom it is hard to see go.

As he leaves for the field of his new endeavors, however, Dean Owre carries with him the sincerest good wishes, not only of the institution and those who comprise it, but of the entire state of Minnesota.



Dr. Alfred Owre

(See "Foreword" on the inside cover)

The Broader Meaning of Intellectual Achievement

By Dr. L. D. Coffman

President, the University of Minnesota

THERE are those who maintain that the sole purpose of an institution of higher learning is intellectual training. By intellectual training they mean the discovery of new ideas, the systematic and orderly arrangement of ideas, and their inculcation through the processes of education. The measures of the effectiveness of intellectual training are the amount of information an individual possesses in a given field and his ability to think in that field. Ability to think involves the arrangement of ideas, the discovery of relationships, the massing of information as evidence in support of a hypothesis, the application of facts, theories, and principles in the interpretation of new situations. In college circles marks, grades, credits, and honor points are the mathematical or symbolical devices used to distinguish intellectual achievement.

Now and then a college or university sets aside a day and provides a special exercise to pay tribute to those who have made the greatest progress and have achieved the most in intellectual pursuits. While we wish upon such occasions to acknowledge our indebtedness to the supreme qualities of the human intellect, we are nevertheless not unmindful of the fact that the intellect cannot be trained wholly independently of the other faculties of the mind. Ideas, pure and simple, never exist. They may result from, and certainly are always accompanied by, imagination. They are always surrounded by and tinged and colored by feelings. Every judgment of worth is the result of feelings which ideas arouse in us. If ideas were the only things the mind could entertain, we should be deprived at once of all of our likes and dislikes; we should find it impossible to point to one situation as more valuable than another; we would have no conception of the significance of things. Things are adjudged

precious because of the feelings that accompany ideas about them.

Must Grow in Things of the Spirit

While we honor today those of high intellectual achievement, we honor them because of the faith we have that in the immeasurable things of the spirit they have grown and matured in ways parallel with the more measurable attainments of the intellect.

Why should we take time upon this occasion to elaborate this doctrine which every psychologist accepts? Partly because there are those who ridicule the assumption that a college should contribute anything to a student beyond mere intellectual training. To speak of a college as an institution in which human character is being trained is to cause these intellectualists to raise their hands in holy horror and to view with alarm the degradation of their precious institution of higher learning. And yet I dare say that this very attitude on their part is one of the most disintegrating influences in the life of the institution to which they belong.

They maintain that it is possible to teach the multiplication table, Boyle's law in physics, the periphrastic conjugation in Latin, the law of diminishing returns in economics, the rights of property in law, as rigid intellectual processes.

To their way of thinking, the only relationship that should exist between any one of these ideas and another is a purely intellectual relationship. But such relationships, wholly unaccompanied by feelings of worth, never exist. One may teach the multiplication table so that his students will be saints or sinners; he may teach the law of capillarity as a mechanistic fact or as fundamental force not of the physical world merely but dominant in the living world as well; he may teach the rights of property as

¹ An address made on Cap and Gown Day at the University of Minnesota, May 12, 1927.

an aspect of legal procedure or as a social instrument for administration of justice. No matter how he teaches these facts he is making for a better or a worse world; he is influencing human conduct. Wherever ideas are being discovered or manipulated, ethical implications are always present.

It becomes highly important, therefore, how one feels about what he teaches. It is equally important how a student feels about what he learns, for what I am saying applies with as much force to the student as to the teacher. The purpose with which a student learns is far more important than the ideas he acquires, although he cannot acquire ideas without influencing his life. A prospective student of the Law School, some six years ago, when asked why he wished to study law said so that he might know how people evaded the law. He thought there was money in preventing the law from functioning. If the Law School did not send him out with a totally different ethical point of view, it failed in its great mission.

An Example from James

William James, America's greatest psychologist, a psychologist who dared to philosophize about human life, a quarter of a century ago, wrote a most profound essay, "On a Certain Blindness in Human Beings." He makes it clear that since each of us knows only a part of the world of reality, whenever there is a conflict of opinion and difference of vision, we inevitably believe that the truer side is the side that feels the more, and not the side that feels the less. I commend this bit of pregnant philosophy to those who declare that intellectualism shall dominate religion and that the inculcation and transmission of ideas shall be exalted over training of character.

In illustration of the truth that by and large we line up with the side that feels the more, Professor James relates this personal experience. He says:

"Some years ago, while journeying in the mountains of North Carolina. I passed by a large number of 'coves,' as they call them there, or heads of small valleys between the hills, which had been newly cleared and planted. The impression on my mind was one of un-

mitigated squalor. The settler had in every case cut down the more manageable trees, and left their charred stumps standing. The larger trees he had girdled and killed, in order that their foliage should not cast a shade. He had then built a log cabin, plastering its chinks with clay, and had set up a tall zigzag rail fence around the scene of his havoc, to keep the pigs and cattle out. Finally, he had irregularly planted the intervals between the stumps and trees with Indian corn, which grew among the chips; and there he dwelt with his wife and babes—an axe, a gun, a few utensils, and some pigs and chickens feeding in the woods, being the sum total of his possessions.

"The forest had been destroyed; and what had 'improved' it out of existence was hideous, a sort of ulcer, without a single element of artificial grace to make up for the loss of Nature's beauty. Ugly, indeed, seemed the life of the squatter, scudding, as the sailors say, under bare poles, beginning again away back where our first ancestors started, and by hardly a single item the better off for all the achievements of the intervening generations.

"Talk about going back to nature! I said to myself, oppressed by the dreariness, as I drove by. Talk of a country life for one's old age and for one's children! Never thus, with nothing but the bare ground and one's bare hands to fight the battle! Never, without the best spoils of culture woven in! The beauties and commodities gained by the centuries are sacred. They are our heritage and birthright. No modern person ought to be willing to live a day in such a state of rudimentaryness and denudation."

The Other's Point of View

"Then I said to the mountaineer who was driving me, 'What sort of people are they who have to make these new clearings?' 'All of us,' he replied. 'Why, we ain't happy here, unless we are getting one of these coves under cultivation.' I instantly felt that I had been losing the whole inward significance of the situation. Because to me the clearings spoke of naught but denudation, I thought that to those whose sturdy arms and obedient axes had made them they could tell no other story. But, when

they looked on the hideous stumps, what they thought of was personal victory. The chips, the girdled trees, and the vile split rails spoke of honest sweat, persistent toil, and final reward. The cabin was a warrant of safety for self and wife and babes. In short, the clearing, which to me was a merely ugly picture on the retina, was to them a symbol redolent with moral memories and sang a very paean of duty, struggle, and success.

"I had been as blind to the peculiar ideality of their conditions as they certainly would also have been to the ideality of mine, had they had a peep at my strange indoor academic ways of life at Cambridge."

The interpretation of life is partial to him who lives it; but its significance is determined by the eagerness of his living, and this is communicable. In the *Lantern-Bearers*, Stevenson says, "To miss the joy is to miss all. In the joy of the actors lies the sense of any action. . . . For no man lives in external truth among salts and acids, but in the warm, phantasmagoric chamber of his brain, with the painted windows and the storied wall."

Unresponsiveness to all but sheer intellectual achievement, if that were possible, would create a drab and uninteresting world. To clothe life with the frame work of intellectual externals makes a poor habitation for the poet, the philosopher, the dreamer, the romancer, the artist, the neighbor, the lover. How unilluminated and self-centered must such an individual be until the narrow interests of his life are shattered and he acquires a new perspective for its interpretation. One finds himself only as he discovers the secrets of life in everything about him. The daily grind, the day's tasks, the practical affairs of life often blind one to the more precious things of life. The narrower the daily grind, the more routine the daily tasks, the more commercial the practical affairs of life, and in teaching and learning the more unemotional the mastery of facts, the less do we hold communion with the finer, the more significant, the more precious things of life.

Must See Beyond Mere Facts

If one sees in two times two nothing except that it equals four; if he sees only that the

square on the hypotenuse is equal to the sum of the squares on the other two sides; if he sees only in teaching Boyle's law that at a constant temperature, the volume of a gas varies inversely as the pressure; if he sees in his study of the human mind that it is merely so many neural connections; if he sees in history only a chronology of human events; if he is interested in the fact and not its meaning; if to him there is no relation between the fact and the thrilling adventure of life, then he is an academic of the academics.

It was Schopenhauer who asked what is life on the largest scale but the same recurrent inanities, the same dog barking, the same fly buzzing forevermore. And yet as Professor James said, from the very "kind of fibre of which inanities consist is the material woven of all the excitements, the joys and meanings that ever were, or ever shall be, in this world."

How does this doctrine apply to education? Its meaning was described recently with force and clearness by Professor Frank P. Day of Swarthmore, who in speaking of literature, said, "Some of us who teach literature are not sure that it can be taught at all. It is generally easy enough to explain the difficult words and the classical allusions, to expose the muscles and lay bare the skeleton, but the spirit, the elusive essence remains hidden. How are we to explain and transfer to our students the feeling the poet had in making the poem, which we, only in proportion to our own sensitiveness, comprehend? There they are before us, forty secretive faces, strange thoughts behind the masks; only once in a while a cheek flushes, only once in a while an eye shines. We are never sure that we are sowing a seed that may flower in appreciation; some years we seem to till barren ground."

From this Professor Day goes on to enumerate the moments in his own student life when from choice lines found in classic prose or poetry, or from flashes of inspiration which now and then emanated from his teachers, he became conscious of a growing love of beauty in literature. It is this love of beauty which he strives to impart to his students in his teaching of literature. Ideas may center in definitions, allusions, and the like but the essence

is something very much more elusive. To quote further:

"Now none of these men who helped me were aware of the help they had given. I never told them that they had taught me anything. I may have been to my teachers an object of despair. Perhaps on days when they seemed to themselves to teach worst, they helped me most.

"I comfort myself, after an hour of bad teaching, with these memories. True, we can not teach a child to like the smell of honey-suckle, or enjoy the beauty of a yellow meadow, through which a ribbon of blue water wanders. But we can take him close to the trellis on which the cascade of bloom hangs and lead him to the knoll that overlooks the still-water.

"Perhaps that is all we can do in the teaching of literature; we can bring the student near the object of beauty."

Leader's Attitude Governs

What Professor Day says about the teaching of literature applies with equal force to the teaching of every subject. The attitude one assumes towards his subject, the side or chance remarks he utters in connection with it, and the philosophy which he brings to bear upon it, make or unmake his students, give them a

wholesome or an unwholesome point of view, make for or against the finer things of life, destroy or build faith in mankind and belief in God.

But let me hasten to say that not all the responsibility rests on the teacher. Much rests on the student. Whether or not students achieve intellectually or expand spiritually does not depend wholly on the teacher. Teachers cannot create ability nor attitude. Whether or not students go away with an enlarged point of view and with love for the things they have been studying, depends much on their own efforts and their sincere responsiveness. There is no escaping this mutual responsibility.

We assume, and we hope this assumption is correct, that those who are to be honored today are not the products merely but the exponents of this enlarged conception of higher education. We congratulate them upon their achievements. But we are not satisfied with that. We hope that there has been built into their achievements those feelings and attitudes that make life more genuinely worth living. And we hope still further that they and all their kind will help us build and strengthen that attitude within the University, for to miss the joys and the purposes of intellectual achievement is to miss all.

College and Character

By David F. Swenson

Professor of Philosophy, University of Minnesota

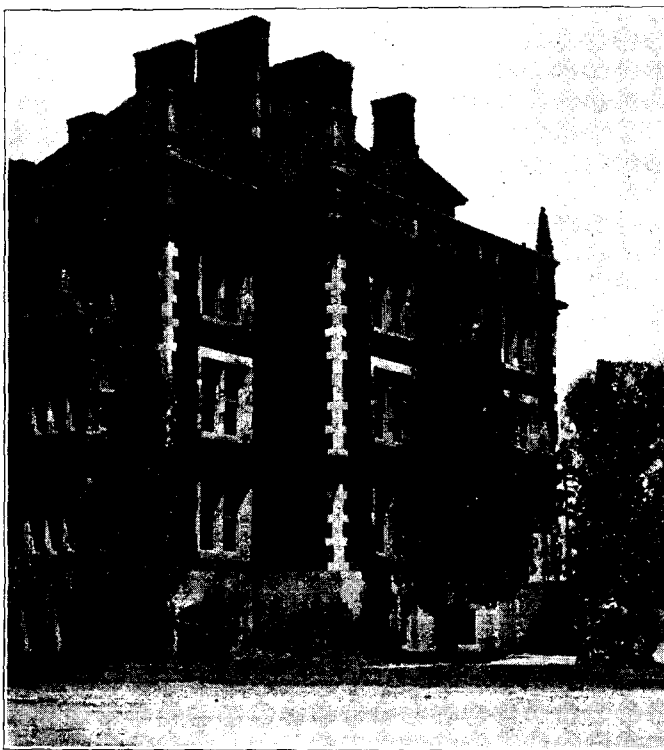
CHARACTER is not only the most individual of all possessions, it is individual also in the process of its formation. There is at least one realm from which that mass production which seems so characteristic of modern times is absolutely excluded, namely the realm of moral and spiritual values. No institution, neither the church nor the school, can guarantee the production of moral individuals to order, as a factory guarantees the output, in determinate quantities, of manufactured articles, granted the raw material and the necessary time. For character is not formed except with the voluntary co-operation of the individual concerned. Heredity alone will not produce it, nor environment; although both contribute the necessary conditions, the raw material, out of which character is formed. Character is not the immediate joint product of heredity and environment; it is an expression of the life of freedom, and results from the choices which an individual makes from among the possibilities presented to him by the environment, limited as these possibilities are by his hereditary resources of strength and talent.

Neither the mighty influence of example, nor the force of persuasive precept, is in the moral realm absolutely unambiguous. A corrupt example may constitute a temptation, but it

may also serve as a terrifying warning; and the proverb about preacher's sons does not always get whatever truth it has from the preacher's neglect of the children of his own household. The astrologers sometimes said of the stars and their supposed influence upon human destiny, that they incline but do not compel. So we can say with truth about moral influences of all kinds, good and bad, that their tendency may be counteracted, and that while the environment is responsible for its influence, the individual is responsible for his character. Even the most happy conjunction of a beautifully harmonious nature with the most elevating of moral environments, is but a possibility, a predisposition. In the realization of character the individual himself is the decisive determinant, and if the hall-mark of freedom is re-

moved, character is no longer character, but a natural endowment in which the self is still asleep.

If the above remarks touch upon a valid fundamental principle, it becomes clear with what reservations we must hedge our question about, when we ask concerning the favorable or unfavorable influence of the college upon human character. We are not asking whether a higher education unfailingly improves all who are subjected to its discipline, or whether it as



An Entrance to Folwell Hall

The principal recitation building of the Arts College

unfailingly brings about a deterioration; we ask a more modest and a more human question: whether the influences of college life, namely, are such that they can readily be made to count upon the side of character, whether they favorably dispose the mind toward the formation of a moralized personality? In asking the question so, we pay a proper respect to the independence and the moral integrity of the individual. But to regard the college as a factory for the mass production of good citizens by machine-like processes is not only nonsense in itself (for what a self-contradiction to imagine an external power capable of producing a moral result with unfailing certainty!), it is an expression of contempt for the individual, an attempt to steal from him that which is his most precious possession, the source and foundation of all his human dignity, namely his personal responsibility.

The life of the college may be viewed from many standpoints, some more or less obvious, others requiring a deeper consideration. Let us for a moment consider the college simply as an armory of weapons, as a storehouse of equipments and tools of an intellectual sort, the dispenser of instrumentalities to those who seek them; and that without much regard to the manner in which, or the purposes for which, its customers may wish to employ them. We are all familiar with the notion of knowledge as an instrument, a means of livelihood, a human tool which guarantees an access of power to its fortunate possessor. The contact of mind with mind elicits the hidden powers and quickens the perceptions; just as "iron sharpens iron, so a man sharpeneth the

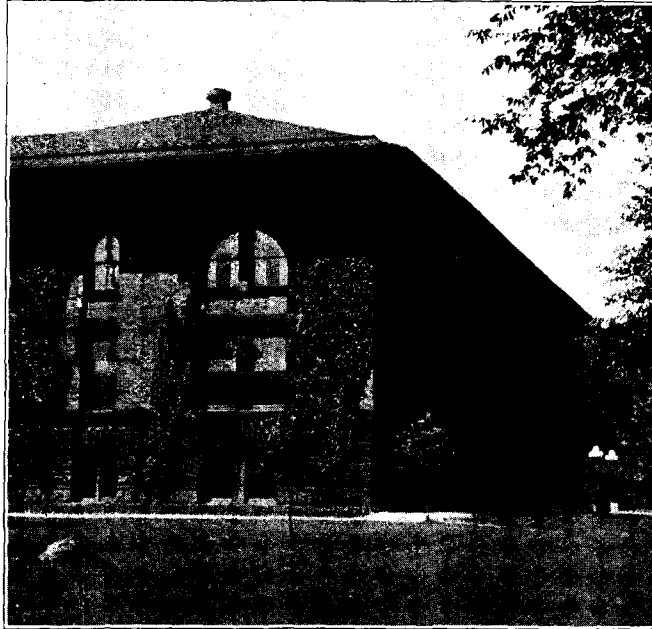
face of his friend," says an Old Testament proverb. Education is from this point of view a sharpened knife, a most powerful instrument for good or evil, placed in the hands of an unmodified personality. This is surely the lowest and most unpretentious valuation which can be

placed upon a college education; its moral value to the community will under this view be dependent solely upon the preponderance of moral character in those who feel themselves drawn to make use of its resources.

Even so, I think it must be admitted that an institution of higher education is a positive moral asset. For it is a general experience that those who seek the college life are certainly not the vicious chiefly, nor even the morally mediocre; but rather,

by and large, those members of the community who are most likely to be sensitive to ideals, to be imbued with public spirit, to have a serious and responsible outlook upon life. If such men and women, as a result of what the college gives them, are endowed with an increased efficiency, an added power to realize their aims, the community must be the net gainer even from a moral point of view, although their standards be not in the least changed, or their characters in the slightest improved.

But a college education cannot stop with making a contribution of useful knowledge. It does not merely add external equipment to an unmodified personality; it changes the mind itself in all sorts of profound and subtle ways, and we must ask whether these modifications, not necessarily moral in themselves, are nevertheless such as to favor the growth of character,



The Minnesota Union
Men's building on the main campus

and offer opportunity for the more adequate realization of the life of the spirit.

First of all, we note that college life is in itself a sort of *pause*, a pause upon the brink of the stream of a more active life. The college student is invited to postpone for a while the plunge into the midst of this stream, in order to take stock of life and of himself, in order to devote this period of his life to a more uninterrupted reflection and survey. The college halls offer, or should offer, a sort of retreat, from which the student may be enabled to view life, for the moment, with dispassionateness; they suggest an attempt to bring some order into life's multitudinousnesses, through the simplifying and clarifying operations of reflective thought. That this is an advantage also from the moral point of view goes without saying. In the midst of hustle and bustle, in the hurried pursuit of immediate ends, when the eye is constantly being seduced by some new variation in the passing show, the ear deafened by the noisy din of empty projects, mind and heart constantly at the mercy of superficial stimulations, it is easy to lose the sense of life's unity and wholeness, of its substance and meaning. The best preparation for life in society is a well-utilized solitude, and the best preparation for aggressive action is a well-spent pause, a space devoted to the cultivation of the fruits of a detached spirit, a spirit of reflection, by which we are enabled to rise above our work at the same time that we press forward in it.

Meditative Seclusion Needed

It is for this reason, I think, that one must look with some suspicion upon those changes in college life which tend to minimize the difference between its meditative seclusion and the exaggerated running to and fro which so often marks the work-a-day world. The pseudo-business activities, the social stunts, the political intrigue, the vast amount of ephemeral writing in the name of college journalism, the whole cult of self-expression in which the stress is laid entirely upon the quantity of the expression and not at all upon the quality of the self—these things are supposed to give the student a foretaste of real life. But they are too

often froth and foam, illusory appearances devoid of reality and substance, cheating the student, who finds their lure so irresistible, of the last opportunity he will ever have to deepen his reflection, develop his intellect, enlarge his horizon, and increase the sensitiveness of his personality. Those who give a disproportionate part of their time and energy to these more superficial stimulations, find too late that while they have been *in* college they have not been *of* the college, and that they are in danger of having to leave its halls with as little genuine education as when they entered. *But those who, having faith in books and learning, in thought and meditation, permit these things to permeate their spirits, find in the intimate changes thus induced in heart and mind a condition favorable to the realization of character.*

In the second place, the college necessarily enlarges the intellectual horizon. It tends to redeem the spirit from prejudice and from provincialism. It familiarizes the mind with a great variety of human attitudes, and it brings it into contact with a multitude of varying customs and valuations; it thus quickens the perceptions to distinguish between local and historical accidents on the one hand, and that which is of a universal human import on the other. The vice of all imperfect morality is the ascription of moral significance to chance preferences, and the elevation of temporary expedients into universal principles. That survey of the entire human inheritance which a college education seeks to bring about, the recognition of other forms of life and civilization than our own, the discovery of human import even in the ruder ways of life—all this should have the effect of emancipating the spirit from its fetters of petty and egotistic self-complacency. It should liberate the mind from that narrow insistence upon the absolute value of one's own idiosyncracies, and the peculiarities of one's own clan and class, which stands so much in the way, both of fruitful social intercourse among individuals, and of decent friendly relations among nations. And this, too, may be impressed into the service of character; for character is a concentration of the energies of the personality upon what is humanly essential. To have character is to be a human being first,

and only secondarily whatever else one happens to be.

"Greatest Men in Highest Moods"

In the third place, a college education is a social introduction to the world's greatest men in their highest moods. For the great men of human history have deposited the best fruits of their spiritual experience, and the largest intellectual visions that ever came to them, in the books they have left us. A great personality is a cherished acquaintance, and in intercourse with him our better and deeper self is evoked. But he who has learned how to use and cherish books has at his command, day or night, the company of the choicest spirits of all the ages. Should not such companionship suffice to evoke all that is fine and profound and noble in himself? What supreme folly to immerse one's self in the pursuit of empty baubles, while blind and deaf to the abundant offering of spiritual riches to be found in every college library!

The Mind Needs Perspective

And lastly, the knowledge at which a liberal education aims, is, as Newman says, "not a mere extrinsic or accidental advantage, ours today and another's tomorrow, one which may be got up from a book and easily forgotten again, which we can borrow for the occasion, carry about in our hand, and take into market; it is an acquired illumination, a habit, a personal possession, and an inward endowment." It is a habit of seeing things in some sort of perspective, of forming broad and comprehensive surveys of human life, a freedom of the spirit in the presence of the strange and exciting, an equitableness of temper, a calmness and moderation of outlook. In the educational process by which such a habit of mind is implanted there are revealed values of a higher sort than those embodied in immediately obvious things, like money, and that which money will buy, sensuous pleasure, the unfruitful and time-consuming trivialities of common amusements, and the incitements of vulgar ambition. Such a culture of the spirit, though it be not character itself, in its essential ethical meaning,

is nevertheless on terms of familiar intimacy with character, shares many common traits with the moral spirit, promotes the reflection which leads to an emphasis upon the moral values, and helps us perceive the emptiness of those petty pursuits which divert our energies from the pursuit of the one thing needful, and prevent us from discovering the true beauty of human life: a personality which is no mere instrument in the service of external ends, a character whose end is in itself.

It goes without saying that these fruits of a liberal education are the rewards of a genuine student life, rewards which cannot be claimed by the mere matriculant, whose bodily presence in college halls is the only real and certain evidence of his having been a student. These fruits are conditioned upon the student's giving himself with his whole heart and mind and soul to the pursuit of that knowledge to which the college buildings are dedicated. *The mere grudging subjection of the mind to such parts of the formal routine of reading and class attendance as are unavoidable if the student is to retain his privileges, is of no avail; the mere hollow pretence of study without zest or zeal, without an inner burning curiosity, is of no avail; the going through the motions of satisfying an intellectual hunger which does not exist, because it has never been permitted to develop, but has been choked by petty activities and trivial amusements, is of no avail, except to intensify the symptoms of mental indigestion; the misuse of the intellectual faculties in creating clever contrivances for simulating the presence of knowledge, instead of enthusiasm in the pursuit of learning and scholarship as ends worthy in themselves, is merely a device for ruining the integrity of the mind. All these distortions and caricatures of true student life are without efficacy in producing a cultured mind, and efficacious only in the destruction of character.*

College is a moral opportunity. But like every other moral opportunity, it requires to be accepted in the spirit which is appropriate and germane to itself, lest it become a curse instead of a blessing.

Student Health Unit Expands Its Services

Annual Examinations Are Planned; Will Start Nutrition and Psychiatric Clinics

THE University of Minnesota will establish in the fall of 1927 three additional projects in its Students' Health Service. The director, Dr. H. S. Diehl, has received permission from the Board of Regents to institute annual health examinations for all students, to establish a nutrition clinic that will devote itself to the study and care of students who are underweight or overweight, and to begin a mental hygiene service for students under the direction of a neuropsychiatrist.

From the time of its establishment the Students' Health Service has examined all entering students, whether freshmen or transfers from other institutions, at the time of their admission. Until now, however, it has had the funds to follow up only the cases of those who were shown plainly to need further attention. This year an increase of the student incidental fee from \$4 to \$5 a quarter has been voted, which will bring in \$3 additional yearly from each student. Of this sum, \$2 will go to the Health Service to meet the cost of its three new projects.

Dr. Diehl decided to test out the value of an annual health examination before recommending it for the entire University, and with this in mind he gave, last year, an examination to the 400 students in the Medical School, selecting them as the ones whose natural interest in health problems would make them most amenable to such an experiment. He followed the examination with a questionnaire and obtained replies which showed the students were overwhelm-



Dr. Harold S. Diehl
Director of the Students' Health Service

ingly in favor of such a plan of annual examinations. It indicated, furthermore, that a very large percentage of the 400 believed they had received definite benefits from the examination.

Dr. Diehl's first question, "Did this examination discover any physical defect or a b n o r m a l condition which you did not know existed?" was answered in the affirmative by 10.5 per cent of the students. Quite naturally, this was the smallest affirmative response. To the second question, "Did it impress upon you the importance of any physical defect or abnormal condition which you have?" 39 per cent answered yes. The third question was, "Did it relieve your mind

of worry concerning any physical defect or abnormal condition?" Here 24 per cent stated that it relieved their minds of worry about some defect or supposed defect. "Did the examination call to your attention any habits, bad from the point of view of health, which you have been practicing?" was the fourth question. Seventy-six per cent said they had benefitted by the advice. In response to other questions, 71 per cent said they were following the advice that had been given them and 88 per cent said they believed a policy of annual health examinations for students should be instituted.

In a report to President L. D. Coffman, Dr. Diehl calls the annual health examination the most valuable single service his department can render to students.

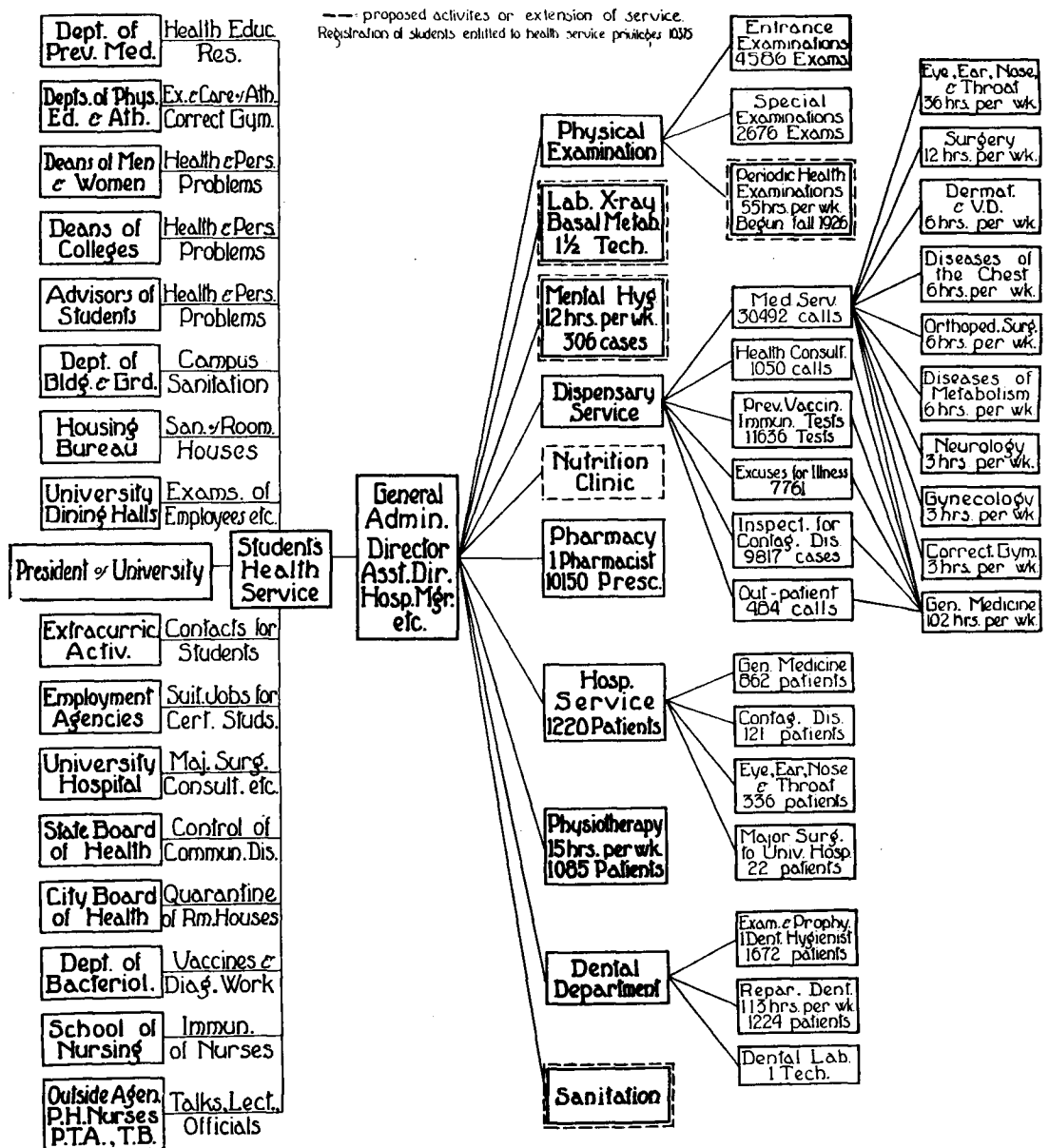
"Under the plan which we have in mind," he wrote, "the freshman examinations will be

conducted at the opening of the university year, as in the past, but the subsequent 'health examination' will be performed wholly by one physician and approximately an hour will be allowed for each examination.

"When the examining physician desires consultation, the students, of course, will be referred to the other members of the staff. Pre-

liminary to these examinations some routine laboratory work will be done and a careful history will be taken of the student's health and habits, with particular reference to eating, sleeping, rest, recreation, worry, etc. The examinations themselves will be thorough and searching. The physician will explain to the student any physical defects that were discovered and any

ORGANIZATION OF STUDENT'S HEALTH SERVICE UNIVERSITY OF MINNESOTA 1925-1926



bad health habits which he practices. He will give the student, as advice, a definite health prescription, which is to be followed.

"I am certain that by means of these examinations we shall discover some important pathological conditions which need attention, and I am hopeful that we may be able to prevent some of the actual breakdowns from tuberculosis and other diseases that occur every year. The work's greatest value, however, will be educational. It will tend to develop in the students the habit of taking an annual physical examination. It will teach them what a thorough health examination should be. It will point out to them their bad health habits, explain the bad effects which follow such habits and will serve as an incentive for them to correct defects and improve health habits. Furthermore, it will be a means whereby the Health Service can get in touch with students who have emotional problems and need advice along the line of mental hygiene."

Must Guard "Mental Health"

Colleges today are devoting more and more attention to "mental hygiene," which is to say, to the emotional condition of the student. At Minnesota a subcommittee of the Committee on Educational Research, in an interesting report submitted some months ago, showed that problems of an emotional nature not infrequently impede and sometimes prevent a student's progress in education, just as they so often do in life after college.

A typical example is that of the student who, through the urging of an ill-informed individual or because of some poorly analyzed motive of his own, gets into a field of study for which he is thoroughly unfitted. His difficulties and failures beset and torment him until he is less able than ever to do satisfactory work. Some of these students are driven to desperation. Other students suffer from inferiority complexes and become unable to assert the capacities and capabilities which they have for fear of failure or because of an unjustified sense of unfitness. Scientists say such a condition is often due to the home conditions in which the young person grew up. He retains a partly subconscious recollection of home happenings of which he

is ashamed, and they oppress him, disturb his emotional balance, ruin his happiness and efficiency. A certain percentage of the students, both boys and girls, have sex problems.

University Has Made a Start

Such are the matters with which a department of mental hygiene in the Students' Health Service will deal. Psychologists in the field of student guidance have already examined and benefitted scores of Minnesota students who had been suffering under handicaps such as these. Now, with the annual health examinations and the close contacts these will afford between physician and student, many more of these cases will be discovered and a much wider service can be rendered to the student body. Presumably the Health Service will reach not only those students whose efficiency has actually begun to break down because of emotional conflicts, but will also find the borderline and incipient cases.

Of this problem, Dr. Diehl said in his report: "The fact that many college students have emotional problems, more or less serious, and that during their college courses some develop actual maladjustments or warps which will be handicaps to them throughout life has been pointed out by various writers. Furthermore, psychiatrists properly qualified for mental hygiene work are demonstrating that it is possible to assist some of these students to acquire healthier habits and to prevent their developing serious maladjustments and neuroses. What proportion of students need such expert advice in mental hygiene has not been determined, but every college of any size has a considerable number of students who need help of this sort. Through its Health Service every institution should provide a way to meet this problem."

The third new field of service which Dr. Diehl's department will enter, that of attention to the nutrition problems of the student body, is also one the need for which is being widely recognized. Statistics from the various parts of the country show that from 20 to 30 per cent of students are more than 10 per cent below the average weight for their height and age, and the studies of Emerson at Dartmouth and of others indicate that a large proportion

of this group is also below par physically and mentally. A nutrition service for such students involves, first, a thorough physical examination, followed by the correction of defects which might be contributing to the condition of underweight. Then there must be an analysis of the student's diet and his habits of eating, sleeping, rest, recreation, and work. On the basis of this comprehensive study, the

Students' Health Service at Minnesota expects to be able to give the student advice which will fit his particular case. The case of each advisee will be followed up from time to time so that the physicians may be sure that progress is being made along the road to correction.

These three improvements will be the greatest that have been made in the Health Service since its establishment in 1921.

NOTICE

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