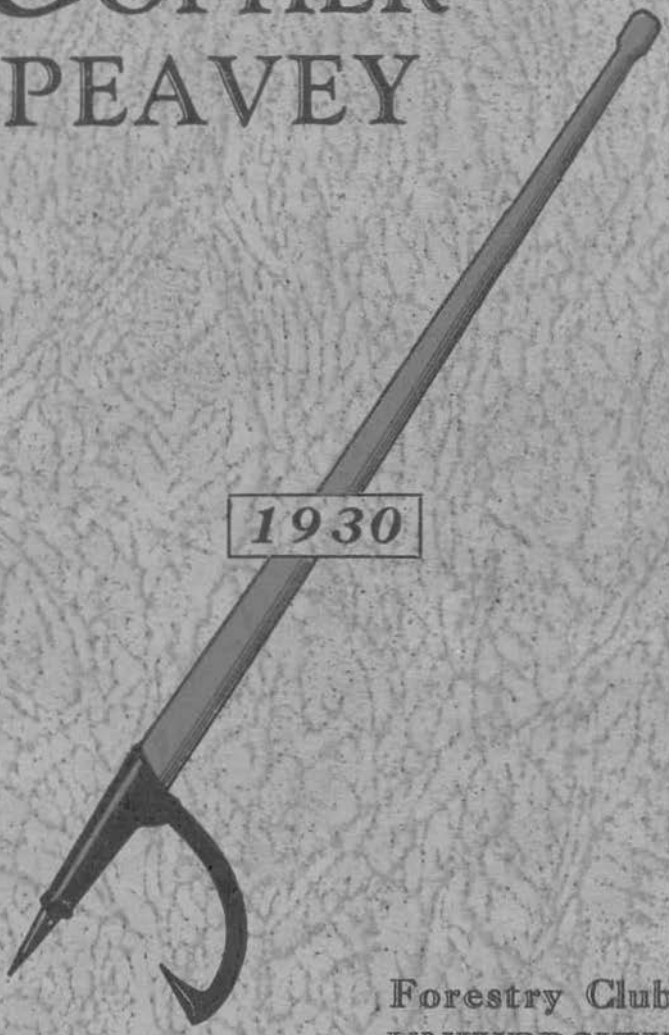
GOPHER PEAVEY



1930

Forestry Club
UNIVERSITY
of
MINNESOTA

THE
Gopher Peavey

THE ANNUAL
PUBLICATION OF THE
FORESTRY CLUB

UNIVERSITY OF
MINNESOTA
1930

FOREWORD

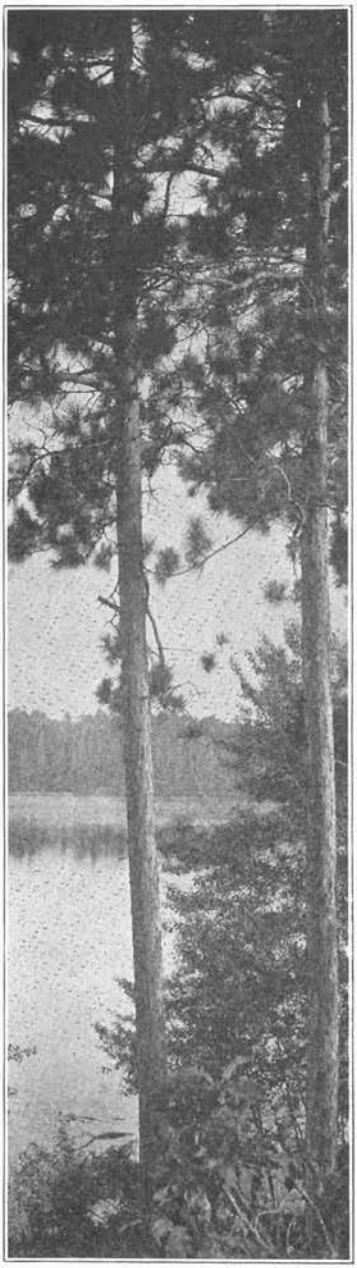
"A BIGGER and Better Peavey" has been the motto of the 1930 Peavey Staff. How well we have succeeded in accomplishing our aim is for the readers to decide. However, we wish to give the former Peavey Staffs due credit for their untiring and loyal service in putting out publications that have been an honor to the Forestry School. It is for us to profit by the shortcomings of our predecessors, should there have been any. We only know that if we have contributed anything toward the betterment of the Peavey it has been through helpful guidance of the faculty and representative students.

The policy of the 1930 Peavey is one of student representation. We feel that both technical and personal element should be included in this publication, because it is a representative of student life.

We greatly appreciate the cooperation that our advertisers have given us in making possible this publication. We sincerely hope that they will be with us in future years.

We also extend gratitude to our contributors who have so greatly showed their interest in this publication.

GOPHER PEAVEY STAFF, 1930.



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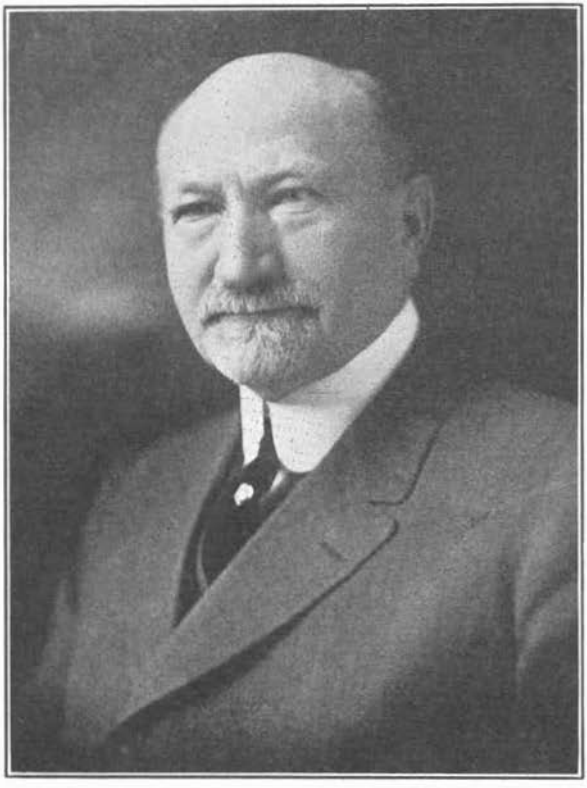
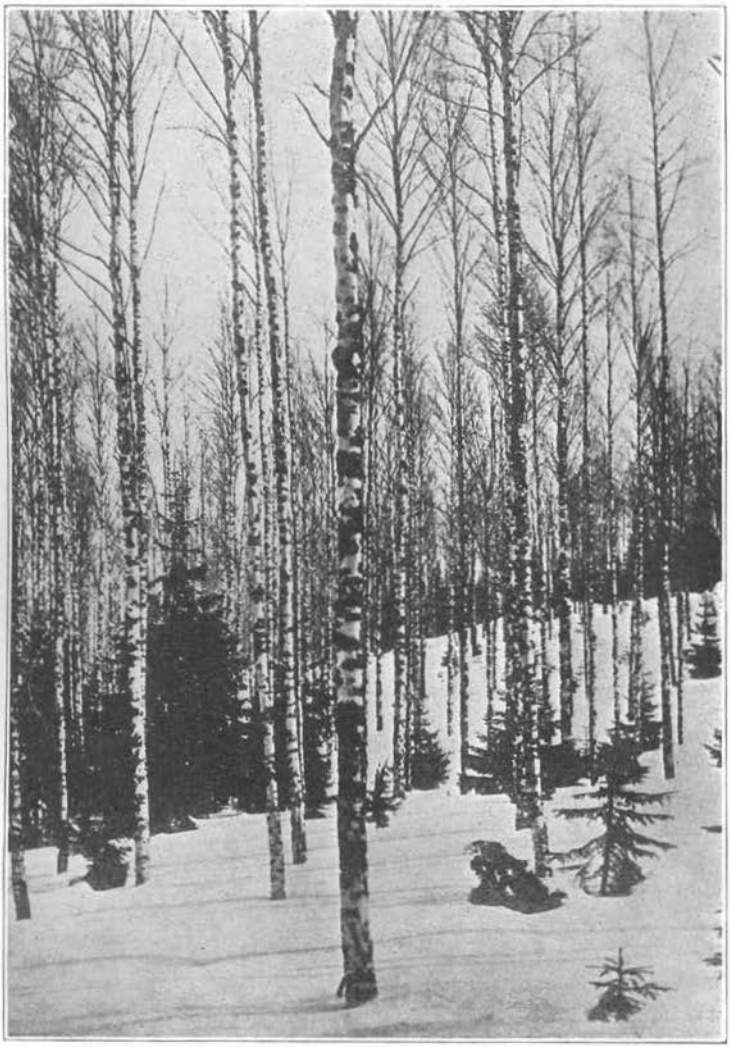


DEDICATION

THE average man makes no progress. But now and then an individual rises above the general crowd. Such men are endowed with superior vision; they can, to a certain limited extent, lift up the veil of fate and obtain a glimpse of the future. It is to them that all progress must be ascribed. Henry Oldenburg was one of these. He had caught a glimpse of the forest needs of the future and it had become for him a guiding star. He never lost faith in that star. Whether as a member of the State Forestry Board, as an important officer of a great lumber corporation or as a private citizen, he steadfastly tried to so mould the course of his associates and of the estate as to bring them a little nearer to his beloved star.

It is in recognition of these earnest and never tiring efforts—probably far more successful than he knew,—that this book is dedicated to Henry Oldenburg, a friend of the Forests.



An Aspen Winter Scene

FORESTRY STUDENTS, NOW AND THEN

E. C. Stakman

MY leit motif in this scriptural discourse is the evolution of the scientific attitude by forestry students at the University of Minnesota. Now that may be a light motive, but it is not with light spirit that I approach the task of developing it. I make no pretense at profundity. This is written from the viewpoint of a deeply interested and sympathetic spectator who never has been a full-fledged member of the forestry guild. It is impressionistic, based on association for about 20 years with forestry students in courses hovering on the fringe of the field of technical forestry. Credentials presented; a few preliminary platitudes follow.

Progress is made by conserving the past, improving the present, and preparing for the future. It would be wonderful if we could improve the future before the future arrives. Most of us, however, are lucky even to interpret the present correctly and help to improve it slightly. To get a prophetic insight into the future is beyond the ability of most of us, although we may try a little crystal-gazing now and then. But usually the only result is eye strain. While we may be relatively far-

sighted when looking back over the past, we are relatively shortsighted when looking at the present, and deplorably so when trying even to peek into the future. Because of this human limitation, attention will be concentrated mainly on the past.

Caesar divided Gaul into three parts—at least in the first sentence of his commentaries. That ought to constitute precedent for dividing this article into three parts too, although the reader may think I also have my gall. As far as my observations go, there are three rather distinct eras in the history of the forestry student group at Minnesota: The ancient, the medieval, and the modern. Do not expect me to give exact dates, and what's the use in giving them at all unless they are exact? The period covered is only that which I know from personal observation.

The ancient era began in 1909 and slipped gradually and noiselessly into the medieval era sometime A. D. During the ancient era the boys were men and took their forestry seriously. And that is not intended facetiously. What a fine group they were: avid for information and ideas, not only in the art of forestry but also in the sciences basic to it. They seemed intellectually mature; they gave the impression of knowing where they were going professionally and why and how to go. They did not disdain fundamentals, but seemed to realize that the art of forestry should rest on a solid foundation of scientific fact. And they built upward from the bottom—not from the top downward. Less was known about plant sciences then than now, but, like the ancient Greek scholars, the students made good use of what was available. A fine group they were—a substantial lot. And what a pleasure it was to work with them, and to play with them. Because they were not exactly sweet cookies, in spite of their fundamental scholastic virtues. They cut their didoes with a rollicking ruggedness that was exhilarating and refreshing. It took a four-masted man to cruise through a summer at Itasca with them. And they were not devoid of certain subtleties, as, for instance, when some inventive geniuses among them conceived the idea of transforming green plums into queen olives, and performed the transmutation, much to the bewilderment of the uninitiated epicures in the old dining hall.

Like the age of Pericles, this was a golden age, to which time admittedly has lent some enchantment. But in time the gold became somewhat tarnished. Just why, is a question which I am quite willing some one else should answer. Nevertheless, the darkness of medievalism supplanted the glory of the ancient era, and the fact, not the explanation for it, is what concerns us in this chronicle.

The medieval era was characterized by the over-development of class consciousness. Foresters were foresters, and they didn't want any one to overlook that fact, not even for a moment, in class or outside. There were times when near mutiny and sedition stalked almost openly in classes when the subject matter did not seem to pertain directly enough to forestry in the most restricted sense. There is no need to take umbrage at this statement, because the same thing was equally

true in many classes populated with students of agriculture. An illustrative incident comes vividly to mind. A student in a Plant Pathology class protested against learning about the causes of diseases and the factors affecting their development. What he wanted, he said, was something practical—methods of disease control. I suggested that knowledge of a disease was prerequisite to intelligent application of control measures. The idea didn't seem to filter, so I tried the parable method. I ventured the opinion that a man who knew an automobile thoroughly and a lady who didn't might get along equally well when driving smoothly-running cars; but, in case of trouble far from an available mechanic, the man probably could extricate himself while the luckless lady would have to wait or walk. The student puckered his brow slightly and said, "Well, what do automobiles have to do with plant diseases anyhow?" I made a noise like a sigh—but I felt very deceitful while making it.

Students of those days wanted something "practical," a perfectly natural desire. But many of them had abortive ideas as to the equipment necessary to be a really efficient practical man. They were "go getters" without knowing where they were going nor what they were going to get after they got there. There was much ado about nothing and nothing ado about much. The boys wanted to be proficient foresters all right, but they did not seem to realize that earnest endeavor is the price of proficiency. They thought they could thump their chests, proudly state that they were foresters, and, by this magic thump, forthwith be foresters. With all the zeal of the crusaders they wanted to do something for forestry, but seemed unwilling to acquire the armament necessary to fight effectively in the good cause they had espoused. Broadsides were indeed shot from time to time, but there was much shooting in the air. Most of the hits were made with gaudy socks and lurid shirts. And much of the powder was wet. Which gives the boys of that period a perfectly good opening to say that I am all wet. Perhaps some of the statements are somewhat hyperbolic, but there is essential truth in them.

Glittering generalities are likely to be dangerous, and while those that I have made about the medieval era may not be glittering, it is admitted that they are generalities to which there are many exceptions. The medieval era was not all a dismal swamp. There were some good students in those days; a few were brilliant. The development of class consciousness was not bad in itself: there was class consciousness in the previous era also. It was overdevelopment that brought with it unhappy results. This was partly symptomatic of the times in general and partly, perhaps, the indirect effect of a widespread impression that in certain national circles the feeling prevailed that no scientific agencies could contribute to the cause of forestry except forestry agencies themselves. Whatever the cause, forestry had its scholastic dog days—its dark ages. But it also had its renaissance.

Like the renaissance and revival of learning of old, the forestry renaissance did not come like a flashing meteor from above. It came

gradually. There was no sudden mutation: rather a healthy evolution, beginning almost a decade ago—an evolution that is still in progress.

The modern era at least furnishes hope for the future. It is an age in which tolerance is being developed and sound objectives are being formulated. Students seem to realize that trees are plants, and that most of the plant sciences can contribute valuable information regarding them. It seems to be rather generally recognized that it is quite proper and possible for several sciences to help build forests and foresters: general scientific principles usually are welcomed and sometimes even sought. The education of foresters is being based on a rather broad foundation. In general, standards of scholarship are being raised. The sights are being elevated. There are many very fine students, some exceptionally good ones, and, of course, the inevitable mediocrities. But most of them are at least earnest in their desire to equip themselves with the tools of their trade, and some are at the same time acquiring an education. Many will work in the ranks, but there is some extraordinarily good material for leadership. When this material has been galvanized into objective activity in the cause of forestry, we may hope for a progressive forest policy based on sound and sane principles.

The cause of forestry needs apostles. It needs men who know and who can do— men with ambition not solely to get a living from forestry but to help forests to live. Foresters are needed who value forests for their economic value and love them for their esthetic value. Technically skilled men are needed to help grow forests economically and to utilize them properly, but men of wise vision and powers of conviction also are needed to awaken a lethargic public to the needs of forestry. And men of both types are coming up in the modern era. There is hope.

This little history started with the golden age, slipped in the mud of the dark ages, and concluded with the present age. The present has at least a silvery sheen. Possibly it may be recorded in future histories as another golden age. That depends on the degree to which present standards are maintained and improved. Push 'em up, boys.

AFTER 20 YEARS

CHAS. L. LEWIS, JR., FORESTRY 1910

IT does not seem possible that our group of Foresters has been out of college almost 20 years. Back in 1910, as Seniors, we held many impromptu meetings to discuss the many topics of the day. The discussions usually ended up with our prospects after college. In this group were Norman Jacobson, known only as "Big Jake", Arnold Benson or "Bennie", Herman Krauch or "Dutch", Bert Berry, Donald Brewster, Win Bowen, Norman Baker, Clarence Underwood, Bob Deering, Carl Hamilton and myself. We were the largest class of Senior Foresters to date, and as game a crew as ever licked double their number of "Ags".

Professor Green was at the head of the Forestry Division at that time and Professors Cheyney and Wentling bore the brunt of the load and the responsibility of making what they could out of us. I well remember the heated discussions of our gang; how we planned to improve the various lines of industry we entered upon after graduation, and the country as a whole incidentally. Varied as were our methods of attack, we were all confident of results and surely by the end of 20 years we would be ready to retire. We were unanimous in the belief that at 50 years of age a man was all done, might as well be taken out and shot. But 50 years was a great old age, certainly loads of time to make our pile and retire.

Now let's take a 1930 look at this 1910 group. Three of these men hold very good positions with the U. S. Forest Service, all authorities in their respective lines. One of them, by close application of unusual ability, has carved for himself a position among the highest authorities in the lumber industry. Two others have become successful commercial foresters. One is a teacher of Forestry and three have succeeded in the allied industry of Horticulture. (Note there are no bond salesmen in this group.) But if you ask any one of them about that 50 year retiring program, they would look astounded and request a revision by adding anywhere from 20 to 50 years to the aforementioned shooting point.

The ambition to accumulate and retire has been superseded by the ambition of accomplishment. If there is any one thing that a college education should attempt to teach a man, it should be toward the development of the ambition of accomplishment. The college graduate usually sets his goal plenty high, he too frequently is discouraged or side-tracked in reaching it. The satisfaction that comes with the accomplishment of an avowed plan is sweet indeed, especially if the process has been against odds and difficulties. Such accomplishment is real success. A man who has attained such accomplishment has been eminently successful and he goes on to new and higher goals, never quitting tho he live 1000 years.

One other thing that the nineteen teners would be unanimous on is the satisfaction and pride in being Forestry graduates. No matter what lines of endeavor we are engaged in, we are fundamentally Foresters, could never be anything else. We fully appreciate the value of our 4 years in college, we cherish the memory of our associations, our direct contact with human professors.

One of the most valuable assets derived from a Forestry education is a knowledge and appreciation of the workings of nature. We may forget our history, our math, our Latin, but we never forget the pine, the birch, the flowers and lakes of Itasca Park. (Not to mention the swamps and mosquitos.)

To the man city born, bred and educated, trees are just trees, grass is simply grass, it matters not to him particularly whether it rains or not, whether it is clear or cloudy, hot or cold, except as it affects his comfort. This may be somewhat exaggerated, but we do know that the only contact the average city dweller has with the country is crowded into a short summer vacation. We feel that we get a great deal more out of life, we are sympathetic with conservation movements, we should be able to give intelligent support to the many problems that affect the natural resources of the country.

If we are to send a message to the present undergraduate it might be along this line:—Look upon your first few years out of college as years for gathering experience. Be prepared to sacrifice both income and comfort for the opportunity to gather knowledge and experience. There is just as much or more opportunity for the Forestry graduate today as there ever was. Large industries are constantly on the lookout for men of ability. But no position worth having is easily obtained. Every business has its drawbacks and difficulties. The softest occupations are flooded with competition.

A man with a college education should have a tremendous advantage over the man without it, but knowledge based upon experience is the knowledge that counts.

Twenty years out of college! and our lives still in the future.

Have we been successful? Ask any one of us....after another 20 years.

Ever working, building, smiling, with a helpful hand for all his boys. For this, Doctor Schmitz, we are grateful.

COOPERATION

EYNAR BENSON

WHERE one of two sovereignties gains a large proportion of the power in a state there is a tendency for it to dictate and squeeze out the other. As applied to the public forests, in some states in the West where the national government has a very large proportion of the public forest land in National Forests, it is almost impossible for the state organization to acquire state land for state forests. This is an undesirable condition as it is only logical that the state should have control of, at least, an equal amount of the forest area within its own boundaries. While on the other hand, there are states in the East that rebel against any federal acquisition. They cannot, or more strongly, refuse to see the good which can come from friendly competition and cooperation.

There is a place for both "sovereignties" within the states so long as one does not dominate and try to run the other.

In Minnesota, there is a place for both state and national forests. In this state the national forests took the lead and the state organization, profiting by the problems and difficulties of these national forests, and cooperating with them, have acquired forest land, set up a strong department, and are now on a par with the federal organization. Through continued cooperation between the state and national forests both are profiting and building up strong organizations. Without cooperation and with an antagonistic attitude, both of them would suffer and their good to the state and nation would be seriously impaired.

This same principle applies right here to our own college. This year, through cooperation and teamwork, the Ags and Foresters have built up a bond of friendship and strength that, with increased growth, will spell success to any cooperative enterprise, whereas neither might be able to carry on alone. This resolves itself into an appreciation of the cooperation between the Ags and Foresters at the Council dances. and a hope that in future All-College functions, all small personal enmities will be laid aside and through cooperation we will work for the good of the College of Agriculture, Forestry, and Home Economics and make our campus even a better place in which to live.

INDUSTRIAL RESEARCH AND THE FORESTRY SCHOOL

RALPH M. LINDGREN, CLASS OF 1926

ONE is impressed in studying the development of forestry schools in this country with the steady increase in the scope of their objectives. The principal function of the early schools was that of training men for administrative positions in the government service, and courses of study were planned accordingly. As new obligations were imposed by the participation of state, institutional, and private enterprises in forestry work, the schools responded by enlarging and modifying their curricula. The diversification in forest activities is nowhere better reflected than in these efforts to equip men for new fields of employment. The recent interest of the lumbermen in industrial research promises to materialize into a definite plan of action and will make new demands on the schools for properly trained men.

Research has played an important role in the rapid development of some industries, notably engineering and chemical. The lumber industry has been slow to appreciate the need for such work. It has been content to rely on state and governmental agencies for the investigation of the nature, properties, and potentialities of wood instead of fostering and maintaining research organizations of its own. The early lumberman's attitude of indifference towards research was based partly on a false feeling of business security which originated from the belief that his product was indispensable. He regarded wood as saw-logs and lumber and not as a material which offered great possibilities of conversion into diversified products. He did not stress, although he may have realized, the value of intelligent utilization of wood as a means of insuring its maximum period of service utility. Since the competition of other materials was not a problem, he gave little thought towards making his own more acceptable through improved methods of manufacture and handling. His beliefs and lack of vision have not been without effect upon the lumber industry as it exists to-day. Unwarranted prejudices have been created against wood as a result of its unsatisfactory service under injudicious conditions of use. Such cases of discrimination have offered opening wedges for substitute products which, advertised by extensive trade promotion campaigns, and created to be acceptable and to satisfy the changing preferences of an exacting market, have gained public favor at the expense of wood. The decline in consumption of wood products and the inroads made by competing materials in some of the principal markets for wood are sufficient cause for considerable concern to the present lumberman. The extent to which the stability and continued welfare of the industry will be jeopardized is dependent partly upon the success of research to improve wood products, to insure their efficient utilization and thereby dissipate unjustified preju-

dices against them, and to develop and extend the uses of wood.

The lumber industry has indicated its active interest in research by initiating cooperative investigative studies with state and governmental agencies. As its faith in this work becomes justified the next step, then, will be establishing and maintaining research units of its own for the study of the vital problems of the industry. The first efforts of such investigative organizations will probably concentrate on problems which give promise of yielding results of immediate practical value. Supplementary studies stressing the fundamental aspects will have to be included in any comprehensive program of work directed at the solution of new problems presented by a developing and changing industry. The lumbermen who are to engage in such work will expect to recruit properly trained men from the ranks of the college graduates just as other industrial organizations have for their respective fields of employment. It has been suggested in several recent lumber trade journal editorials that such a procedure of employment be practiced more extensively than at present. The student of the forestry school should see in these recent developments a prospective field of endeavor which is worthy of his serious consideration.

THE FORESTRY CLUB

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THE object of the Forestry club is to promote general and academic interests of all forestry students, to stimulate interest among the students and the faculty of the University and the people of Minnesota, and to help mold a proper professional attitude among forestry students toward their chosen profession.

Any student registered in the Division of Forestry is eligible to membership in the Forestry club. Meetings are held once a month and two dances a year are given.

The first meeting of the year is a bonfire affair held in a lagoon near the campus. This is a very informal affair to which all new students are especially invited so that they may become acquainted with the upperclassmen and faculty.

A prominent speaker is secured for each meeting. The policy of the present year has been to secure speakers from various parts of the world, to speak on subjects of their own choosing, in an effort to broaden the interests of the foresters.

Photo by Overholtzer.

GOPHER PEAVEY STAFF

1930

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"THAR'S GOLD IN THEM HILLS"

ALF NELSON

ALL prospectors have for their ultimate goal the winning of great riches. Knowing that odds are strongly against them, yet they stick doggedly to their elusive search, dreaming and hoping of the day when they can throw their picks and gold-pans away, sit back in their easy-chairs before the fireplace, fill up their pipes and dream of the hardships and privations they have undergone.

Ever watched an old time prospector pan gold? There's quite a trick in it, if one is to get the desired results; always provided that the gold is there. I watched one grizzly, old prospector make from twenty-five to fifty cents per pan when I was unable to get a sign of yellow. There seems to be a knack in filling the pan to the right height, sluicing it in just the correct amount of water with a certain circular twist of the wrist. As one prospector, between expectorations of tobacco juice, said, "It arl comes with practise".

Speaking of prospectors reminds me of an odd character whom I met in the mountains of western Montana this last summer. I was at the time stationed on a lookout above the Yellowstone Valley in the Lolo National Forest. As I was not in the habit of having visitors, I thought it odd that one day an old man should laboriously clamber up the pinnacle to my lookout. He said that he was avoiding the valleys because the rattlesnakes were quite common at that time of the year, as during hot seasons they seek the moist, cool valleys. It seems that he was headed back into the mountains to a claim that he was working and which claim, he said, would make him rich, if he could only strike that elusive vein. His equipment consisted of a pair of old overalls thrown over his shoulders to serve as a packsack and which contained his rations; a pick and shovel, gold-pan, and what old clothes he wore. If he had not been so old he would certainly have been a tough looking character. What surprised me more was the perfect English that he used. It seemed that he must have had considerable education at some time during his life. I questioned him about this and he said, that he had never had any education, but that his spare moments were spent in reading on every conceivable subject. Frankly, I was ashamed of myself when he asked me a simple question in geology that I was unable to answer. For thirty years he had been prospecting in the same manner, hoping that some day he would make his strike. What hopes and ambitions this man must have! Old and bent in years, but young in mind. Before he left, he asked me the names of books on astronomy, geology, religion, and philosophy that he might purchase them with his meager, hard-earned gold dust. And I was ashamed to admit that I knew the names of scarcely any books on those subjects, but referred him to an eastern book concern, the name of which I did happen to remember. Perhaps if we sought knowledge under such handicaps as this man it would be better for us.

The mountain stream beds of western Montana very often contain gold to a limited extent, and on these streams men still pan gold as in the days when the west was young. Some make a fair living at it, others, a bare existence. Perhaps only one man in a thousand will find a rich lode, sufficient to make him wealthy.

EDUCATIONAL AND RECREATIONAL FORESTRY

DOROTHEA CAHILL

FORESTRY has a romantic appeal which can not be denied. It is felt by the nature lover, the fisherman, the hunter, the camper, the book lover, and the ordinary American citizen. Forestry as a science and a profession in the United States has made enormous progress in the last twenty-five years. With the rapid development of forestry, new fields have been opened and new opportunities presented.

There are two comparatively new fields open to the student in forestry. One is forestry education, and the other is recreational forestry. Forestry education may be divided into two phases, professional and public. Both of these fields are very important. Young people no longer consider the study of forestry as belonging only to pioneers, guides, trappers, and other woodsmen. Most states offer a course in forestry in their universities. There has been a change in the attitude of the public toward the student of forestry. High boots, red shirts, and a strong vocabulary are no longer considered as absolute necessities of the embryonic forester.

Educating the public to forestry has two divisions, child and adult education. It seems to me that the best way to educate the public is through the children. In the first place the child gets a foundation for a life long respect for the forest, and in the second place whatever a child learns, he generally imparts to all who will listen. Courses in nature study for the young child satisfy his desire to learn more about the world he lives in. Simple facts about trees, shrubs, and flowers, learned in childhood are often the foundation for a deep love of nature. When a child learns about nature, he may see and touch the things he is learning about. What he learns to observe, he won't forget. The study itself gives him outdoor exercise, an appreciation of nature's work, and develops within him the habit of opening his eyes and seeing something. It is a good thing, when possible, to allow the child to plant a tree or a garden, as it awakens in him a creative force, which will not allow him to destroy the work of his own hands.

Nature study and forestry are being taught in summer camps for boys and girls. Some very wonderful work along this line has been done in West Virginia 4H clubs. They are taught simple facts about the planting and care of trees and other plants, and also the value of forests to the citizen. In this way they learn about ordinary processes of nature to which they have never given a thought. Some perhaps have wondered the why and wherefore of things that they have seen or read about, but most of them accept nature's work as they do the color of the sky. The study of nature develops in boys and girls appreciation and habits of observation. The study of forestry can be made fascinating and very instructive for the boys and girls. It prepares them to deal sensibly with the governing of the nation's forest resources when they are citizens.

The problem of educating the adult is considerably more difficult. There are three important problems to be presented to the American public: danger of forest fires, destructive use of forests, and inadequate restocking. These different aspects may be introduced in several ways.

The easiest way is through the medium of the press, by well regulated publicity. Motion pictures and slides are also very effective because they vividly present real facts. Education through clubs and other organizations often gives gratifying results. There is one way which has been already prepared for us, and that is education through art and literature. The best way, of course, is through vigorous action on the part of every man, woman, and child interested in forestry.

The danger of forest fires is very great, and it is the responsibility of every citizen to do all in his power to prevent such disasters. All of the methods mentioned before are of use in educating the public to the danger of forest fires since lives and valuable property are destroyed each year by fires which need never have been started let alone allowed to gain headway. Careless handling of campfires, cigarettes, and matches often start fires which accomplish much damage. As each citizen has an economic interest in the forest, it is to his advantage that the woods are well protected, but legislation and money are necessary to remedy this condition. When United States Forester Henry S. Graves, then Chief of the U. S. Forest Service presented his "Policy of Forestry for the Nation" in 1919, one of the things that he urged was, "A vigorous campaign of education of the public regarding the danger of forest fires and the need of cooperation on the part of every user of the woods." The destruction of a forest by fire means loss of protective timber and consequent damage to stream and soil. The presence of timber on watersheds is invaluable in regulating water flow because when there is nothing to bind the soil, such as tree roots, it is carried away by rains.

America's forests will not last forever. Excessive cutting has already wasted millions of dollars worth of timber. The forests of Minnesota were wasted this way. A new crop of timber must be created to provide for future cutting. The ideal way is to have all forests under strict management, either governmental or private, but preferably governmental. The public can be led to see the necessity of such measures, and work is now being done to accomplish work along the lines indicated.

The value of the correct kind of publicity can not be overestimated. Work in this field has already accomplished highly satisfactory results. A large number of people may be reached through the medium of clubs such as the Izaak Walton League, the Federation of Women's Clubs, and in general the civic and educational organizations that can be reached by direct personal appeal.

One of the ways of reaching the public in an appealing manner is through art and literature. Beauty awakens our interest. Beautiful paintings and sketches and delicate pictures in verse and prose challenge the imagination and create in our minds ideals which we strive to attain. The aesthetic value of the forest runs throughout literature and art.

"There is a pleasure in the pathless woods," sings the poet. The forest has always been considered a place for sublime thoughts and lofty inspiration. Through the ages man has taken inspiration and courage from the grandeur and calm majesty of nature.

It is but natural, then, that those who are work-worn and tired of the grind of living should turn to the forests for their recreation. For this reason every year thousands of Americans "take to the woods" to re-create themselves. Beauty is absorbed in each breath. The soul expands as it comes in contact with the vastness and majestic grandeur of nature. Canyons, mountains, secluded groves, mighty, roaring water falls, tiny mountain streams, and the delicate beauty of flowers all appeal and uplift. At sunset when the departing sun withdraws its alluring path of light across the lake, dreams that one has forgotten come stealing about one, creating a new Eden on earth. The sun sinks and the western sky is flooded with crimson, gold, purple, and mauve. The pines whisper all night long and the voices of the forest invite one to sleep and peace.

Recreation is a very important phase of American life. Boys and girls, men and women all feel the need of getting away from everyday things. There are thousands of camps all over the country every summer that give people a chance to get a new grip on life. Weak bodies grow strong and drooping ideals arise again.

The National Forests provide camping grounds for the tourist. Information concerning trails and desirable camp sites may be secured from the District Forester. Rangers and other Forest Service men are always glad and willing to cooperate with and aid travelers. Nature has been generous with stocking the National Forests with every kind of natural scenery. Mountains, canyons, glaciers, deserts, forests, lakes, rivers, rolling plains, and tumbling water falls all exist but to please. Hunting with the camera for rare flowers and animals is a favorite sport with many who regularly visit the forest groves. Fine fishing can be indulged in in a number of the National Forests.

For the citizen who wishes a beautiful location for his summer camp, land may be leased in the National Forests. These leases may be renewed from year to year. The number of people who take advantage of this offer increases every year. Many camps both public and private have been established in the National Forests. Here health is renewed, the mind refreshed, and new friendships made. One of the pleasures of summers spent in the woods, is the knowledge one gains of the fine qualities of other folks.

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GERMINATION OF SEED FROM DIFFERENT PARTS OF CONE AND CROWN

By Dayton P. Kirkham,
Colorado National Forest

ALL reforestation measures rest upon the germination of seeds; therefore, the value of germination tests can hardly be overestimated. As yet, little or no attention is given in nursery practice to the viability of seeds. The cones are usually picked and seeds extracted without regard to position, size or weight. It is taken for granted that one seed is as good as another. The following thesis, as well as previous articles, show that there is a great difference in the viability of pine seeds. As the science of Forestry develops, more and more attention should be given to the germination tests of forest tree seeds.

It is the object of this thesis to determine the germinating values of white pine (Pinus strobus) and pitch pine (Pinus rigida) seeds from different parts of the tree and cone and determine what relation, if any, exists between germination and position of seed in the cone and seeds from the different parts of the crown.

Review of Previous Investigations

E. N. Munns, in his study of Jeffery pine, found "that it is the size of seed rather than position in the cone which is the determining factor, there being a decided decline in the germination per cent with size, while apparently no relation holds between position and germination"....He also states "....that there were more undeveloped seeds than developed, except in the case of small cones where there was a slight decrease. In the large cones 47.1 per cent were fully developed, in the medium cones 47 per cent and in the small cones 54.2 per cent". He also found a decided decline in the germination per cent with a decrease in the size of seeds.

In a previous article by Munns it was found that, "In general, cones from the thrifty trees furnished the larger and heavier seed, no matter what tree furnished the pollen. The seeds, in addition, had a higher germination per cent and a higher rate of germination."

J. W. Toumey in his research studies of white pine, found that the average germination per cent of commercial seed was 68 per cent. He also found that 82 per cent of the pitch pine germinated, the maximum per cent of viability being 86 and the minimum per cent being 33. He also states that all seeds should be thoroughly ripe before harvesting, seeds gathered a short time before maturity are not necessarily infertile, although invariably its vitality is impaired and it produces weak and inferior seedlings.

WHITE PINE

The white pine cones were collected from virgin and second growth trees in Center County, Pennsylvania. The cones were collected from the upper and lower crowns of the trees and these were kept separate.

Cones on the virgin trees do not ripen at the same time. At the time of collection the cones were divided into three groups, based on the degree of ripeness; ripe cones, cones just turning brown, and very green cones. These were kept separately to determine what germinating values, if any, exists between them.

Description of the White Pine Trees

1. Virgin (over 100 years old)

The cones were collected on September 11, 1927 from a virgin tree having a diameter breast high of 34 inches; total height, 45 feet; crown length, 60 feet; spread of crown, 50 feet, and a distance of 15 feet to the first branch. The general health of the tree was very good, the current growth was 1/8 of an inch, and no signs of fungi, insect attacks or fire scars could be seen.

2. Second growth.

The cones were collected on September 8, 1927 from three classes of trees which are as follows; (a) Dominant; total height, 50 feet; diameter breast high, 14 inches; crown length, 43 feet; spread of crown, 30 feet; and 7 feet to the first branch. The general health of the tree was very good. The rate of growth was very rapid, there being 4 rings in the last inch of growth as determined by increment borings. (b) Co-dominant; total height, 47 feet; diameter breast high, 10.3 inches; length of crown, 30 feet, spread of crown, 25 feet, and it was 7 feet to the first branch. The general health of the tree was very good, while the rate of growth was a little slower than the dominant tree—there were only 5 rings in the last inch of growth. (c) Intermediate; total height, 35 feet; crown length, 25 feet; spread of crown, 19 feet; diameter breast high, 9 inches. The general health of this tree was also very good and the rate of growth the same as that of the co-dominant tree. Seeds from the co-dominant and intermediate tree were not germinated due to a lack of a sufficient number of seeds.

Extraction

The seeds were extracted immediately after collection, without the aid of artificial heat. All cones were divided into three equal parts, the seeds from which are to be known as the stem end, center and tip. The seeds were extracted by hand, care being taken to divide the cones into the above three equal parts as nearly as possible, while the seeds were being extracted. As soon as the seeds were extracted from the different parts of the cone, the wings were removed by hand and the cleaned seeds were placed in envelopes for storage.

Storage

All seeds were stored in an unheated attic from the time of extraction until December 3, when the germination tests were started.

Fertility of Cones

It was sought to determine the fertility of the cones produced from the four classes of white pine trees studied. The following data was collected; average length of cone, average number of cone scales per cone, and average number of seeds per cone. The results are shown in table I.

Table I shows that the upper crowns of the virgin tree produced the most seed per cone, an average of 76.8 seeds, while the lower crowns of the intermediate second-growth produced the least seed per cone, an average of only one, with many of the cones producing no seed at all and no fertile cone scales producing more than one seed. Nearly all of the fertile cone scales from the virgin tree produced the normal two seeds.

From the three classes of second-growth, it was found that with increasing dominance of the tree there was an increase in the number of seeds per cone, with the number of cone scales per cone and average length of cone remaining fairly constant. Cones from the virgin tree showed a decided increase in the number of seeds per cone, length of cone, number of cone scales per cone and number of seeds per cone scale, over those of the second-growth.

Germination

In this report the term "real germination per cent" ([1]) will be used to express the germination values of the fully developed seeds in the tests, while "germination per cent" will be used to express the value of the total number of seeds in the tests. It was found that a very large per cent of the seeds were undeveloped (hollow), making it necessary to use a term that distinguishes between the germination per cent which is based on the original number of seeds in the tests and the real germination per cent, which is based on the number of developed seeds in the tests. This is believed to be of value because in future practice tests will probably all be based on the number of developed seeds rather than the entire number, as all the light, empty seeds can be removed by the electric blower, which has been recently invented.

Method of Germination

The following method applies to both white and pitch pine. One hundred seeds from each part of the cone were used to make the tests, i. e. one hundred seeds from the tip of the cone and lower branches, etc. Each set of seeds were placed between separate sheets of blotting paper and these were then placed on trays in the germinating ovens. ([1]) For the first five days the seeds were placed in ovens having a temperature of 60 degrees Fahrenheit. They were then taken out and placed in ovens having a temperature of 88 degrees Fahrenheit, where they were left until the end of the germination period, which was 76 days for pitch pine and 51 days for white pine.

The blotting paper was kept moist, but never saturated. The seeds were inspected every three days and those in which the radicel had broken through the seed coat were considered as being germinated. These were then counted and thrown out.

All germination tests were carried on in the State Seed Testing laboratory at University Farm, St. Paul, Minnesota.

Results of the Germination Tests.

The results of the germination tests carried on with white pine are shown in tables II—IV.

Germination per cent based on 100 seeds. Real germination per

cent based on number of developed seeds in the tests. Germination period, 51 days.

Germination per cent based on 100 seeds. Real germination per cent based on number of developed seeds in the tests. Germination period, 51 days.

The seed from the lower part of the crowns in both the virgin and second-growth had a higher real germination value than the seed which came from the upper crowns. Seed from the upper crowns of the virgin tree had an average real germination value of 7.6 per cent, while those of the lower crowns had an average value of 9.9 per cent, an increase of 2.3 per cent. In the second-growth, seeds from the upper crowns had an average real germination value of 51.8 per cent, while those of the lower crown had an average value of 65.0 per cent, an increase of 13.2 per cent. This shows that it is the position of the cones on the tree, rather than the position of the seed in the cone that is the deciding factor in germination, there being an increase in the real germination values from the seed which came from the lower crowns.

The above figures also show that the seeds from the second-growth germinated better than those from the virgin tree. The seeds from the lower crown of the second-growth germinated 55.1 per cent better than those of the same part of the crown on the virgin tree, although the second-growth tree produced 51.3 per cent more undeveloped seeds than did the virgin tree.

Germination per cent is based on 100 seeds. Real germination per cent is based on number of developed seeds in the tests. Germination period; 51 days.

As stated before, cones on the virgin tree at the time of collection could be divided into three groups, based on the degree of ripeness, i. e. ripe cones, cones just turning brown, and very green cones. The germination results from these three groups are shown in tables II and IV.

The following data, as tables II and IV show, are based on seeds taken from the upper crowns. Strange as it may seem, the seeds which came from the cones that were just turning brown had the highest real germination per cent, an average of 34.9. The seeds from the green cones had the lowest real germination per cent, an average of only 1.9. The seeds which came from the tip of the very green cones did not germinate at all. Seed from the center of the very green cones had a real germination per cent of only 1.1 and the seed from the stem end of the cone had the highest per cent, which was 4.6. Table II shows that the seed from the ripe cones had a real germination value of 7.6 per cent. The low germination per cent, especially in the ripe seeds, was probably due to the short resting period. The results show that even though the seed may be picked at the same time and on the same tree, they may vary greatly in their viability.

PITCH PINE

The cones of pitch pine (Pinus Rigida) were collected on September 11, in Center County, Pennsylvania. They were collected from

the following four parts of the crown; bottom, center, top and very tip. The cones were of all ages, as they are persistent on the tree for many years. The newest looking cones were picked out for extraction, thus making the ages of the seed used in the germinating test vary from 1 to 3 years old.

Description of the Tree.

The cones were collected from a virgin tree (approximately 100 years old or over) having a diameter breast high of 25 inches, total height of 90 feet, crown length 65 feet, spread of crown 25 feet, and the first branch was 25 feet from the ground. There were no signs of defects on the tree, such as fire scars, fungi or insect attacks. The current growth was very slow.

Extractions

Pitch pine cones are too hard to extract without the aid of some artificial heat. Therefore, they were placed in a room having a temperature of 95 degrees for a period of four hours. At the end of this period the cones had dried out enough to allow the extraction of the seed by hand. As in the case of the white pine, these cones were also divided into three equal parts, the tip, center and stem end. The seeds were extracted by the aid of tweezers, care being taken to divide the cone into the above three parts, as nearly as possible, while the seeds were being extracted.

Storage:

The seeds were stored in an unheated attic until October 27, 1927, when the germination tests were started.

Methods of Germination:

The method used is the same as that discussed under white pine.

Germination Results:

The results of the germination tests carried on with pitch pine are shown in Table V. The table shows that there is no relation between the position of the seed in the cone and the real germination values, thus checking with the results that Munns found in Jeffery pine. There exists a wide variation, but not constant, in the real germination value of the seed from different parts of the cone.

Table V shows that the seed which came from the stem end of the cone, and center of crown, had the highest real germination value, which was 60 per cent. The seed that came from the same part of the cone, but from the very tip of the crown had the lowest real germination per cent, which was zero, or a difference of 60 per cent.

Approximately 90 per cent of the seeds were undeveloped, as shown in Table V. The lower branches of the tree and the stem end of the cone produced the lowest number of undeveloped seeds which was 85 per cent, while those from the same part of the cone, but from the upper branches of the tree, contained the highest per cent of undeveloped seeds, which was 94 per cent. The average per cent of undeveloped seeds varied from 89.8 per cent in the lower part of the crown to 91.8 per cent at the very tip of the crown. This shows that there was a slightly larger per cent of undeveloped seeds taken from

the upper part of the crown, although the per cent was fairly constant for the four parts of the tree and the three parts of the cone.

Table V also shows that there is a decided relation between the real germination and the position of the cones on the tree. The average real germination values from the four parts of the tree are as follows:

Seed from center part of the crown .....48.0 per cent
Seed from lower part of the crown .....42.6 per cent
Seed from top part of the crown .....38.0 per cent
Seed from very tip of the crown ..... 7.9 per cent

It is therefore the position of the cones on the tree rather than the position of the seed in the cone that is the deciding factor in germination, there being a decided decrease in the real germination per cent in the seeds that were taken from upper portions of the tree.

Effects of Oxygen:

Oxygen was used with separate samples of both the white and pitch pine seeds, with the hope of getting a higher germination per cent and a higher rate of germination.

The seeds were first run through an electric blower to separate the developed seeds from the undeveloped. The fully developed seeds were placed in a dissector which had previously been evacuated. Oxygen was then passed in from an oxygen tank until it was entirely filled. The seeds were left in the oxygen for four days, each day the dissector was refilled with oxygen. After the four days, the seed was taken out and placed in the germinating ovens. The following results were obtained.

For the white pine, seeds from the lower crowns and tip of the cone, it took 26 days for the first seeds to germinate, and in 35 days 50 per cent had germinated, whereas without the oxygen it took 32 days for the first seeds to germinate and in 51 days only 8.1 per cent had germinated. From this, it appears as if oxygen tends to break the rest period and increase the germination per cent for white pine seeds.

For the pitch pine, seeds from the lower crowns and tip of cone, it took 9 days for the first seed to germinate and in 21 days 75 per cent had germinated, whereas without the oxygen it took 13 days for the seed to germinate and in 76 days only 42 per cent had germinated.

From the above figures it appears as if oxygen has a decided effect in hastening the germination period, increasing the final germination per cent for both species and in breaking the rest period in white pine seeds.

CONCLUSIONS

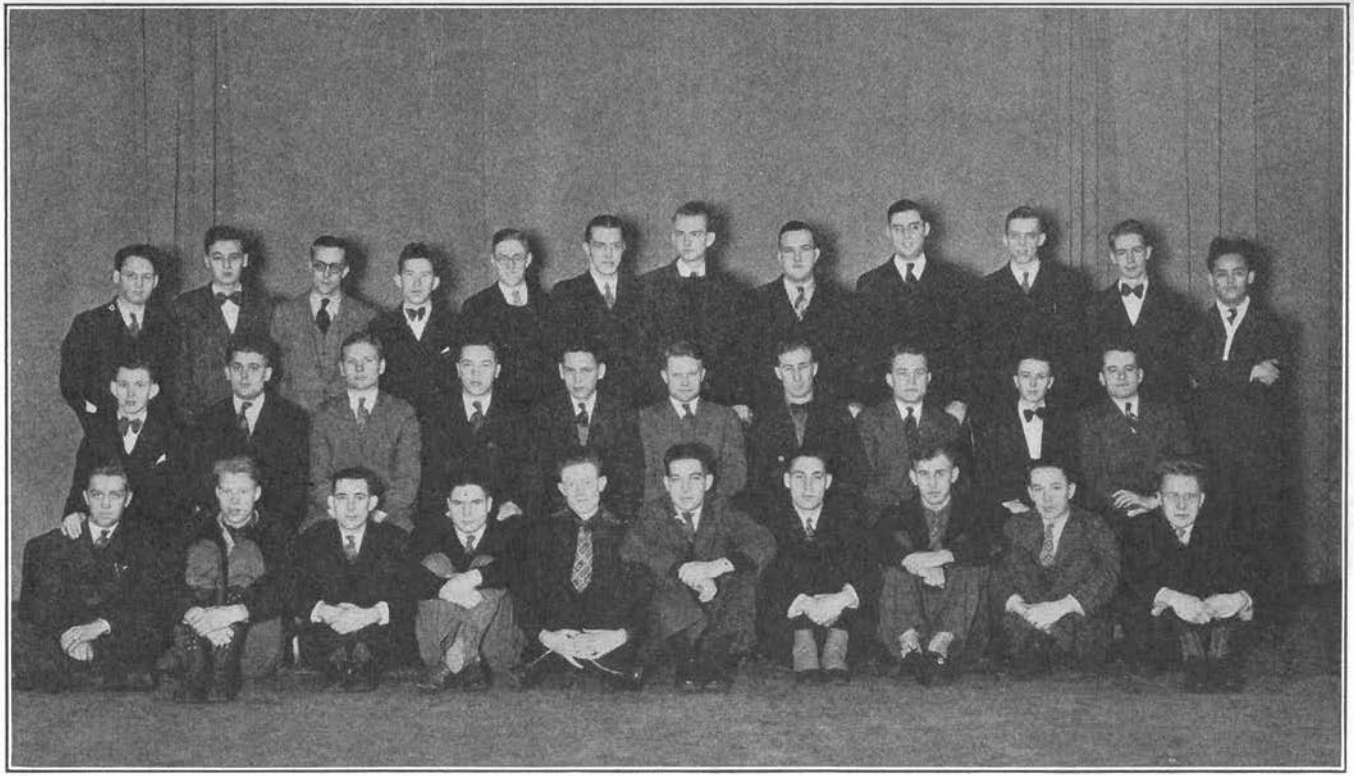
Pitch Pine

1. There is apparently no relation between germination and the position of the seed in the cone.
2. Seeds from the middle and lower crowns have the highest germination per cent. Seeds from the very tip of the crown have the lowest germination per cent.

3. There are more undeveloped seeds than developed, approximately 90 per cent being undeveloped.
4. Oxygen apparently hastens the germination period and increases the final germination per cent.

White Pine

1. There is apparently no relation between germination and the position of the seed in the cone.
2. Seed from the lower part of the crowns have the highest germination per cent.
3. Seeds from both the virgin and second-growth trees have a low germination per cent. This was probably due to the short resting period.
4. Seeds from the dominant second-growth have a higher germination per cent than those from the virgin tree.
5. The dominant second-growth tree produced a higher per cent of undeveloped seeds than did the virgin tree.
6. The cones from the virgin tree which were just turning brown produced seed that has a higher germination per cent than either the ripe or green cones. The green cones produced seed having the lowest germination per cent.
7. There was a decided decrease in the number of seeds per cone in the order of the following three classes of trees: virgin, dominant second-growth, co-dominant second-growth and intermediate second-growth. Many cones from the intermediate tree contained no seed and of the cones that contained fertile cone-scales, none produced more than one seed. In the virgin tree nearly all the fertile cone-scales produced the normal two seeds.
8. Oxygen seemed to break the rest period and also to hasten and increase the germination per cent very decidely.



BACK ROW—*Moore, Stewart, Ferguson, Campbell, Wellberg, Day, Nelson, Anderson, Niles, Olson, Fredrickson, Yang.*
MIDDLE ROW—*Huckenpahler, Keehn, Tysk, Osborne, Kopitke, Huhtala, Cline, Risbrudt, Dahl, Beardsley.*
BOTTOM ROW—*Janelle, Dellberg, St. Amant, Moore, Stoudt, Buckman, Woolery, Sterba, St. Amant, Rudser.*

I HUNT DE BEAR

By FRANK "PORKY" ANDERSON—'31

Wan day I go for hunt de bear,
An tak de gun long weet.
De dog come too. I do no care.
De dog shes name ees "Speet."

De dog shes wan fine skookum pup,
Weet long an lousy hair.
Wan ear she down; wan ear she up;
De tail she ees no dere.

Myself, I wan beeg strong galoot,
Six axehandles cross de back;
Beeg, an number twelve de boot;
Shes mak wan awful track.

Shes spring. De groun shes full of slush;
De trail shes steep an wet.
An "Speet", shes run roun troo de brush,
Wile all I do ees swet.

An wen I mak de top, by gar,
I seet doun top de stump,
An smoke me wan ole black ceegar,
Wile grouse, de log she t'ump.

Wen all for once I hear wan crash!
An close to heem, wan yell, !
An "Speet" shes tear from out de brush,
Lak bat from out de hell.

De bear shes mad, an tak for "Speet";
An 'Speet" shes tak for me.
Dees guy hes sure in wan fine jeex;
De gun, I do no see!

De bear, by gar, shes tak for "Speet,"
An "Speet" shes tak for me.
An me, no gun to keel heem weet,
I dash for wan beeg tree.

De tree shes got wan fine beeg limb,
Ten feet from oop de groun.
I mak wan joomp an mees at heem,
But grab heem,—coming doun.

De dog no stop for anyting,
Shes fly lak wan beeg weend.
By gar, no bear shes chew on me,
High oop on wan beeg limb.

De bear shes seet doun for wan rest,
An leek de chops for me.
By gar, shes tink for how ees best,
Shes climb dat cedar tree.

De bark, shes grab rite hold of heem,
An run rite oop de tree.
Shes stop an look out on dees limb—
By gar, shes tak for me!

I climb way far out on de perch;
My hair shes turn to gray.
By gar, I lak for be in church,
An pray, an pray, an pray!

De bear shes scale four hunder pounds;
De limb shes geeve wan crack!
By gar, I geeve four hunder pounds
To be in Hackensack.

I heet de groun; my legs she sing;
My feet shes tear oop brush.
I stop, by gar, for nodamting.
I'm sure in wan beeg rush.

De bear, by gar, shes notting slow,
Shes ver queek on de feet.
Shes come so fas, shes melt de snow,
An dry de groun beneet.

Dees guy hes sure in wan beeg race;
Hes mak wan awful weend.
De trees she bend an some she break;
De leaves she fly an speen.

At las I mak de cabeen door,
Wan joomp in front de bear.
By gar, I hunt de bear no more,
So long my name ees Pierre.

TRUE CONFESSION IS GOOD FOR THE SOUL

WILLIAM ROYER

FELT reminiscent the other night sitting in front of the fire-place with the girl friend. The Freshman Corporation of 1927 seemed not so far behind then as I recalled incidents of that crew.—Burial of the quiz, the hike around to DeSoto, and to Squaw Lake, and of course the lost charter of the No-Shave Club. Funny thing about how that charter—made of a board about six inches wide and two feet long with the conditions and penalties printed at the top and the members' names below vanished. It disappeared one day, and showed up a week later without any names on it—in fact, the board was cut clear off just below the charter members' names.

I have had a theory of my own about that incident, and I guess its as good as the parson's or Porky's at that. As no rumors have reached me regarding the culprit or culprits responsible for this misdemeanor, I will put forth my own theory and await developments.

It would be simple for one of the boys to take the charter from the bunk house any time late at night. They say a thing is well hidden when it is in plain sight, so why couldn't the board be hung in a spruce near the boat house until disposition could be made of it? It wouldn't have to be hung high as the foliage is very thick, but it would be safer if hung on the lake side of the tree. But why would any of the fellows want to spoil the fun of the camp in this underhanded manner? Perhaps the unethical way in which the signatures were obtained caused discontent among the members. Perhaps to throw suspicion on someone else the names of the charter members were left on the board.

But now that the board has been removed from the bunk house, the next problem is to obliterate the names. It couldn't be done in camp without suspicious traces being left, therefore it would be better to take the charter out of camp, but how, by land or sea? How about going for hike—and possibly meet somebody, or go canoeing at dusk, and thus escape detection? Let's suppose that they paddle. A saw would be necessary to cut the board, but that would be easily obtained from the bunk house, just pick it up and carry it to the boat house. The charter could be taken from the tree and tossed near the water by the boathouse easily enough, so the saw and board would be together—ready for a simple pickup and quick get-a-way. No one ever paid any attention to arriving or departing vessels, so a canoe at the dock would not be unusual; except, as in this case, when stolen property was being stored beneath its deck.

Slipping along the shore, say to Green Monument Point, the party could land to alter the charter without fear of interruption. After cutting the offensive portion from the plank, the Roll and trimmings could be gathered up and stuffed into any one of the many hollow

stumps around the point. By this time it would be dark, and the return journey uneventful; including the return of the saw to its peg, and the charter to its roost. One day's time should elapse here, awaiting return of composure to the brigands.

The charter was found in the morning after breakfast, wasn't it? But as no one was caught hanging it up we weren't sure just when it was returned. I think one of the fellows waited until most of the gang had gone up the hill, brought the board in, hung it, and preceded the usual tardy ones to the messhall, thereby averting suspicion by not coming in last.

With the organization broken up in this way, the charter members met to dis-organize as they had organized—in the Club. Porky broke the Law over his knee and scattered the pieces among the ivy. Herb and Bill silently gave thanks—for their identity was not established—and they could shave without smoking. Oh, it was a great gang all right, all right!

"Reproduction Crew"

ECONOMIC IMPORTANCE OF FARM WOODLAND IN SOUTHEASTERN MINNESOTA

By William H. Fischer

Introduction

As in all other forester areas, farm woodland in the southeastern part of Minnesota has gone through the destructive and mismanaged stage. The present woodlands are merely the cull left after the sawmills have been satisfied with the choicest of its logs and the plow with the most fertile of its acres. But even today the woodlands are producing some revenue for their owners through the sale and use of ties, fuel, fence posts and saw logs. They are further considered valuable for the shade, shelter and ground protection they afford. However, very few farmers at present realize that this supplementary wood crop is of real value to them, and they are not planning to keep it in a continuous stage of production in the future.

In order to determine for the farmer what the value of his woodland is, the Division of Forestry of the University of Minnesota began an economic farm woodland study in 1928. In this connection the writer was detailed to the southeast part of the State. Here 150 farm operators in the counties of Houston, Fillmore, and Winona, were interviewed and on this field work the following paper is based.

All information was obtained directly from the operators by the questionnaire method. Fifty farms in each county were visited and although selected at random, care was taken to get an equal representation from all parts of each county.

The counties studied lie in the extreme southeast corner of the State. No systematic study was made in Dakota, Goodhue, Wabasha, Olmstead, and Mower counties, but conditions in these are very similar to those in Houston, Fillmore and Winona counties. Whatever conclusions are arrived at for the latter group can also be applied quite generally to the former group.

Along the Mississippi River and its tributaries, the Root and Whitewater Rivers, the surface is broken into deep valleys and steep slopes. Many of these slopes are too steep and rocky to ever be cultivated or even pastured. Extending westward to the prairies the land becomes more regular in topography, remaining, however, quite rolling.

This entire area with the exception of Houston County has been glaciated and therefore a great variety of soils is found. In Houston county it is generally a clay loam with a clay subsoil. In the remaining area it changes frequently with the topography. Black and sandy loams are found in the valleys, while clay and clay loams are more common on the slopes and ridges.

Character and Amount of Woodland on the Farms

The total area of 148 farms studied in the three counties is 27,607 acres, or an average of 186.5 acres per farm. For further consideration this acreage has been divided into the following classes:

	A. per Class	% of Total	A. per Farm
Cultivated land	14,299	51.8	26.5
Cleared pasture	4,057	14.7	27.5
Pastured woods	8,046	29.2	54.5
Unpastured woods	964	3.6	6.5
Other (swamp, meadow, etc.)	241	0.8	1.5
Total	27,607	100.0	186.5

This shows the average farm to contain 61 acres of woodland, of which 54.5 acres are also used for pasture. Under present farm management practice these 54.5 acres will be converted into cleared pasture as fast as the trees can be cut and sold or used for fuel and fence posts on the farm. If it continues to be pastured its future for wood production is doomed. The present practice in this region is also to clear and cultivate more and more of this woodland. An estimate was obtained from each farmer as to how much more of his farm he thought could be cleared. The total of all estimates on 148 farms was 1457 acres, or 10 acres per farm on an average. Granting that their judgment in this matter is correct, there still remain 61.0 acres per average farm which will always remain woodland or be cleared for pasture.

County Agents in Houston and Fillmore counties were asked concerning the value of woodland as pasture. L. A. Churchill of Houston county replied that as pasture land its value ranges from nothing to $25.00 per acre. H. O. Putnam of Fillmore county made the following statements: "Some of this timber and brush land has absolutely no value for pasture, some of it is not even worth fencing and the bulk of it is not worth more than $.50 an acre per year." The land referred to by Mr. Putnam is that class of which the average farm contains 51.0 acres. He stated further, "rough pasture land that does support grass and not trees is probably worth from $1.50 to $2.00 per acre per year for pasture. $1.50 will cover the bulk of it." This would be the class of land we have classified as cleared pasture and of which there are 27.5 acres per average farm. The county agent also stated "the majority of such land (pasture land in general) has no real pasture value and undoubtedly should be reforested. I am in hopes that the State will help interest some of our farmers in reforesting it." There is, then, a potential area of 78.5 acres on the average farm in this region which may be more profitable for woodland than for any other purpose.

Sources of Revenue

At this time there are but three active outlets for wood products produced on the farms of this region. They are ties, fence posts and fuelwood. Some lumber is also produced, but the amount on each

farm varies so greatly and with no records kept by individual farmers it is hard to get a true average for all of the farms investigated. Practically no sawlogs or lumber are produced for the market as the supply is too limited to establish such. If woodlands are put under management sawlogs will undoubtedly become an important product in the future.

There is in this region a very active market and trade in railroad ties. Ties are made chiefly from red and white oak, but other species such as elm, black cherry and others are also used. The trade has been carried out on a scale large enough for tie operating companies to come in and take over almost the whole of it. This has meant a distinct loss to the farmers who have often been paid too low stumpage prices for their standing timber.

Without exception, all of the farm operators interviewed expressed the opinion that they could sell as much cordwood as they wished to market. Out of the 150 operators 132 reported a price per cord they could receive for fuelwood at the market. The average price is $7.75 per cord.

Besides the revenue which can be derived from the sale of products there is another income from the woodland on the farm. All of the farmers reported the use of fuelwood for their home and over 90% reporting used all wood and no other material for fuel. 147 operators reported an average home consumption of 16.5 cords of fuelwood per year. Another important home use of the woodland is for fence posts. Of these 141 are used per year on the average farm. White and red oak are the chief species used for posts. The quantity of lumber used on the farm annually is a hard figure to obtain. Most farmers reported the use of two or three selected logs per year, but with no degree of certainty. Occasionally one using as high as 10M board feet was reported where a new building had been or was being erected. Lumber used on the farm is valued at from $25.00 to $50.00 per M. when sawed and is an item which cannot be entirely overlooked in valuing the income from the woodland.

There is, then, a variable use for farm woodland products, the value of which can be determined. There are also other uses which are valued by the farmer, but which cannot be determined. Woodland that protects adjoining fields from hot and drying winds may save heavy crop losses, but the value cannot be measured. Woodland sheltering the farmstead is valued highly by every farm owner for the shade it produces and the wind protection it affords. Well located and managed woodland adds greatly to the appearance of the farm and who will deny that appearance adds a true economic value to the property? This value can rarely be measured, yet we must recognize its existence. The value of a forest crop in preventing erosion on steep slopes is of the same nature.

Yields

The yields of woodland in this region are fully described in Minnesota Bulletin 241 by E. G. Cheyney and R. M. Brown. They will be briefly reviewed here. Two forest types prevail throughout the

region. One is the mixed hardwood type, which is composed of about 55% of maple, basswood and elm. The remaining stand is scattering trees of shagbark hickory, ironwood, black ash, red oak, aspen, butternut, boxelder, hackberry, white ash, bur oak and others. The other type is called the oak type and is composed of about 45% red oak, 11% white oak and the remainder of the stand is made up of a mixture of all the species found in the mixed hardwood type.

Both of these types have about the same volume per acre which is 3200 cubic feet, or 5000 board feet. They both show a yield or annual growth of 76 cubic feet, or 120 board feet. This volume and growth was based on all trees over 4 inches in diameter and including the tops in the cubic measurement. For board feet contents trees 10 inches and over were included.

Inasmuch as we have no economic data on the utilization of sawlogs in this region we will consider the yield of tie and fuel products only.

The yield of 76 cubic feet per acre per year is equal to .9 of a cord, using the converting factor of 85 cubit feet to the cord. Or changing the board feet into the number of ties that can be obtained, we get 5 ties at 25 board feet per tie. When a stand is cut for ties a considerable amount of fuel wood remains in the woods and an appreciable amount of lumber is sawed from the slabs. The yield in terms of fence posts could also be determined, but as the market for these is limited it will not be considered here. The posts used on the farms are generally made in connection with the cutting of cordwood. In this way only choice material can be selected without waste of time and wood.

Economic Value

The average price which farmers are able to receive for fuelwood is $7.75 per cord according to their own estimate. Since the yield as determined by Cheyney and Brown is .9 of a cord per acre, the gross annual income is $6.975, or roughly $7.00. Since cordwood is the easiest to produce, affords the best utilization, and has a ready market, we can assume that other products will have to yield at least as large an income before they will be produced. Apparently this is not true at the present time for farmers are not getting full value from tie sales. Fuelwood in large quantities is left to rot in the woods or given away after ties have been removed. Farmers have also accepted a very low stumpage price per tie rather than take out the ties themselves. The average price paid to farmers by tie operators is 10c to 12c per tie in standing timber, according to a wood utilization study made by L. W. Rees. On the other hand Rees has the records of one farmer who sold his own ties delivered at the mill. This farmer received 57 cents per tie, which allowed him 25 cents per tie stumpage and a good wage for his labor and that of his team. He also received the lumber which was cut from the tie slabbings. Usually all trees are cut which will make one tie or more, which means that the tops left in the woods are about 10 inches in diameter. From this it can be seen that a separate study of the tie situation is necessary

before definite conclusions as to its profitableness can be drawn.

The cost of producing cordwood can be determined accurately from the information of their study. Complete information of the time spent in woodwork and transportation was obtained from all farms studied. The cost of production can be divided into general expense, woodswork and transportation to market.

General expense in the case of woodland can be limited to taxes. On farm land in general, depreciation on buildings is also included in general expenses. The amount of depreciation chargeable to woods operations is negligible compared to farm crop operations. Taxes as reported in the Minnesota Tax Commission Report of 1925 are as follows: average for Winona county $.88 per acre, Fillmore, $1.09, and Houston, $.93 or an average of $.90 for the three counties.

Figures from 148 farms were used in determining the cost of woodswork in producing fuelwood. The total cost of felling trees, cutting them into cordwood lengths and piling the brush was $2.20 per cord. This figure is based on the operations of the farmers in getting up their own supply of fuelwood. The average farmer consumes 16.5 cords of fuelwood and 141 fence posts per year. Converting the fence posts into cords at 6 board feet per post and 500 board feet per cord the 141 posts equal 1.69 cords. We can say then that 18 cords of wood are produced for use on the average farm. The time required to cut this wood and haul it to the farmstead or cut it into cordwood and pile it in the woods is 20 man days per farm or an average of 1.1 man days per cord. At $2.00 per day, which is a good farm wage in this region during the winter, the cost per cord would be $2.20. In some instances farmers hired men to cut their wood by the cord and paid $2.00 per cord piled in the woods.

The average distance to market of all of these same farms is 4.5 miles. Hauling wood this distance, two trips a day can be made carrying 1½ cords per load. At $4.50 per day for man, team and rig the average cost per cord for transportation to market is $1.50. Total cost per cord delivered at the market can be summarized as follows:

General expense (taxes)	$ .90
Woodswork	2.20
Transportation	1.50
Total	$4.60

The cost of $4.60 per cord is based on present conditions of the woodland and does not take into consideration any cost of changing the composition of the stand or in any other way improving it. If such things were considered we would also have to estimate the difference in yield which they would bring about. At present we have no data for this region on which we can base an estimate for increased yields due to improving the present stand. But we can assume that any increased cost due to improving the stand will be more than offset by the resulting increased yield.

Deducting the total cost of $4.60 from the gross annual income

of $7.00, we get a net income of $2.40 per acre per year from fuelwood. The average rate of interest on farm loans in the counties studied is 5.1% according to 1925 Census figures. Capitalizing the net income of $2.40 at 5.1%, we get a capital value of $47.06 per acre for farm woodland in Houston, Fillmore and Winona counties. With farm woodland management and practice in the future it is reasonable to suppose that present incomes will be increased. We cannot capitalize this expected increase in income, however, until we have some past records to base it on. A considerable percentage of farm land value is often based on such an anticipated increase of income. This is especially true of new farm land where improvements are being made from year to year and where it is known that incomes have been increasing in the past.

The growth studies made by E. G. Cheyney and R. M. Brown are based upon the best cared for and best quality woodlots which could be found. This was done to avoid, as far as it is possible to do so, the influence of neglect and mismanagement. Necessarily, then, our incomes in this paper are based upon higher values than the average present conditions justify. It will take from 15 to 30 years to bring the average woodland up to its normal producing capacity and it will in some cases mean an outlay of cash in doing it. But this decreased income and extra cost should not be charged against present or future crops. It rightfully is a charge against excess profits in the past or against mismanagement. As was often the case, select logs were taken from these woodlands at a great profit and without regard to the remaining stand. The owners did nothing to help or encourage the replacement of such wood capital which they removed. In many cases farmers should charge decreased income from the normal to the livestock industry on their farm. Pasturing of stock on woodland has checked normal yields wherever it has been practiced.

Acreage

It is quite evident that with the present yield of income that woodland cannot compete with cultivated land where cultivation is favorable. H. G. Oldfield[6] in a study of land values in the State found the average for the three counties to be as follows:

Houston	$65.57
Fillmore	98.83
Winona	81.32
Average	$81.91

These values were based on net rents of $2.98, $2.39 and $2.26 per year respectively for the three counties. These incomes were capitalized at the rates of 5.1% for Houston county, 5.0% for Fillmore and 5.2% for Winona. Of the total land value of Houston county 16% is based upon anticipated increase or income. In Fillmore county it is 31.4%, and in Winona county 46.6%. Such land values are considerable higher than those of woodland. There are now 96.5 acres per average farm of land in cultivation, and the possibility of 10

acres per farm more which is likely to be cleared from woodland in the future. No estimates were obtained on how much of the present cleared pasture is arable, but it is likely that much of it is, because cleared pasture is often a stage in the process of converting woodland into cultivated land. There is an average of 27.5 acres of cleared pasture land per farm now and it is safe to assume that it all will either be cleared or kept as permanent pasture. This makes a total of 96.5+10+27.5 acres or 134 acres, which will be more profitable for other purposes than for woodland. This is 76¾% of the average farm. The other 51.5 acres, or 23¼%, will either be pasture land or woodland. Economic returns as determined by this study show a definite advantage from woodland. Besides a net increase of farm income from woodland, it has other advantages. The average consumption of wood on the farm will require the yield of 20 acres. Most farmers appreciate the value of wood as fuel and fence posts. And also the handiness of having it right at home where they can get it as they please. Another point to be considered is that woodland crops are as good a supplementary farm crop as can be found for the farmers in this region. Practically all the man and horse labor used is such that would be wasted otherwise. Harvesting the yield of 50 acres of woodland each winter would pay one man for 62.5 days of labor, and one team of horses for 13 days. At $2.00 per day for man labor and $2.50 per day for team and rig there would be an income of $167.50. The net income of the yield of 50 acres which is 45 cords, would be $108.00 at $2.40 per cord.

Grazing Policy

If the above incomes and advantages of farm woodland are to be realized all grazing of livestock on it must be stopped. The present practice of grazing all woodland has resulted in preventing reproduction and the production of continuous normal yields. Futhermore, the difference in rents from woodland pasture and cleared pasture indicate that woodland pasture is very inferior. Forage under shade has been proven to be only from ½ to ⅕ as nutritious as that in the open. Shade for cattle can be provided for much more profitably by scattering trees and small groves in open pastures or by fencing off a small portion of the woodland.

JUNIOR CORPORATION
1929

IRWIN PUPHAL, '30

CERTAIN events stand out in men's lives as events never-to-be-forgotten. In the Forester's great sphere of life, Itasca Park is one such event. Many's the embryo Bunyanite who has been baptized and initiated and received into the fold, and into the type of life which some people believe we lead, on the shores of old Itasca.

But Itasca is as nothing when compared to Cloquet. It is like comparing kindergarten to college—or a convent to a reformatory; not that all the bad boys go to Cloquet, but if they are still good when they leave there it is no one's fault but their own. Opportunity doesn't knock in Cloquet—it doesn't need to.

For the benefit of the neophytes, Cloquet is the place that you go to in the spring quarter of your junior year, when you are tired of the grind and feel in need of a rest.

Ostensibly the juniors go there for the purpose of making practical studies and becoming wise in the ways of the woods. The boys of '29 succeeded remarkably well. There wasn't a trail in the woods which they couldn't follow even in the dead of night, and the studies and investigations they made were practical, to say the least. Of course a few of the professors were around to give the place the proper intellectual atmosphere, but that is merely incidental. Mr. Schantz Hanson is the man who sort of runs things up there. He kind

of takes the boys around and shows them what has been done at the station. When the weather gets nice and warm and the nursery work begins he takes you out and shows you how to pull and how to transplant seedlings. He's got an awful line, which loses its sinker after you've worked for one day, about some mythical crew who planted a helluva lot seedlings one day. That's supposed to be the mark for which you aim. Don't you believe it. No one ever shot that high.

Mr. Allison goes up there too, and he teaches a course called "Forest Regulation". He has you cruise and map an eighty. The only thing I learned to regulate was the size of my types so that they would total eighty acres. The boys were always glad when it rained so they could stay in and look at the Swedish maps. Of course the "Wannigan" crew didn't care whether it rained or not, because rain or shine, it was always wet for them.

Along about the first of May Mr. Cheyney makes his appearance. Just about the same time as the sap begins to flow. From then on there is no rest for the wicked. Everybody's busy. We, however, made a grave mistake. We hurried through our silviculture work with feverish haste in the hopes that we would have a week or so at the end to just loaf. Imagine our surprise and consternation, when, with all our work supposedly done, we were each told to thin out a half acre of dense jack pine.

And then of course, Mr. Brown was up there too. No camp would be complete without him.

He didn't do anything but run around and bore a lot of holes in the trees and make a lot of tables that nobody ever understands, but if it hadn't been for him, who would have written their logging report?

Dr. Schmitz paid us a visit once but we heard he was coming up so we had the bunk house all straightened up. Which same was some job. We could have put any New York tenement dweller to shame. There were only twenty four of us in a room made for sixteen, which is not such a bad percentage, but when you picture twenty four suits, twenty four overcoats, twenty four stag jackets and about ninety six shirts hanging from the ceiling, not to mention suitcases, trunks, boots, etc., littering up the floor, then you get some idea of what I mean. And to top it off, imagine about forty eight nice, soft, soggy, sweet smelling socks hung in a circle above the roaring bunkhouse stove, dripping and steaming, filling the air with an exotic aroma, like the fragrance of an open sewer.

At night sights and sounds and smells all harmonized to make the great Symphony of Socks and Snores—with the composers all asleep. Some hit a high note, some hit a low note, some hit a new note, and "Ike" just hit any old note.

On Saturday nights the suits would come down from the ceiling and the boys would array themselves in their finest and hie them off to the Toothpicker town. Ann and Marie were there with bells on but somehow or other the boys didn't like the tune of their bells, so they started on a search for the "elite stuff." Wogey, our "Prexy", and

Ralph Lorenz got themselves all tangled up with some school ma'ams and never did get extricated. "Wogey" and Rolland Lorenz used to vie with each other to see who could dance the longest with the least amount of effort, on the same spot. "Wogey" won without a struggle. Rumor has it that he was bitten by a tsetse fly when he was young. The same bug must have bitten Knoblauch of "Hail bythe spirit" fame.

The famous pavilion was the regular Saturday night rendezvous for the cellar gang. No one was acquainted with the man at the door so it was the custom to ignore him and just walk right in. That worked all right for three or four weeks until one night the presence of a man outside, three more in the door, and a couple inside, suggested that perhaps we had better purchase ribbons for the lapels.

Some difficulty was experienced in getting Wes Donehower to go to dances after the second or third time. He wouldn't commit himself on the subject, but it was intimated that he was too embarrassed at having to carry a club around all the time to keep the women away. "Wes" was our treasurer, but we came out ahead anyway.

Somebody said that "Ike" Benson was going to school up there too, but no one knows for sure. He used to drop in occasionally around the middle of the week to see how the boys were getting along, but the rest of the time he was conspicuous by his absence.

Chester, "Moon Mullirs", Miller also was considerably absorbed by extra-curricular activities. He was the only man who dared appear on the campus wearing golf knickers. Youth must have its fling—at Jay Cooke Park.

The search for the "elite stuff" relieved "Pizzle" Mitchel of much competition. He used to sleep all morning, dress all afternoon, and stay out all night.

"Happy" Forder, "Tenstrike" Maki, (The Irish Tenor), and "Joe" Dolence were right in their element and in their glory. When the balsamwoolers, the toothpickers, and the clothes pinners commenced to do that famous combination Finnish polka-Highland fling it was time for us ordinary mortals to hit the sidelines; but not "Happy"—he could fling a hoof and kick a shin with the best, or worst, of them.

Vernon, "L. O. PP" Lopp was the Captain of the "skulling" crew. He could "skull" faster and longer than any one else in the camp. Too bad he had to go bugs and become an entomologist.

"Skipper" Iverson, the man with the ten-gallon hat, English, brindle-colored boots, Sears & Roebuck breeches, Spanish belt and twelve inch hair-trigger, double action gun, was a riot in the woods. He would have been thrown in the lake, only there wasn't any lake, and he couldn't be shot because he said he wore armour for protection.

"Hank" Keehn was our steward but we fared quite well just the same. The food the first cook provided had extremely lasting qualities. The lemon pie would bounce when thrown against the wall and "Hank" used the crusts for tire patches. The hotcakes made excellent "oakum" for chinking up the logs in the bunkhouse.

Bob Anderson passed the cigars long before he went up to Cloquet but that didn't prevent him from—Ah, perhaps it's best unwritten.

Whenever things commenced to drag a bit around camp, Dierke, the promoter, would come to the fore with a bright suggestion.

Some of the boys actually did some studying occasionally despite the detracting influences: Carl Anderson, when he wasn't in Duluth; Paul Boettcher, when he wasn't sleeping; "Amos" Aamot, when he wasn't fooling with a hundred and one articles of junk around his bunk; Vic Freeman, when he wasn't out with his "ten-o'clock" girl; Clarence Chase, when he wasn't reading Tennyson or slinging the mitts with Dolence; Bill Royer, when he wasn't in Duluth; and Clarence Wiese when he wasn't collecting bugs to pickle in alcohol.

The writer claims no special distinctions for himself except that he holds the record for the number of times anyone was thrown out of the pavilion in one evening.

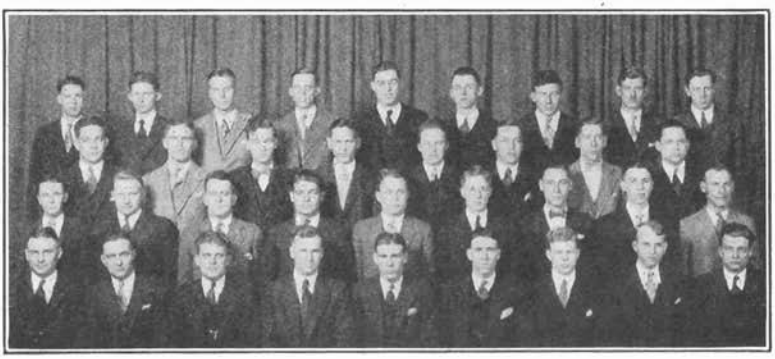
All our social activities, however, were not confined to points off the campus. We put on a bridge and dancing party of our own which was quite a success. Somebody forgot to award the first prize for bridge, a box of chocolates, to the winner, so at the break of dawn the success of the party was considerably heightened by a game of "ring-around-the-chocolate-box" until there were no more chocolates.

Contrary to intimations and popular opinion, all our activities were not social. The athletically inclined organized a basket ball team and proceeded to clean house on the local pick-ups. The games progressed splendidly, we were winning fame far and wide, until one dreadful Saturday night, fate stepped in and took a hand. And she dealt a stunning blow! It was a tense moment in the game, nerves were strained, muscles taut, every eye was glued on the ball. The silence was terrific. Breathlessly the crowd watched a player as he nimbly handled the ball. And then it happened. He slipped, he fumbled, he lost the ball! And then—Ah! shame the lad! "Damn", he hoarsely cried. And so, in righteous wrath, the powers that he placed the scarlet brand of shame on the noble Sons of Bunyan for so profaning their Christian Association, and forbade them the use of their Hall of Brotherhood evermore!

Thank God for the Salvation Army!

Athletic and social activities, however, did not overshadow scholastic activities. The former may be more talked about but the latter will assuredly be more lasting. We were there to learn and learn we did, in spite of ourselves. The field work at Cloquet is of great importance in the training of a forester. The regulation, the silviculture, and the nursery studies pursued there will be remembered long after lecture courses have faded out of mind.

And so, we, the Junior Corporation of 1929 have passed. We leave for corporations that will follow the sincere wish that their quarter at Cloquet may be as fruitful, as eventful, and as delightful as was ours.



TAU PHI DELTA

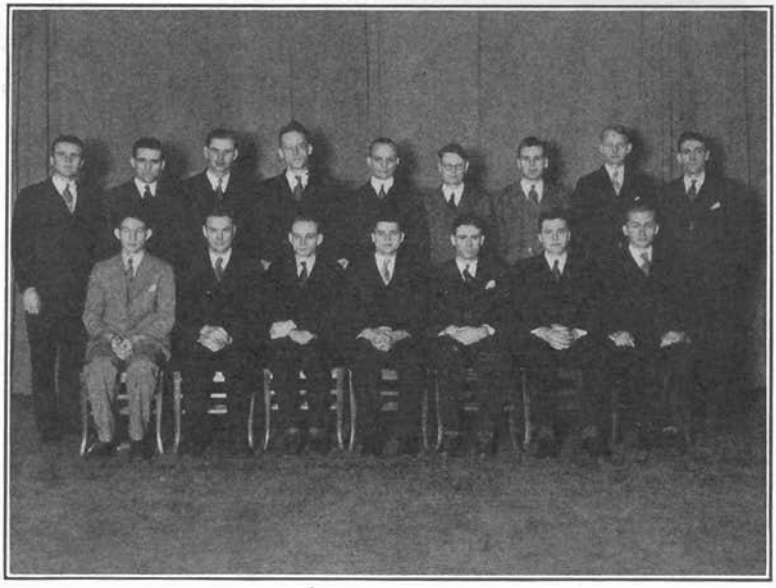
OFFICERS

RALPH LORENZ ..... *President*
MILFORD RIGG ..... *Vice President*
ROLLAND LORENZ ..... *Secretary*
GEORGE DENNIS ..... *Treasurer*
HENRY KEEHN ..... *Asst. Treasurer*

EDWIN BENDER
ORRIN FOLSOM
CHESTER MILLER
CLARENCE OLSON
EDWARD NILES
GEORGE PLANT
ARTHUR SAVAGE
MILTON FORDER
ARTHUR HORN
STANLEY BUCKMAN
SAMUEL FRISBY
DONALD STEWART
JACK KOPITKE
CLARENCE ANDERSON
RAYMOND OSBORNE
ARTHUR ROE
JOHN FRY
ERNEST DAHL
AATOS HUHTALA
CHARLES BEARDSLEY
TED HOLT
CLIFFORD RISBRUDT
CLARENCE EVENSON
RONALD WOOLERY
ROY WAGNER
GEORGE OLSON
IRWIN PUPHAL
DANIEL BULFER
HENRY KEEHN
MILFORD RIGG
RALPH LORENZ
ROLLAND LORENZ
GEORGE DENNIS
EYNAR BENSON
ROBERT ANDERSON

TAU PHI DELTA is a national social fraternity limiting its membership to men primarily interested in forestry. Chapters may be established only in colleges and universities where degrees in forestry subjects are given. The Beta chapter of Tau Phi Delta was established at Minnesota in the winter of 1926.

It is our utmost desire to further the profession of forestry and its allied subjects; to maintain a high scholastic standing and to derive the mutual benefits resulting from the association of its members; both socially and professionally.



XI SIGMA PI

OFFICERS

WESTON DONEHOWER, *Forester* EYNAR BENSON, *Sec.-Fiscal Agent*
RALPH W. LORENZ, *Associate Forester* ADOLPH WOGENSEN, *Ranger*
WARREN CHASE, *Executive Council Rep.*

XI SIGMA PI, national honorary forestry fraternity was founded at the University of Washington in 1908, for the purpose of securing and maintaining a high standard of scholarship in forest education, of working for the upbuilding of the profession of forestry, and of promoting fraternal relations among earnest workers engaged in forest activities. Existing as a local honor society at the University of Washington until 1915, the fraternity adopted a new Constitution and began its new policy of expansion. Due to the wise forethought and conservatism of its founders, the fraternity has developed slowly and carefully until at present there are eight chapters at forestry schools throughout the United States.

The objective in view of this honor society is the stimulation of scholarship in forestry and the bringing together in good fellowship those students who have shown exceptional ability. It is the intention of Xi Sigma Pi to honor the student who is doing good work in forestry and who has a personality that will tend to increase his possibilities for success. The fraternity stands for clean scholarship and encourages forestry activities at the institution with which it is connected by active participation.

The Minnesota Chapter of Xi Sigma Pi was established in 1920 through the efforts of several men, a few of whom remain on the faculty staff at the present time. Progressing steadily the chapter has reached a total membership of one hundred and twenty six men, many of whom are prominent in forestry activities today.

THAT LOGGING TRIP TO BRULE LAKE

T. Ewald Maki, '30

WITHIN the boundaries of the Superior National forest, and not far from the Canadian border, there is a little lake near which men and lumberjacks have made several alterations within the last year or two. The dark rim of spruce, fir, and pine bordering its rugged shore lines still remains almost unbroken; the honk of an auto's horn has never desecrated the stillness of that semi-wilderness; but already the whistle of the "logger" occasionally mingles with the whistle of the quail; and the "swish-swash" of the swamper's axe, or the buzz of the feller's saw, have encroached upon the silence of that vast expanse which was alien to those sounds only a few years back.

We (the members of the 1929 Junior Corporation) had heard just enough about Brule Lake and Superior National forest to be anxious to see them in reality; we got our chance the last week in March.

As Monday, March 25th, dawned cloudy but cold, we boarded a "logger" out of Cloquet. It carried a precious "cargo." Not only were there quantities of beans, bacon, salt pork, and other supplies, but also some 21 erudite lumberjacks (better known in collitch circles as rough tree climbers) together with Professor R. M. Brown.

Northward we slowly bounced along. Nobody knew what the morrow held in store for us; nobody dared to conjecture what awaited us beyond that gray skyline. Of one thing we were certain—Brown was about to initiate us into the mysteries of logging practises as carried out in the National forest and its vicinity. Small wonder then that our eyes were aflame and our faces flushed with suppressed excitement.

Saginaw was our first stopping place. There we were delayed only long enough to allow Royer to take a few snapshots, after which he gave the signal to proceed.

The coach in which we rode didn't have all the conveniences of a Pullman. Moreover, the engineer had a rather disconcerting habit of starting with great violence so that many of us suffered from "Necka dislocatia." But we all managed to reach Hornby by noon of that same day. Hornby, by the way, is a little town between Minneapolis and Hudson Bay. It didn't have any hotel, bank or post-office; it did have two box cars and one boarding house, the last being equipped with a kitchen stove, a slot machine, and many other modern conveniences.

After the slot machine quit paying, we were ready to get out of Hornby. All through that long afternoon we bounced along. Evening and darkness came on. Not until 7:15 post meridian did we jump off at Cascades junction.

The bull cooks were out to meet and greet us. They warmly ushered us into the box-car which we used as the bunk house. Hur-

riedly we scrubbed and curried ourselves in preparation for that evening's banquet. Suddenly through the quiet evening air there floated the clear note of a bugle. Somebody was playing the "taps." The boys looked bewildered. Some bared their heads; others faced the east. We were suddenly aroused from our reverent attitude by a bull-cook who roared that supper was ready—that's what all the music had been for. (Social error No. 1).

Nobody ever will forget that first supper. We stood around the tables and ate out of two bowls. Nobody spoke; nobody laughed; nobody even cracked a smile. Solemnity was the keynote of the whole affair—it resembled more a ritual than a supper. When one wanted something, he pointed at it; and if his comrade was sufficiently intelligent to understand the improvised sign language, he got what he wanted; if not, he went without it. New manners, new forms of ettiquette, were inaugurated that evening—manners which perhaps never will receive the pragmatic sanction of Emily Post. Some of the more impressionable minds never were able to break away from the habits formed during their stay there. They say that Lorenz still uses the point-method when he wants anything at a table.

The first evening in the bunk car resolved itself into another memorable occasion. Lengthy and bitter debate ensued when we began to make choice of bunks. It happened that in one of the lower berths a dog had given birth to a batch of pups. As nobody volunteered to sleep with the bitch, we tossed to see who'd occupy that bunk. "Pooch" Knoblauch won the toss. However, he protested because he had already made arrangements to sleep with Mitchell. He was in a dilemma for quite some time, but he finally decided to sleep with Mitchell.

Before retiring, "Moonshine Mullins," known in private life as "Banjo-eyes" Miller, rendered a vocal solo by title of "Pals, just Pals." It is true that he was considerably handicapped by not having his banjo with him, but never the less his rendition was impressive. He responded to the numerous encores by "Pals, just Pals." While this was going on, "Happy" Forder, well-known Buhl Slav, went from man to man lending his sewing kit, for a lot of things had ruptured in the first free for all in one of the bunks.

At nine o'clock somebody blew the "taps." Lights went out and everybody crawled in between the blankets except Knoblauch who had a lot of faith in the insulation properties of his four-point iceman's pants. However, even he had pulled the blankets over himself before morning dawned.

We all slept well, except Brown and Lopp who got into an involved conversation about anamorphic curves in the fourth dimension. They furnished the disturbing elements for the night, as well as Freeman, who got up in the middle of the night to see whether his boots had dried out, and the dog, thinking that he was after her pups, burst loose with a most ghastly shrieking and howling.

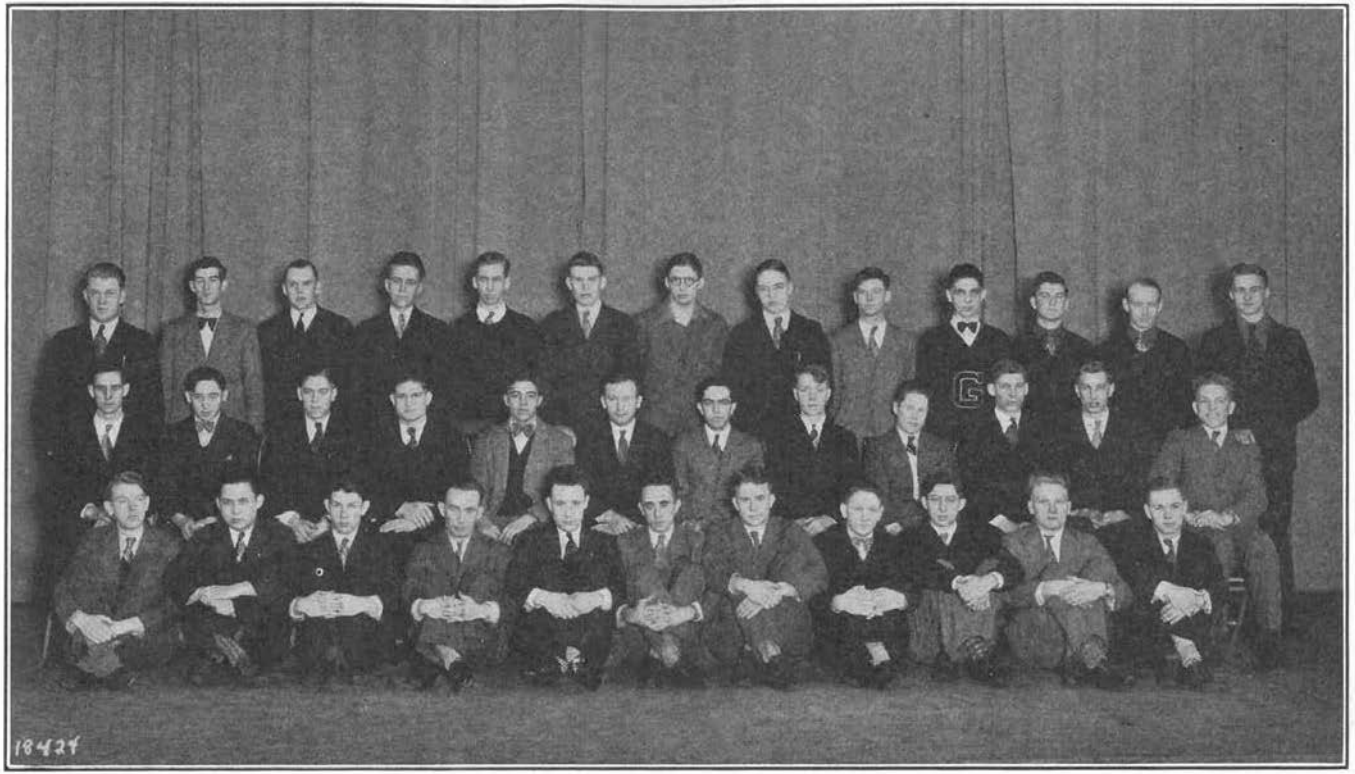
The following day we visited camp No. 1 but returned to the bunk car before night fall. We had walked only a little over ten miles that day and thrown only a little over ten thousand snowballs. We

were all stiff and sore, except Brown. He was stiff too only he wouldn't admit it. After nursing the blisters and bandaging the broken parts with the aid of Doctor Weise and his first aid kit, we were ready for another big day.

It came Wednesday when we made camp 3 by noon. There we split into parties and drew for camps. By some crooked balloting the crew consisting of "Happy" Forder, Mitch Mitchell, Skipper Iverson, Pizzel Lorenz, Pooch Knoblauch and Hank "Butcher Boy" Keehn drew camp three which meant that they didn't have to walk any farther that day. Less fortunate were Carl Anderson, Amos "Six-Months" Aamot, and Inspector Weise, who under the direction of "Mailman" Royer were forced to trek all the way to Frederickson's camp. Still less fortunate was the crew which chose camp six. Incidentally, it happened to be the "A" crew, not by accident either, but by virtue of the fact that it was composed of no less brilliant students than Chase, Benson, Donehower, Miller and Bob Anderson who under the guidance and steadfast influence of President Wogensen could be expected to perform wonders even in a short time. They all had "A" reports except President Wogensen who didn't write a report; he merely compiled a logging inventory. Most unfortunate of all was the crew which drew camp five, the camp farthest away. Nevertheless they made camp five that same day. This gallant band was led by no other than R. M. himself, closely followed by "Kentucky Colonel" Lopp; "Big-Boy" Boettcher, "Cowboy" Freeman, "Joe" Dolence, and Maki. The snow was deep, the way long, but whenever we began to falter Brown was there to encourage us to carry on.

What happened during the ensuing days would take too long to discuss here. Needless to say, Friday night we were again back at Cascade Junction, except Hank Keehn, who (being our steward) had been shipped back to Cloquet earlier in the week.

Saturday morning we ran half a mile before sun-up to beat the hordes of "homing lumberjacks" who were swarming into the same coach as we. We were all seated before the place got plugged, and we remained seated till we got to Cloquet, cause we were too weak to stand. What a sorry looking crew we were! Haggard, pallid, and bearded of face, sore of foot, we trudged wearily to the Cloquet "Y." After using up three nickel bars of palmolive each, we had purged ourselves free from most of the week's accumulation of corruption. And as the last of it floated away down the drain, the logging trip passed from stern reality to the realm of golden memories. "Brule Lake" will always be full and rich in connotation—a veritable treasure house of memories to every member of the 1929 Junior Corporation.



Class of '33

SOME CHANGES IN THE PHYSICAL FACTORS OF A FOREST ENVIRONMENT BROUGHT ABOUT AS THE RESULT OF LOGGING

By Ralph C. Hall

Assistant in Entomology University of Minnesota

DURING a preliminary investigation of the bronze birch borer problem in New England and the Northern Lake States it was quite evident that other factors in addition to the bronze birch borer, *Agrilus anxius Gory*, were responsible for death or decadence in birch trees left on a cut-over area. It was found for example, that, in some instances, birches left standing on cut-over areas die or become decadent without having been infested with the borer. This is especially true of yellow birch. This investigation showed that 97 per cent of all the yellow birch trees examined on cut-over areas in the Lake States were decadent to a more or less degree, whereas only 10 per cent of them were infested by the bronze birch borer. Paper birch showed approximately the same percentage of decadence but in this species the percentage of infestation by the borer averaged above 80 per cent. Work in New England substantiated the findings in the Lake States with the exception that, here, the percentage of yellow birch infested was higher. In both regions it was found that post-logging decadence was not limited to the birches. Other tree species showed similar effects but to a lesser degree. In the Lake States these other species showed an average decadence of 30 per cent with scarcely any insect infestation. These facts suggested the probability that many trees, apparently killed by the bronze birch borer, might have succumbed to various environmental influences even though unattacked by this insect and that the borer may be in many instances a supplementary rather than primary cause of death.

In view of the above findings it seemed advisable to direct our investigation during the past season to a study of the changes in the environmental conditions following logging and the effects of such changes upon the tree. The investigation upon which this report is based was a study of the changes in the physical factors of a forest environment following cutting operation in the New England States.

This project was conducted cooperatively by the University of Michigan with the United States Bureau of Entomology, Division of Forest Insects, and the United States Forest Service. Headquarters for the work were established in the Waterville sale area of the White Mountain National Forest where ideal conditions were available.

Temperature, moisture, light and other physical environmental factors were studied intensively on three comparable adjacent areas of which one was uncut, one had been logged three years previously and one had been recently logged.

Comparisons of the records obtained show astonishing great

changes occur in the physical environment after logging. Conditions of light, moisture, and temperature were very different in the cut and uncut areas. In fact every factor which was studied showed a significant difference when compared with the check or uncut area. The factors which showed the greatest degree of variation were light and duff temperature and the temperature of the trees at the south base. Those which showed the least variation were rainfall and soil temperatures below two feet. One example of extreme differences occurred when the duff temperature on the cut-over area was 171 degrees F. while on the uncut area at the same time it was only 72 degrees F. a difference of 99 degrees. These extreme differences in duff temperature were quite common but the above was the highest temperature noted.

Temperatures far above the fatal point for cambium were frequently observed and it does not seem impossible that heat alone may account for serious injury to the tree at the ground line.

Moisture conditions in the surface layers were much more favorable to the trees on the uncut area than on the cut-over areas. In the uncut stand the duff moisture rarely went below 30 per cent while on the cut-over areas practically the only time it went above 30 per cent was a short period following rain. Often it was observed that a period of eight hours following a heavy rain the duff on the cut-over area had dried down, from complete saturation to 20 per cent moisture content.

Moisture measurements in standing living trees indicated a rather striking relation between moisture content of the sapwood and the health of the tree. As a tree became decadent (small leaf development) the moisture content of the sapwood at b. h. increased. That is, the moisture content of the trees on the cut-over area that were thrifty showed a very close mean moisture content to those in the undisturbed forest. However, as the trees on the cut-over area declined in health they showed a higher moisture content than when thrifty. Where thrifty trees with fully developed leaves on the cut-over area showed a mean moisture content of about 51 per cent other trees with barely any leaf development showed a mean moisture content of 110 per cent.

Observations showed that Armillaria root rot is an important factor in the death of many birches on cut-over areas and is frequently associated with the bronze birch borer in dying trees. The character of this relationship is not yet fully understood and deserves further study.

Although the data thus far collected and studied have shown relatively little concerning the specific effects of changed conditions upon the activities of the trees left on cut-over areas, they nevertheless have given us invaluable information concerning both the character and the degree of these changes. Further work will be necessary to complete the gaps in this study of physical factors and to determine how generally the conditions observed in New Hampshire prevail in other localities. Still further studies will be necessary to determine the effects of the changed conditions upon the trees and the biotic factors of the environment.

THE BLISTER RUST SITUATION IN MINNESOTA

By Lawrence B. Ritter, '28

Agent in Charge

Blister Rust Control in Minnesota

THE white pine blister rust is a disease caused by the growth of a parasitic fungus (Cronartium ribicola, Fischer) within the inner bark of white pine trees and in the leaf tissues of currant and gooseberry bushes which are technically known by the Latin generic name (Ribes). The fungus is a native of the old world and was unquestionably brought into this country upon white pine seedling trees imported principally from France and Germany.

Blister rust is present in twelve of the counties within the natural range of white pine in the state. It is present in every county along the Wisconsin line from Washington county north to Lake county. The western limit of the disease is Morrison county; the northern, St. Louis county (at Tower). Pine infection in natural pine stands is known to be present as far north as Two Harbors in Lake county, as far west as Crow Wing county and as far south as Washington county.

The disease is spreading north and west, not at an alarming rate, but slowly and steadily. In areas where the disease is present the amount of infection is increasing. In the Hartley plantation in Duluth, the disease has progressed with a spectacular rapidity deserving special mention. Two pine infections were found on a plot of about 1/8th of an acre in the planting in 1927. During the past summer 482 infections were found, 98% of the pine being infected and averaging over 4 infections to the tree. The Hartley plantation suggests what the disease may do in the other pine stands of the state if it is not controlled. The slow spread of the disease in this state is due in part to weather conditions, scattered distribution of host plant associations, few original introductions of the disease, and early control work. Control work in the state is justified by the amount of damage the disease is doing in this state and in other states and by the increased amount which will take place as the result of favorable seasons for the spread of the disease. Prompt control work will retard the spread of the disease.

Some examples of the damage resulting from the disease follow:

In some of the pine areas near Taylors Falls, one-quarter of the reproduction is infected and about ten percent already killed by the disease.

Many of the mature pine in the Rush Lake area stem cankers, have had their tops broken off by the wind at the stem canker or are dead. In other parts of this area, especially the swampy parts, much of the reproduction is infected or has died as a result of the disease. This area has been eradicated. The infection in the older trees took place before the eradication in 1918-19. In the swampy areas the Ribes are again present in abundance.

In the Hartley plantation in Duluth as already has been mentioned, the effect and spread of the disease has been spectacular. Only one or two of the 105 pine on the eighth acre plot in the planting are free of infection. Many dead branches "flags" are appearing. Many dead tops will appear in the near future. The trees in this stand are 15-20 feet in height; rather large reproduction.

White Pine in Minnesota

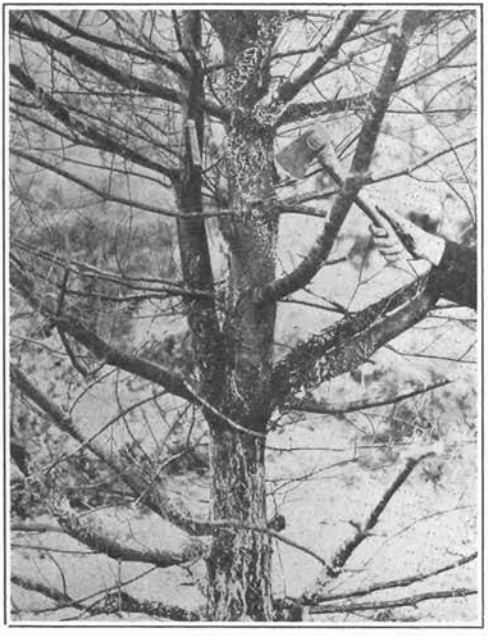
The day of white pine in this state has not passed. The present cut of eastern white pine in Minnesota is twice that of any other state cutting eastern white pine. It makes up about 33.5% of the lumber cut in the state. An extensive survey by the blister rust control office in 1927 placed the acreage of white pine in Minnesota at 700,000 acres. This figure may be considered low since Hansen* placed the acreage on which white pine is an important tree at 218,797 in St. Louis county, alone.

White pine has always been the king among softwoods. There is, no doubt, that because of the many uses for which white pine is especially suited that it will continue in this kingship.

History of Blister Rust in Minnesota

Blister rust was first found in Minnesota in a nursery near the St. Croix on May 24th, 1916. This nursery had the previous spring obtained stock from a nursery in St. Croix Falls, Wisconsin. Ribes infection was found later in 1916 in three areas near Taylors Falls.

* Hansen, I. Shantz, Second-Growth On Cut-Over Lands, in St. Louis County. Minnesota Experiment Station Bulletin 203.



A second pine infection was found forty miles south of Taylors Falls.

Nine new infection areas were found in 1917, five in 1918 and four in 1919.

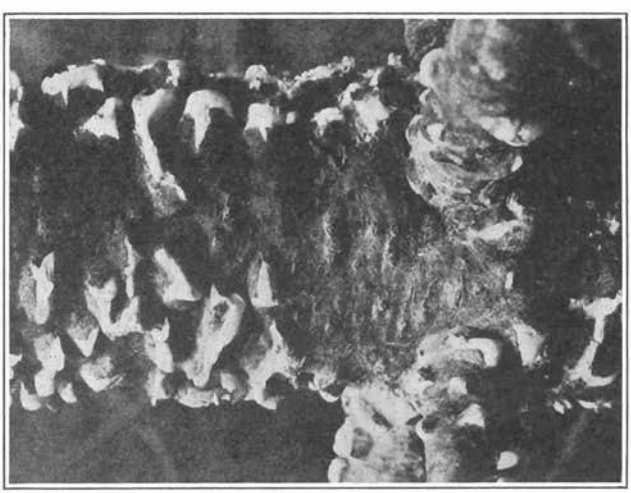
An effort was made during 1917, 1918 and 1919 to eradicate the disease entirely from the state by the destruction of Ribes and infected pine in the known infection areas. In some cases the young healthy pine were cut and the older trees pruned. Late in 1919 futility of entirely eradicating the disease was realized.

From 1918 to 1923, inclusive, 4,981 acres were cleared of wild Ribes at a cost of $14,180.17, or $2.85 an acre. This control work includes that done in Itasca, Jay Cooke, and Inter-State Parks. All control work was done by the State Entomologist, Division of Forestry and Division of Plant Pathology, University of Minnesota, the State Forest Service, and the Bureau of Plant Industry co-operating.

Since 1923 blister rust work has been limited to scouting and infection studies done in co-operation by the Bureau of Plant Industry and the Division of Plant Pathology, University of Minnesota.

The 1929 session of the State Legislature enacted a blister rust law giving the Commissioner of Forestry and Fire Prevention authority to co-operate with the Federal Government and with organizations and individuals within the state toward the suppression and control of white pine blister rust. A co-operative agreement is in effect with the Blister Rust Control office, Bureau of Plant Industry. Under this agreement a state leader is employed who is responsible for the conduct of the work in the state.

The present program calls for general publicity throughout the state, intensive publicity and control work toward the protection of white pine in areas where the disease is already present and nursery sanitation work under the direction of the State Nursery Inspector.



FRESHMAN CORPORATION -- 1929

LYALL PETERSON

THE other evening, after dissecting an innocent little pig, I felt the need of a change so I laced up the well known "boats" and glided over to visit with a buddy. This fanciful creature, my friend I mean, was jake with me cause that boy is the king of bedtime story tellers.

Now glance at me, draped into an oozy chair with a glass of light wine on my right, a beer on my left, while exotic strains from Chopin breathed a languorous accompaniment to a voice of honey, which told me this tale.

"Open your ears, my friend, and prepare yourself for a eulogy of a band of Dame Nature's apostles. I see them now, one by one laboring along dusty roads towards a common goal. Still one by one I see them being resuscitated as they literally drop into a sort of mystic paradise—better known as Itasca Park.

They hurry on, and by evening I see them assembled at the Forestry Camp, a happy, yet purposeful, bunch of forty odd strappers. To be sure, they are none other than the renowned Freshman Corporation of '29.

Contentment?—and why not? with a mess house full of palatable food, a commodious bunk house, a library for scholars, a good old-fashioned pump, canoes, (with back rests) a diving tower, and an atmosphere of peace. "Ah", chirps "Major" Collinan, "home was never like this." And what a lake—cool, refreshing waters. Refreshing indeed for poor Harry Adams, etc., as four pairs of tense arms fling him into its bosom. What a picture! Ah! What a splash! Yes, they accepted their haven gladly and silently revered the state which makes possible the enjoyment of this virgin grandeur.

It is indeed wonderful how the proper time, place, and opportunity can team together to tie the Gardian knot of friendship. I was inspired to note the effects of six short weeks, when a group of more or less idealists were moulded into the common caste of foresters—having a saner outlook on problems in general.—Friendship—made more consistent by a few well chosen lake parties and an occasional atmospheric bull-fest.

Need I mention that they study at Itasca—indeed they do! I refer you to Chief Cheyney, Mr. Brown, Dr. Rosenthal, and Dr. Dawson for proof, ha! I can see, once more, that gang of shirtless brownskins exercising bugnets, measuring timber in a hazel and mosquito *thicket*, on hands and knees in a hardwood type counting grasses, or writing up a Forest description in a Cedar Swamp. There you have a sample.

Now I see the "foyer" of the bunk house—a lustrous fire crackles a hectic accompaniment to the weeping piano which is being punished by the frail lad, Tysk. Savage, another puny tot, saws on a weary fiddle, while Callinan struggles with the "smile" in "When Irish Eyes

are Smiling." Soon the fire seduces the bunch into a more confiding mood and as the embers glow in peace many tales of adventure and romance are unfolded. Ah! Sing not of "Neapolitan Nights."

Ha! ha! Pardon my mirth, but I have just drifted upstairs, and as I blush to hear Spaeth after his collision with an obstinate beam I must laugh at the site of Nilson's bunk and kaboodle strung up in the ceiling— and *I* would indict that guy named Godin.

Horrors! the picture suddenly shifts to a thunderous scene of a stormy nite on the Lake, and I see a miserable cast of boys and girls huddled in a coughing, tossing scow. The picture is sheer drama, and I grow tense as I labor along with that scow in its struggle to reach the promontory. Thank heavens they've made it, and a couple of hours later finds them "drying out" before the friendly fireplace. I sigh in the realization that I cannot paint such understanding faces. Then the big dance in the library—a bad nite for scholars, but oh, my! I wonder where in—! all those gorgeous "femmes" came from. And Osborne—ha! even if "Strong-man" Holt did break his arm—he's in the midst of the melee, and going great.

I find myself in a panorama of strange sites—savages—Hawaiian dancers, and what have you. Why, this is the famous quiz burial! Such a colorful parade—with Miss Cahill leading on a spirited stallion, and Savage producing doleful tunes from the organ—Now, the crowd is drooped around the cold dark grave while the solemn Parson thunders, "and to Dust shalt Thou return."

I find myself confronted now by two rustic stone pillars which seem to serve as an entrance to the Campus. This, no doubt, is the Corporation Memorial, and quite appropriate I must commit myself.

As the picture progresses I am taken on a tour of the Park—first I see a bunch of the boys exterminating heaps of ice cream at Wegman's thence thru the Tourist Park—an interesting spot in the moonlite I am told,—the headwaters of our own Mississippi, a panoramic view of the gorgeous Lake Itasca, including many stands of beautiful Norways—and here is Douglas Lodge, wherein I see the objective for the stream of canoes being plied in this direction. What a lucky break for some girls! Well, boys will be boys.

Suddenly my trance is broken as my friend coughs and suggests another glass of beer. Well, all I can say is—Itasca must be a great spot, and the Freshman Corporation of 1929 was one lucky, and gifted bunch.

AMONG THOSE PRESENT

HARRY ADAMS "Bashful"
"Wanta buy a duck?"

DORTHEA CAHILL "Ask Len"
"O Solo Mio!"

HARRY CALLINAN "Major"
"Oh, boy, I'll say!"

DON CAMPBELL "Pig"
"Geez, what crow-bait."

JOHN CANN "Jawn"
"Sir Rawleigh."

CONRAD CARLSON
"Well, that's not right, you know."

THURE DUVALL "Lazy Duvey"
"Whither goest Thou?"

DON EGERMEYER "Big Shot"
"No exaggeration, fellows."

JACK ENGLESBY "Little Jack"
"D'ya always close up at nine bells?"

ORRIN FOLSOM "Robin Hood"
Five paces to the chain.

ERNEST GODIN "Gode"
"How 'bout a fag?"

ALVIN HAGEN "Al"
"You wouldn't kid me, fellah?"

HOWARD HALLOFF
Hoof and Mouth, the cradle snatcher. "You should holler."

ZINA HATHAWAY "Felix"
"Damn good girl. Married?"

TEDDY HOLT "Sampson"
"Delilah, where art thou?"

ARTHUR HORN "Art"
"Ja, dey vas pushing und shuffing und yumping."

ALLEN JACKSON "Stubs"
"Oh, them Finns."

JOHN JACKOBS "Jake"
"No time for you."

LAURITZ KREFTING
The Oily Woim.

BOB LOVE
Bemidji bound,—Homeward bound,—"hic"!

TOM MORTONSON
The Man With The Camera Mind.

NEIL MCKENNA
"Hey, Neil, draw Greta on my back."

LEONARD MOORE "Len"
"Who tore my shirt half into?"

THEODORE NIEHAUS
"I sleep with my mouth open."

NORBERT NIEWORTH
"Oh, is zat right?"

HAROLD NILSEN "Nils"
"My soul is yearning for a kiss!"

HERMAN OLSON "Ole"
"Two-bagger and a homer, not so worse, eh?"

RAY OSBORNE "Ozzie"
Cave-man Ozzie, the one-armed hoofer.

LYALL PETERSON "Pete"
"May peace be with thee, beloved brethren."

GEORGE PLANT "Willy"
Da! da! da! boop, boop oo doop.

DON PRICE
"Has Egermeyer got a girl for me?"

ERNEST RATHMAN
"Well, say listen, fellahs, yes, yes, yes."

ALBIN REZBA "Rezzy"
"Gee, the girls in Bemidji are nice!"

ARTHUR ROE "Art"
"Does he ever?"

ART SAVAGE alias "Art Shires"

ROLAND SCHARR
Speak not of Mercury!

WILLARD SPAETH "Scum"
"Listen, Honey — —"

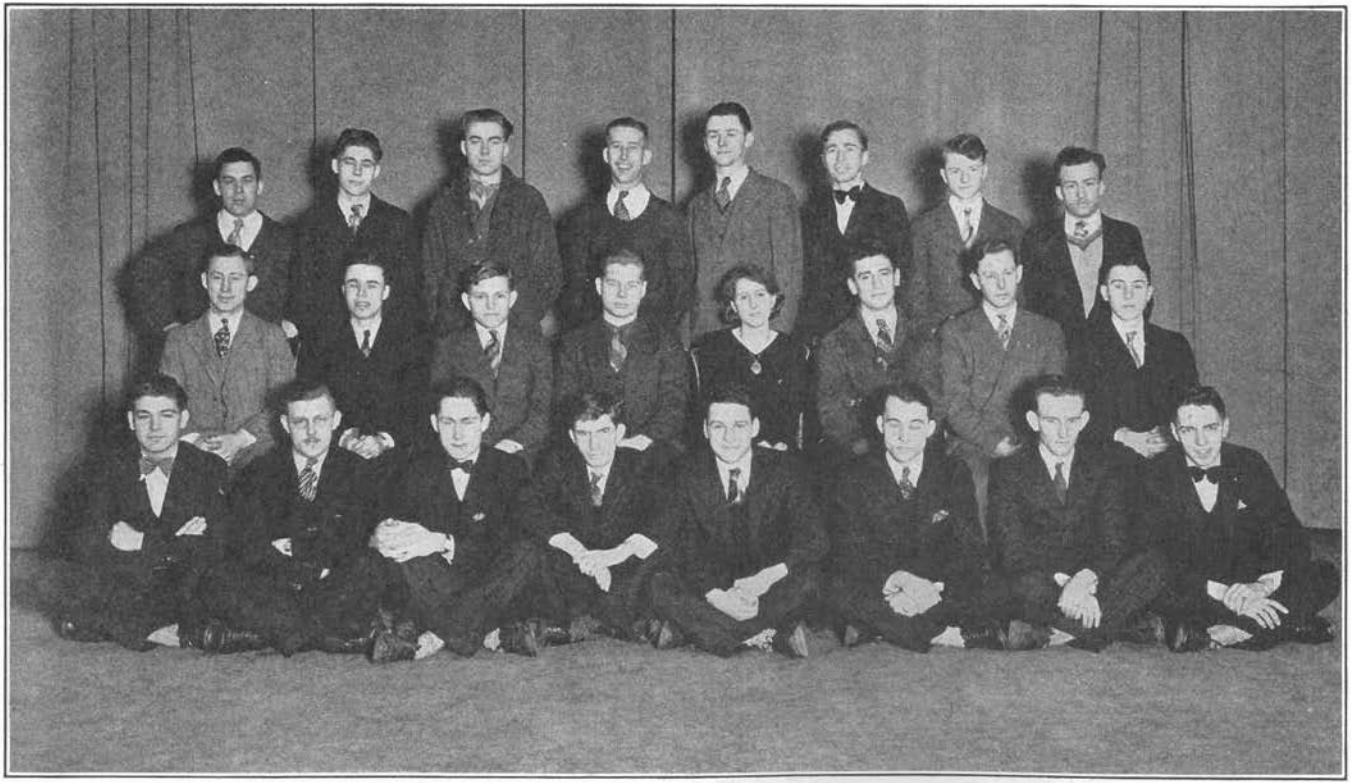
ALBERT TOFTE "Ab"
Godin slaves while Tofte plays.

HAROLD TYSK
"Look at the frail widow, Powder River!"

ROY WAGNER
"The girls always wanna kiss me."

ERNEST WELLBERG
"To be brief, concise, and to the point,—

ROBERT WILKIE
Bob, always broke. "Oh yeah!"



CLASS OF '32

TOP ROW—*Sword, Olson, Anderson, Grigg, Plant, Carlson, Schaar, Godin.*
MIDDLE ROW—*Olson, Adams, Niehaus, Duvall, Cahill, J. A. Jackson, Horn, Wagner.*
BOTTOM ROW—*Holt, Nilsen, Colburn, Cann, Ramus, Sanders, Jacobs, Carr.*

SOME PHASES OF FOREST MANAGEMENT IN THE SOUTHERN TURPENTINE REGION

PAUL RUDOLF
Junior Forester

Introductory

ALONG the coastal plains region from North Carolina to Florida and west to eastern Texas, the production of naval stores is a factor which must be considered in any plans for forest management.

Throughout this region longleaf, slash, and loblolly pines occur. The naval stores industry of the United States which in 1928 produced 65% of the world's turpentine and rosin supply, depends upon the former two pines for its raw product. Loblolly pine does not yield gum (as the crude product of the tree is called) in commercially profitable quantities.

Longleaf pine occurs throughout this region on the drier portions of the flatwoods and on sandy ridges. Slash pine is restricted to the wetter situations along the edges of ponds, lakes and streams.

Condition of Forests

The forests throughout this region have been heavily cut and badly burned. Very little virgin timber remains, and in some places, second-growth timber has been cut for some time.

Due to destructive logging and turpentining methods, practically annual burning-over, and unrestricted grazing of cattle and hogs, the pine forests are badly understocked. In Florida, on what is considered forest land, the average stocking is about 20 trees per acre.* The conditions throughout the rest of this area are probably quite similar.

The extreme prevalence of fire is hindering the development of trees now standing and is preventing or cutting down natural reproduction on large areas.

Ownership of Forest Land

By far the largest percentage of forest land in the turpentine region is held under private ownership. The Federal Government has acquired National Forests in some of these states, but it is doubtful whether or not it will ever own any considerable percentage of this area. The state governments too own relatively little forest land, and in most cases it seems to be contrary to their policy to acquire more.

The situation then is, that the bulk of the forest management will be on private lands, and that public agencies will serve only to demonstrate the best methods.

Management for Timber Production

On some lands the object of management may be to produce tim-

* Forestry for Vocational Agricultural Schools. Bul. No. 2, Florida Forest Service, H. A. Smith, 1929.

ber only. Under such circumstances the forester will strive to keep relatively densely stocked stands in order to produce long, clear boles with little taper, and dense wood, and the general methods of management will be similar to those used in other coniferous forest regions of the country.

For Combination Timber and Naval Stores Production

The prospects of quick returns and a greater total income will undoubtedly appeal to most forest owners, however, and so most of the forest land in this region will probably be managed to produce both naval stores and wood products.

Trees with large well developed crowns, plenty of growing space, and a large percentage of sapwood are desired for gum production. Such trees, however, are not so desirable for lumber production, and a compromise must be made. For a combination timber and naval stores operation indications are that from 150 to 200 final crop trees per acre over 9 inches d. b. h. would be desirable.

With adequate fire protection and source of seed (a very few seed trees per acre are sufficient) reproduction of both longleaf and slash pines comes in very thickly on cut-over areas. On such areas, for the best development of the stand, thinnings are necessary at an early age (10 to 15 years). At present the thinned material could not be disposed of, but in the future it can probably be used for cellulose products.

A second thinning at 20 to 25 years, leaving the final crop trees, is the next step. At this age many of the trees would be large enough to turpentine. The trees to be removed would be chipped heavily for a period of years before the thinning in order to get any revenue which the gum might produce. On the smaller trees a narrower face (3 to 4 inches wide) made by the French method might prove to be the most practical. The material removed could be disposed of for posts, some ties, and perhaps pulp wood.

After a period of 5 years or so, to allow the remaining trees to adjust themselves to the new conditions and to obtain some benefit from the thinning, the turpentine operation proper would start. A method of chipping the trees which would produce the maximum yield of gum with the least injury to the tree should be used. Present indications are that this means a face (as the chipped surface is called) about 33⅓% of the bark perimeter in width and the weekly removal during the chipping season of a streak not more than ½ inch deep (exclusive of bark) and ½ or perhaps ¼ inch high. With such methods the trees can be turpentined from 10 to 20 years. The timber can then be cut and sawed for lumber. The chipped surface being that usually removed in slabs, the lumber yield should be nearly that of unchipped trees of the same size.

The chipping of trees cuts down both their diameter and height growth to some extent, but the additional profit should much more than offset the decreased lumber production.

The foregoing gives some idea of rather an extensive system of forest management for the combination production of timber and

naval stores. As market conditions become better and utilization becomes closer, methods of management will tend to become more intense and will probably approach those used in the turpentine forests of France. They will be characterized by lighter and more frequent thinnings.

For Naval Stores Production

Some stands may be managed with naval stores production as the prime object. They will be characterized chiefly by fewer final crop trees, (probably not more than 100 per acre). The methods of working them will be similar to those used on the dual purpose forests, except that chipping will probably begin earlier in the life of the stand.

For Pulp Production

Kraft paper has been produced from southern pines by the sulfate process for some time. Recently, however, the Forest Products Laboratory has been able to produce white paper also from southern pines and hardwoods on a semi-commercial scale.

Young rapid growing slash pine consists almost entirely of sapwood and has a very low rosin content, under 2%, which is no greater than that found in spruce.* With Canada raising the price on pulpwood and large areas in the south capable of producing pulp material in from 10 to 20 years, conditions are very favorable for a great development of this industry in the South.

In this event many operators may find it profitable to grow pulpwood as their major product. Others may combine pulpwood and naval stores production, converting thinned material into pulpwood, working the timber for naval stores for a time, and then using the worked out trees for pulp material.

At any rate the opportunities for more intensive forest management will be greatly increased.

Future Possibilities

At present longleaf pine, which is quite fire resistant, is the predominating species in the turpentine region. With proper fire protection, however, the amount of slash pine, which is considered the more valuable tree both from the naval stores and pulp standpoint, will very likely increase a great deal. Planting also, except on the drier ridges, will probably be mostly to slash pine. This should serve to make the region as a whole more productive.

With fire control shown to be possible and practical by various federal, state, and private agencies, with the Southern Forest Experiment Station and certain other research agencies working on the many problems, and with many progressive operators to apply practical methods, the southern turpentine region should prove to be a field for a type of forest management more intensive and more interesting perhaps than in any other section of the country.

* "Naval Stores, Wood Paper Pulp, Reforestation, Linked up as Future Great Wealth Producers for this Section", Dr. C. A. Herty. Naval Stores Review, Vol. XXXIX No. 44, p 9, Feb. 1, 1930.

THE CONTROL OF PEAT FIRES IN MINNESOTA

JUNIOR FORESTER THESIS

By J. N. Van Alstine

March, 1928

PEAT consists of the partially decomposed remains of plants which have collected in shallow water and in places where there is an excess of moisture. It is usually found in regions of poor drainage and especially where there has been glaciation in a relatively flat country like Minnesota.

At one time any area where peat occurs consisted of a shallow lake. Submerged, floating leaf, and amphibious aquatic plants came in and in time their remains helped to fill the lake. In places a sedge mat grew out over the water and its materials and those of plants which grew on it helped to fill the lake with peat. Even after the water is filled the building up process may continue. Because of the excess of moisture the dead plant remains have been only partially decomposed or but little changed from their condition when they fell.

The area covered by peat deposits in Minnesota is very large. The Minnesota Geological Survey (8) has classified 11,672 square miles of the state as consisting of peat and marsh lands. The term "marsh lands" is not defined, it may or may not contain peat, but its area is very small. According to these figures, then, 14% of the entire state area and 25% of the northern half of the state is covered with these deposits. 10,114 square miles or 86.6% of all of the peat is in the northern half of the state.

Some counties have large areas of peat. St. Louis County with an area of 6,503 square miles has 1,862 square miles of peat. 2030 of the 3924 square miles of land in Beltrami County are peat. These are exceptional examples.

Peat becomes dry through drainage or periods of drought, or a combination of both of these factors and is then a fire hazard. Ordinarily it catches fire when dry and not frozen, from surface fires running over the ground. Haystacks, pieces of wood, ditch banks, and hummocks burning on the surface carry the fire to the peat beneath (5). The surface fires are due to ordinary causes such as farmers clearing land by burning, railroads, burning tobacco and matches carelessly thrown away, camp fires, lightning, accidental burning and incendiarism.

In the beginning most peat fires are small. Numerous small fires may occur scattered over the surface of the peat. These fires if not put out burn downward and outward from the point of origin. They will burn down to mineral soil or to material too wet to burn, and spread laterally in all directions through the peat. In time several small fires will join to make a large one. The fire burns slowly, silently, and without visible flame for weeks, months, and sometimes

for years. Under most conditions it is a mass of hot, glowing, smoldering material. Strong winds may fan it into active flame.

The depth burnt is variable, ranging from a few inches to several feet, depending on the depth and condition of the peat. The edge burns outward in very irregular lines often leaving isolated hummocks or islands of slower burning material. The edge may be perpendicular or the fire may burn underneath before coming to the surface. Even after the surface has been burnt for several weeks the fire may continue to burn downward.

The ashes are light in weight, fluffy, yellow to red in color and cover the burnt area everywhere, sometimes to a depth of over a foot. Rains compact the ashes but it takes a very heavy rain to reach the fire underneath. Ordinary rains of short duration merely wet the upper layer and the water is dried out from the heat of the fire beneath.

Heavy rains may put out the fire under ashes but will have little effect at the edge of the fire especially where burning under ground. Because of the slowness with which it burns the fire has the power to dry out and burn even moist peat. Fall rains which last for several weeks will put out much fire in shallow burning peat.

At the present time, Feb. 5, 1928, there is a very small fire burning to a depth of about three feet in peat in the north part of Minneapolis. As the dry summer grass is still present this fire probably started from spring surface fires. From April 1, 1927 to Dec. 31, 1927 there was a precipitation of 26.77 inches in Minneapolis (4) yet it was not sufficient to put out this fire. However, several nearby fires burning in peat about a foot deep were put out by melting snows in the latter part of December.

Trees growing on peat lands usually have flat shallow root systems. When the roots and the ground under the trees have burned, they fall. Sometimes even the herbatious vegetation will not be burnt but the ground underneath will be destroyed. Sooner or later, however, this small stuff will be burned.

Land, timber, young growth, and sometimes even crops and roads are destroyed. Aside from this, the great danger of peat fires is in their potential danger of starting surface fires. Those fires which start in the spring and burn till fall are particularly dangerous. When the vegetation is dry in the fall strong winds are apt to fan the smoldering fire into active flame and set fire to the surface material. Peat fires, then, when scattered over large areas are a very serious menace.

Some of the worst fires in the history of Minnesota came from this source. The Baudette-Spooner fire of October 7, 1910, in which 29 people were killed and $1,000,000 worth of property destroyed, originated from peat fires (1). The series of fires on October 12, 1918, in which Moose Lake and Cloquet were destroyed, was in part due to burning peat in swamps. In this latter series of fires over 400 people were killed and about $100,000,000 damage was done.

There are two general ways of putting out an established peat fire: (1) by isolating the burning area; and (2) by the use of water.

The first method is usually used where the fires are small or where

water is not available. The work is done by digging ditches and trenches or by digging out the edge of the fire. (5).

Ditches and trenches are built as close to the fire as possible and dug to mineral soil or to the water table. The entire fire is surrounded by the ditch. For success the peat must be shallow, for unless water or mineral soil is at the bottom of the ditch the peat will dry out and allow the crossing of the fire. Men using shovels and broad axes usually do the work, where the fires are small. The broad axe is helpful to cut the peat into chunks as it is very difficult material to dig with shovels. All burning peat is thrown toward the burning area. Patrol of the ditch is necessary until the fire is out to prevent wind from blowing sparks across.

In 1919 several peat fires burning over 200 acres of land were put out in Beltrami County by the use of a bull ditcher. (7). Work was not started on these fires till fall when they had covered this large area. In twelve days this machine had surrounded the fires with ditches. In this time it dug 973 rods (3.04 miles) of ditch averaging three feet deep, five feet wide at the top and twenty inches wide at the bottom. All of the peat inside of the ditches was allowed to burn but the fire was shoveled back (described later) when it reached the ditch. Constant patrolling was necessary to prevent the fire from crossing the ditch. 236.6 acres of peat were burned and the suppression costs were $1824.33.

These fires started from spring surface fires. If they had been put out immediately after their start very nearly all of the land would have been saved and the suppression costs would have been negligible.

The edge of the fire is usually dug back when the peat deposits are deep. The burning material is dug from the edge of the fire for a distance of about six feet and thrown into the burning area. In this way the entire fire is surrounded. The process must be repeated every few days, to prevent the advance of the fire, until the fire has gone out. Rains, if they bring enough water, will succeed in putting out the fire, if it has not already burned itself out.

Digging out the edge of the fire down to mineral soil is effective but may require much work.

Back firing is sometimes used (5). A fire line is first built around the peat area on highland (mineral soil) and the surrounded area burned over. This can best be done where the peat areas are small. The peat is left to burn and for the time being, at least, will not be apt to cause surface fires.

Water where available, and if properly used, is the best means of putting out a peat fire. Both hand and power pumps are used. Flooding may occasionally be employed.

The hand pump outfit usually consists of a cistern force pump, with a hose connection, and 50 to 100 feet of one inch rubber hose, fitted with a spray nozzle. A sand point is driven to a constant supply of water. This outfit is used where the fires are small and scattered and the water table close to the surface. It is very good for fires along ditch banks where there is some water in the ditch. The outfit

is set up in the most advantageous position and operated by two or three men. One or two men operate the pump while the other directs the stream of water on the fire. Shoveling is often necessary to expose all of the fire. Breaking the burning peat into small pieces and mixing it thoroughly with water and ashes is very effective. It is a slow process but once the burning area has been thoroughly gone over all of the fire should be out. When ready to move the sand point is pulled out of the ground and the outfit is relocated.

Power outfits are used on large fires and where there is plenty of water (5).

The power outfits used by the Minnesota Forest Service in Cass County in 1926 consisted of a one and a half or two horse power gasoline engine (Fairbanks Morse) connected to a rotary pump (Blackner) and mounted on a go-devel. One and a half-inch rubber lined cotton fire hose was used to deliver the water from the pump. The intake hose of the pump consisted of a ten foot length of one and one-half inch non collapsible rubber hose fitted with a strainer. Water from the hose was forced through a nozzle made of a section of three-fourths inch galvanized pipe three to six feet long and reduced to three eights inch at the end. Pumps delivering twenty five to forty gallons per minute at the fire are good.

This outfit is hauled to the fire with a truck or wagon or may be skidded part way with a team. It is located as close to the fire as possible and at the supply of water. Water is obtained from a ditch, stream, pond. or by the use of a sand point. The building of dams, in ditches with but little running water, is helpful. The length of hose depends on conditions, but over 2000 feet should not be used. Two men can easily operate the outfit.

Water is forced with considerable pressure from the nozzle. This stream of water is directed on the fire from the distance of about a foot or the nozzle is prodded around in the burning peat till all of the fire is out and the peat saturated. Where the fire has burnt under the surface a grub hoe or a shovel and broad axe should be used to expose all of the fire. In this way one is sure of putting out all of the fire. Fire burning downward in the burnt area should also be put out. In this way the whole fire is systematically gone over.

On large fires and where the fires are scattered it may be necessary to move the outfit. This is easily done by disconnecting the hoses and skidding the pump and engine to the new location. The hose if broken into 100 foot lengths can be dragged by hand.

The fire that can be put out in a day varies with conditions. Where the peat is burning for a depth of several feet and extending under the surface the work progresses very slowly. If the fire burns to a depth of a few inches to a foot and does not extend under the surface the work progresses rapidly. The more irregular the edge of the fire the more time is needed. Changing location of the hose and putting out fire on isolated hummocks also takes much time. Fallen timber also hinders progress. Under the most favorable conditions several hundred feet of fire can be put out in a day.

There are several good pumps and power pumpers on the market which should be very satisfactory for this kind of work. The "Pacific Northern Type N" pumps should be a good outfit to use where the fires are small and there is the necessity of much moving. This pumper weighs seventy pounds and can be fitted to a pack frame and carried by one man. The gasoline consumption is very high being seven gallons per ten hour day as compared with two gallons, for the same time, when using the one and a half or two horse power Fairbanks Morse engine.

In 1919 W. T. Cox, then State Forester, conferred with the U. S. Bureau of Mines upon the possibility of using a gas for suppression of peat fires (2). The conclusions drawn were that no gas would be practicable for the work because of the difficulty of its application and because of the fact that peat contains enough oxygen for combustion even in the absence of air.

The State takes the entire responsibility for the prevention and suppression of peat fires through the forestry branch of the Department of Conservation. This is necessary because the owner of the land may not care whether it burns or not. A good farmer would not allow his lands to burn up, but in many cases it is up to the state to see that the fires are put out. Usually the State hires men, furnishes them with the proper outfit, and directs the work.

The presence of peat fires should be known by the proper officials, for according to law—"The occupant of any premises upon which an unauthorized fire is burning in the vicinity of forest lands, whether such fire was started by said occupant or otherwise, shall promptly report the said fire to the forester or the nearest district ranger, patrolman, or fire warden." (Chap. 426, Sec. 22, Laws of 1925.) Any one who sees a fire is also requested to report it to a forest official.

The best policy in handling peat lands is to prevent all fires from running over the land. If surface fires should burn over the land, especially in the spring, it should, if possible, be immediately gone over and all fire put out while yet small. The longer a peat fire burns the more difficult it is to put out. Ordinarily they will have to be put out by hand for rains have but little effect. When farmers desire to burn peat lands to get rid of an accumulation of dead grass and weeds, to improve a meadow, the burning should be done in the spring while the frost is in the ground. In this way little or no peat will catch fire but the land even then should be inspected for fire.

Peat lands that have been drained should have the ditches provided with dams (Several per mile). Then by the use of these dams the run-off could be checked and the water table maintained close enough to the surface to prevent excessive drying. Above all, the useless draining of swamps should be stopped. Partial drainage is good in some cases but over drainage should not be tolerated. There is now too much drained peat area lying idle. Undrained peat areas retain the run-off thus helping to prevent floods on the lower stretches of the drainage system.

"FOUR THOUSAND YEARS"

By Charles Randall

A SMEARY moon half hidden in the sky.
Sometimes appearing, sometimes wholly hid,
As thick and surly clouds passed over it.
A feeble sickly light was given off
And blown about by frequent restless gusts.
The night was heavy, damp, and like a corpse
Gave up a feeling of uncanniness.
A feeling of a lurking presence, close,
And yet concealed, but nearby, which perhaps
Might soon appear, and yet perchance might be,
Forever hidden in the dismal gloom.
Again a feeling gruesome as if death
Were scattered broadcast by the fitful wind,
And now and then lay down with quiet weight
Upon the dark black covering of night.
No sound except the swishing of the brush
And echoes, as of guttural mumblings,
That came and passed and left a doubtful mind.
On such a night as this, one man alone,
Stood in the midst of willful butchery.
Climbed up the mountains of our western coast
Along an old forgotten bit of trail
And walked among the relics of the dead.
The ruins of an ancient splendor, old,
And tho once clad in all the fineries
Which life and wealth could possibly bestow,
Now crumbling, dead, remained mute evidence
Of conquest, slaughter, and destructiveness.
The atmosphere, oppressive, hard to breathe,
Now lifted by a bit of passing wind,
Now bearing down with weighty ponderance,
Ominous, sullen, heavy, menacing,
Upon the silent midnight mountain slopes.
The wind stopped suddenly its fitfullness,
The sounds of old forgotten forests, ceased,
The grey clouds opened in the sky above
And let the musty yellow moon-beams thru
To better, tho still vaguely, illuminate
The zenith of repugnant, wanton, death.
One man alone climbed up the mountain side,
Hurried along a path, almost obscure,
Passed thru thin clumps of brush and heavy grass
All moisture ladened by the settling dew.
Emerged from a small group of denser growth
And reached the crest of a low sloping hill,
Where from the summit he could see beyond

The blackness of the valley far below,
The lighter distant summits on ahead,
And scraggly growths of trees that had sprung up
Unorderly and intermittently.
He paused to rest, and laying down his pack,
He leaned against an old decaying stump
And let wild fancies entertain his mind.
There temples full of glorious majesty
Were once erected, lifted in the air,
Straight upwards toward the sky and toward the sun
To honor Him above who gave the life
That had produced such gorgeous monuments.
But on that very ground with weapons sharp
Had men waged warfare cruel and merciless.
Had conquered and destroyed the native born,
Stripped them of all their pomp and all their pride,
Taken their grandeur, stolen all their wealth,
Trampled the new born underneath their feet,
Destroyed an empire, razed it to the ground,
Left not a trace of their magnificence.
Crashed down upon a gentle peaceful race,
Murdered them, killed them, slew them on the spot,
Dragged off all traces of prosperity,
Leaving but ruins there to mark the spot,
The stumps of the once great sequoia trees.
Again the man continued on his way.
Picked up his pack sack, started down the hill
That led into the valley, dark and black,
Where heavily the fog had settled down.
Across a rocky gullet where heavy rains
Had washed a gully, cut deep in the earth,
Eroded all the finer silt away
And left the boulders lying on the bed.
On up the slope again, steep, sharply cut,
Gouged out by glaciers, streams of solid ice
That slowly formed from many feet of snow
And slower moved across the mountain's face
And down the valley, cutting as it went
The steep sides that were not yet graded down
By tributaries of a rapid stream
That flowed and raced, until it reached a plain
Where it could spend its stored up energy
And gradually wind and flow away.
Then after coming from the deep ravine
He climbed the gentler slope that lay beyond
And so kept on his solitary way.
The forest trees grew thicker as he climbed,
The brush that covered all the former slope
Now gave up space to living breathing trees.
The bushes first grew thin, then disappeared,

And he was traveling then a heavy stand
Of virgin timber, noble trees of spruce
Which as he higher climbed gave way to Pine,
And which in turn gave up the soil to fir.
These trees of strength and beauty, rich in years,
Gave forth a feeling of such confidence
That as he walked among them he forgot
The slope, disconsolate bereft and bore,
That lay behind him in the sunken gloom.
As when a man, exiled away from home,
Has spent his years in lonely wretchedness
Alone, apart from those he longed to see,
Away from those that once he loved so well,
Should meet those loved ones for whom he had grieved,
All of the happiness that then would come
Would wipe out all the years of lonesomeness.
So joy replaced the feeling of remorse
That held the forester an hour back,
For he again was with those whom he loved.
The forest was his home, the trees his friends,
And tho the greatest of his own were gone
Still there were many left to take their place.
He reached the summit of the neighboring ridge,
Turned, and looked back upon the crest beneath
And thought he saw great forests standing there.
All great trees inconceivable in size,
Trees that were monarchs of the living world,
Trees older than the oldest life on earth,
Trees twenty, thirty feet, across the base,
Trees reaching up, and up, and far above
The ground from which four thousand years before
They had been born as seedlings in the grass.
The vision died, and all the dismal light
Cast by an old and dull and faded moon
Kept harmony with those old stumps below
That gave up testimony, ancient, weird,
Of all the glory that once ruled the slope
And all the gruesomeness of dead remains.
He turned and passed away into the night,
Intent upon the journey yet to come
He kept his path and traveled on beyond,
With mingled thoughts of wasteful lumbering
And trees that still held high their virgin heads
And seedlings that should some day rule the soil
And trees that yet unplanted, yet unborn,
Would some day come to live and grow and thrive
Assisted by the hand that had torn down
The trees more splendid than the human race
Should ever see again upon the earth.
The night enveloped him and he was gone.

Photo by Oberholtzer.

A Minnesota Trout Stream

AMONG THE ALUMNI

THIS is the first time that there has been a special section in the "Gopher Peavey," which is devoted entirely to Alumni doings.

It was the opinion of the 1930 Peavey Staff that such a section should be created, as the "Gopher Peavey" should encourage the interest of the Alumni by giving the whereabouts and experience of their classmates.

The Alumni response this year was very favorable, but there could be a great deal of improvement. Let's have some response from all of the classes. Show the next year's Peavey Staff a wholehearted Alumni support.

Editor.

'99

G. G. Chapman is Professor of Forest Management at Yale University.

Martin Erickson's permanent address is Flandreau, S. Dakota.

'06

Frank Rockwell is with the D. S. B. Johnston Land Company and managing thirty farms for that company. He is located in Marion, North Dakota.

W. T. Cox has gone to Rio de Janeiro to organize a forest service for the Brazilian government.

Dillan P. Tierney is a retail lumberman and nurseryman at Castle Rock, Minnesota.

'10

A. O. Benson is at the Forest Products Laboratory, Madison, Wis. He is contemplating an annual pilgrimage to Itasca with the old timers.

C. L. Lewis "Cranberry King" is with the Badger Cranberry Company at Beaver Brook, Wisconsin. His home address is 125 South Oxford Street, St. Paul, Minnesota.

'11

C. L. Hamilton is with Weyerhaeuser Forest Products Company in St. Paul.

Julius V. Hofmann resigned from the Mont Alto Forest School last year and accepted a position as head of the Forestry Dept. of the North Carolina Forestry School at Raleigh, N. C.

"Dave" Arrivee is numbered among the honored ranks of the supervisors. He is in charge of the Targhee National Forest, Ogden, Utah.

William Underwood is working for his doctor's degree in Economics at the University of Minnesota.

'12

John A. Stevenson has been Senior Mycologist in charge of Mycological Collections in the Bureau of Plant Industry, since 1927.

Robert Wilson is stationed at the U. S. Field Station, Cheyenne, Wyoming.

Harvey Blodgett is with the Harvey Blodgett Printing Co., 1745 University Avenue, St. Paul, but he attends every meeting of the Society of American Foresters.

'13

Paul Tobin is with a Lumber Company at Lewiston, Idaho.

C. D. Simpson is supervisor of the Tolo National Forest, Missoula, Mont.

Andrew Erstad is working at the new Weyerhaeuser Mill at Klamath Falls, Oregon.

'14

George F. Freeman still roams the sea. He may be caught, occasionally at 131 Hooper Avenue, Tome's River, New Jersey.

S. A. Graham is professor of Forest Entomology at the School of Forestry and Conservation, Ann Arbor, Mich.

Harold Spink is with the H. R. Smith Lumber Company, Kansas City, Miss.

Donald R. Aldworth reports the blanket business flourishing in New York. His address is 225 4th Ave., New York City.

'16

A. B. Gerlow is with the Nicaragua Mahogany Company. He reports that in his thirteen years' in Mexico and Nicaragua he has not met a single Minnesota graduate.

L. S. Tuttle is still a timber worker in Minneapolis, Minn.

'18

Leland L. de Flon has resigned his job at the Forest Products Laboratory to attend the Moody Bible Institute, 153 Institute place, Chicago Ave. Station, Chicago, Illinois.

George Hauser is now assistant coach at Ohio State University, where he is studying medicine.

'20

"Shirley" Brayton has been with the Itasca Paper Company at Grand Rapids, Minnesota, since 1926.

Leyden Ericksen is with the American Lumbermen's Association. His address is 2331 Cathedral Avenue, Washington, D. C.

Rudolph M. Grabow has resigned from the Forest Products Laboratory and is forester for a county in California. His address is 646 California St., Glendale, California.

Paul R. Palmer is Episcopal Minister at Benson, Minnesota.

'21

Lloyd Grapp is with the Indian Forest Service at Keshena, Wisconsin.

P. O. Anderson is Extension Forester at the University Farm and as busy as ever. He takes time off occasionally to don knickers and frequent the University Golf Course.

A. E. Wackerman is forester for the Crossett Lumber Company, Crossett, Arkansas.

'22

Burton Thayer is in the lumber business in Minneapolis. His address is 2400 Bourne Ave., St. Paul.

A. A. Anderson, better known as "Triple A" says the slump in the auto business is hard on the lumber salesman, but he is still to be found at 1305 Short Ave., Canton, Ohio.

Otis C. McCreery is assistant Dean of Men at the University of Minnesota.

'23

Augustine J. Streinz is in charge of timber sale work for the U. S. F. S. in Arkansas. His address is 706 Quapan Avenue, Hot Springs, Arkansas.

Raymond E. Stevens is in charge of Land Economic Survey for the State Forest Service, Old Capitol, St. Paul.

Orcutt W. Frost is with the Wood Conversion Company, Cloquet, Minn.

Gunnar Fenger is with the U. S. F. S. on the Chippewa National Forest at Cass Lake, Minn.

Sidney S. Burton is with the North Dakota School of Forestry, Bottineau, North Dakota.

Arthur L. Nelson is now Forest Supervisor of the Nebraska National Forest. "Art" was editor of the Peavey in 1922.

'24

Nelson W. Upton is still in Minneapolis and his address is 4505 York Avenue South.

Philip Bryan is with the U. S. F. S. at Hot Springs, Arkansas.

Arland C. Blaze is now an Episcopal minister. That makes two that we have in that profession.

Herbert Maturen is with the Alabama Forest Service, Montgomery, Ala.

Harold O. Ostergaard is with the Minnesota Forest Service.

Maxon Y. Pillow is with the Forest Products Laboratory at Madison, Wisconsin.

Victor A. Lynne is City Forester for Winona, Minnesota. His address is 559 Olmstead Street.

'25

L. G. Baumhofer, better known as "Shorty" is now taking graduate work in Entomology at the University of Minnesota.

Roy B. Thompson is with the U. S. F. S. Mt. Shasta, California.

'26

Eugene T. Erickson is engaged as Private Forester in Millbrook, New York.

A. B. Everts is with the U. S. F. S. at Quincy, California.

Hyman M. Goldberg received his Master's Degree from the Yale Forest School last year and is back with the Minnesota Forest Service.

George Sargent is Junior Forester on the Klamath National Forest, which is one of the largest forests in that region.

Ralph M. Lindgren is stationed at the Southern Forest Experiment Station as assistant Pathologist in the office of Forest Pathology.

'27

Roy A. Chapman is with the Southern Forest Experiment Station in New Orleans.

E. P. Duclos is a representative of the Edham Company manufacturers of Kolored Red Cedar Shingles. His headquarters are in Wauwatosa, a suburb of Milwaukee, Wisconsin.

Carl G. Krueger is with the U. S. F. S. at Ishawooa, Wyoming.

Leslie W. Orr is now at the University of Michigan in the Forestry School. He is Junior Instructor in Forestry.

Arthur F. Verrell is instructor in Plant Pathology at the University of Minnesota.

Raymond Clement is with the Minnesota Forest Service and is located at St. Paul, Minnesota.

Warren Chase received his Master's Degree in 1927. He is now Assistant in Wood Utilization at the University of Minnesota.

Uno M. Marttila is with the Firestone Rubber Plantation in Monrovia, Liberia, West Africa.

Gerald S. Horton is with the U. S. F. S. at Mio, Michigan.

Carlyle Carson is in charge of a U. S. F. S. nursery at Susanville, California.

'28

Paul Blatter is scaling for the Clearwater Lumber Co. in Idaho.

Ellery Foster is with the U. S. F. S. at Hayfork, California.

J. Lee Deen is working at the Yale Forest School for an advanced degree.

Merrill Edgar Deters is studying for a Master's Degree at the University of Minnsota.

Ray Knudson is with the Sawyer-Stoll Timber Company, producers and wholesalers of cedar posts, ties and pulpwood. His work runs largely to cruising.

Paul Rudolf is connected with the Southern Forest Experiment Station and is engaged in research work on naval stores.

J. N. Van Alstine is busy this winter scaling government timber and looking after timber sales. He is located on the White Mountain National Forest at Plymouth, New Hampshire.

Thomas Lotti is taking graduate work at the Harvard Forest School, Petersham, Mass.

Ben Whitehill is located on the

Washakie National Forest, Du Noir, Wyoming.

Waldemar R. Anderson is working for his Master's Degree at the University of Minnesota.

W. H. Fischer Jr., is with the U. S. F. S. on the Colorado National Forest, Ward, Colorado.

Albert Grant is with the Scott Pole Co., Minneapolis, Minnsota.

Emil Norgorden, "Whitey" is in Dry Kiln work at Vernonia, Washington.

'29

David M. Williams is chief chemist of the Spokane Plant of the Curtin-Howe Corporation.

Danford Thomas, "Prexy," is connected with the International Paper Company at Piercefield, New York.

Dale F. Chapman is working on a scholarship at the Forest Products Laboratory, Madison, Wisconsin.

Clyde Christensen, is working for an advanced degree in Plant Pathology at the University of Minnesota.

Wm. Hallin is taking graduate work at the Yale Forest School. He expects to attend the Yale Forester's Spring Camp in Louisiana, this spring.

Frank Kaufert is taking graduate work in Plant Pathology at the University of Minnesota.

James Light is with the Indian Forest Service in Wisconsin.

Elmer R. Marks is taking praduate work in forestry at the University of Minnesota.

John R. Neetzel is taking graduate work in forestry at the University of California.

Thad Parr is with the Armstrong Tree Surgery Company at Poughkeepsie, New York.

Harry Peterson, "Pete," is with the American Telegraph and Telephone Company, Cleveland, Ohio.

Lawrence B. Ritter is State Agent for Blister Rust Control, Old Capitol, St. Paul.

Ernest C. Oberholtzer, President Quetico-Superior Council; Miss McFeeley of the University Extension Dept.; R. S. Mackintosh, Exhibit Specialist, Horticulture; and Tau Phi Delta have been kind enough to loan us various cuts. We thank them for their courtesy.

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1899

Chapman, H. H., School of Forestry, New Haven, Conn.
Erickson, M. L., Flandreau, So. Dakota.

1905

Cuzner, Harold, College of Agriculture, Laguna Province, Los Banos, P. I.

1906

Cox, Wm. T., Federal Bldg., Winona, Minn.
Detwiler, S. B., Chief Office Blister Rust Control, Bureau of Plant Industry, Washington, D. C.
Rockwell, F. I., Marion, North Dakota.
Tierney, D. P., Castle Rock, Minn.

1907

Canavarro, Geo. de S., 2739 Huuanu Ave., Honolulu, Hawaii.

1909

Moore, Walt M., Box 234, Osborne, Ohio.
Orr, Geo. R., deceased.

1910

Baker, Norman M.
Benson, Arnold O., Forest Products Laboratory, Madison, Wis.
Berry, J. B., Winter Haven, Fla.
Brewster, D. R., 1339 Bank of Commerce Bldg., Memphis, Tenn.
Derring, Robert, Ferry Bldg., San Francisco, Calif.
Jacobson, N. G., 630 W. Lumberman's Bldg., Portland, Ore.
Grauch, H. G., Ft. Valley Exp. Station, Flagstaff, Ariz.
Lewis, C. L., Jr., Beaver Rock, Wis.
Underwood, C. L., 305 4th Avenue, Yakima, Wash.

1911

Arrivee, David A., Ogden, Utah.
Beard, F. W.
Bowen, C. W., Jr.
Brownie, J. R., Thompson Yards, Livingston, Mont.
Campbell, Hugh B., Prarie, Wash.
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Gilles, R. R.
Hamilton, C. L., 808 Merchants National Bank Bldg., St. Paul, Minn.
Hauge, A. G., McNary, Ariz.
Hofmann, J. V., State Forest School, Mont Alto, Penn.
Kenety, W. H., Cloquet, Minn.
Martin, D. W., 1843 South St. N. W., Washington, D. C.
Oppel, A. F., 1523 Branston, St. Paul, Minn.
Underwood, Wm., Pullman, Wash.
Weber, Henry, Northern Oil Co., Virginia, Minn.
Williams, Donald.
Young, J.

1912

Beyer, W. F., 59 Maiden Lane, New York City.
Blodgett, H. P., 1376 Portland Ave., St. Paul, Minn.
Clymer, W. R., 1626 Laurel Ave., St. Paul, Minn.
Conzet, G. M., Commissioner of Forestry and Fire Prevention, Old Capitol Bldg., St. Paul, Minn.
Harris, S. Grant, Jr., Page & Hill Co., Minneapolis, Minn.
Hodgman, A. W., Westport, Ore.
Norman, Sigvald, 2253 Scudder St., St. Paul, Minn.
Orr, J. E., Chicago, Ill.
Pearce, Wm. R., Botsford Lumber Co., Faribault, Minn.
Pettibone, H. M., 500 Webster Place, Milwaukee, Wis.
Spellerberg, F. E., deceased.
Stevenson, J. A., Office Forest Diseace, Invest., B. P. I., Washington, D. C.
Wilson, Robert, U. S. Field Station, Cheyenne, Wyoming.

1913

Buhler, E. O., Merchants Trust Co., St. Paul, Minn.
Erstad, Andrew, Payette Lumber Co., Barber, Idaho.
Griffin, Thos. A., 3529 Humboldt Avenue S., Minneapolis, Minn.
Hall, Edwin H., 2000 Fairmont Ave., Eugene, Ore.
Haworth, Robert, Red River Lumber Co., 702 Slauson, Los Angeles, Calif.
Henchel, Norman, Bushong, Kan.
Moir, John, 1501 Pioneer Bldg., St. Paul, Minn.
Nuffer, Harry.
Renshaw, David, deceased.
Rogers, Ernest, deceased.
Savre, Oliver M.
Simpson, Chas., Loto National Forest, Missoula, Mont.
Tobin, Paul, Lewiston, Idaho.
Wiggin, G. H., Cloquet, Minn.

1914

Aldworth, Donald, 456 Fourth Avenue, New York City.
Braden, Kenneth.
Cummings, Thos. S. C., Fort Benton, Mont.
Freeman, George, 50 Trinity Place, c/o Charlton Hall, New York City.
Graham, S. A., School of Forestry, U. of Michigan, Ann Arbor, Mich.
Lindeberg, Geo. C., 111 Lumber Exch., Minneapolis, Minn.
Mueller, A. T., Princeton, Wis.
Ringold, Stanley L., 2124 St. Clair Street, St. Paul, Minn.
Rose, Logan, Mankato, Minn.
St. Marie, A. A.
Spink, Harold W., H. R. Smith Lumber Co., Kansas City, Mo.
Torgrim, J. R., deceased.

1915

Chance, Jenner D., 719 7th Street S. E., Minneapolis, Minn.
Dennis, Henry M.
Dunn, Frank M., 3110 Fourth Street S. E. Minneapolis, Minn.
Hansen, Thorvald S., Forest Experiment Station, Cloquet, Minn.
Hawkinson, Carl, Jr., Virginia, Minn.
Sischo, Paul C.
Wyman, Hiram.

1916

Bartelt, Harry, 2091 Buford Avenue, St. Paul, Minn.
Bell, Ernest, deceased.
Blake, Philip, Glendora, Calif.
Broderick, Martin, 305 Hammond Bldg., Detroit, Mich.
Crane, Leo F., Post Recruiting Office, Fort Sam Houston, Texas.
Gjerlow, Atle B., Nicaragua Mahogany Co., Bluefields, Nicaragua.
Hyde, Luther.
Johnson, Oscar.
Rhoads, Ralph.
Schwartz, E. R., 1821 Liberty Street, Marinette, Wis.

1917

Burnes, J. D., 5008 Vincent Avenue S., Minneapolis, Minn.
Forsberg, Carl, 3444 32nd Avenue S., Minneapolis, Minn.
Tuttle, L. S., Odell-Tuttle Lumber Co., 1645 Hennepin Ave., Minneapolis, Minn.

1918

Danson, Robert, 627 Water Street, Albert Lea, Minn.
deFlon, Leland L., 153 Institute Place, Chicago, Ill.
Hauser, Geo., Ohio State University, School of Medicine.
Pendergast, Earl, 13215 Birwood Street, Detroit, Mich.
Swanson, Herb.

1919

Backus, Romayne, 1953 Cheremoya Ave., Hollywood, Calif.

1920

Brayton, S. C., Itasca Paper Company, Grand Rapids, Minn.
Frudden, Clyde M., Greene, Ia.
Grabow, R. M., 646 California St., Glendale, Calif.
Isaac, Leo A., U. S. Forest Service, 514 Lewis Bldg., Portland, Ore.
Palmer, Paul, Benson, Minn.
Schmid, Walter W., 50 Church St., New York City.

1921

Anderson, P. O., Extension Division, University Farm, St. Paul, Minn.
Dwyer, Daniel E., 969 Goodrich Avenue, St. Paul, Minn.
Ericksen, Leyden, 2331 Cathedral St. N. W., Washington, D. C.
Grapp, Lloyd, Indian Agency, Keshena, Wis.
Ostrowski, Francis, Waldorf Paper Co., St. Paul, Minn.
Person, Hubert, Calif. Forestry Experiment Station, University of Calif., Berkeley, Calif.
Wackerman, A. E., Crossett Lumber Co., Crossett, Ark.
Whiton, Arthur L., 572 Elmwood Ave., Apt. 19, Buffalo, N. Y.

1922

Anderson, Alvin A., 1305 Shorb Ave., N. W., Canton, Ohio.
Nelson, Ralph M., Office of Forest Pathology, Washington, D. C.
Sheehan, John A., Cudahy Packing Co., Duluth, Minn.
Thayer, Burton, 2400 Bourne Avenue, St. Paul, Minn.

1923

Burton, Sidney S., N. D. School of Forestry, Bottineau, N. Dak.
Chesebrough, Herbert S., West Liberty, Iowa.
Dockstader, Chas., 2338 Marshall Avenue, St. Paul, Minn.
Fegraeus, Thorbern, deceased.
Fenger, Gunnar, Chippewa Natl. Forest, U. S. F. S., Cass Lake, Minn.
Frost, Orcutt W., Cloquet, Minnesota.
Hamilton, Herbert, McCloud, California.
McCreery, Otis, Assistant Dean, Student Affairs, U. of Minn.
Nelson, Arthur L., U. S. Forest Service, Ft. Collins, Colorado.
Probstfield, E. E., c/o Holland-American Plantations, Kiseran, Asahan, Sumatra, D. E. I.
Stevens, Raymond, Minn. Forest Service, Old Capitol, St. Paul, Minn.
Streinz, Augustine, 706 Quapaw Ave., Hot Springs Nat. Park, Ark.
Sunday, Clarence W., 414 Baker Bldg., St. Paul, Minn.
Tilden, Floyd, 412 Prior Avenue, St. Paul, Minn.

1924

Berggren, Harold, Cloquet, Minn.
Betzold, Harold, 1224 Lexington Ave., St. Paul, Minn.
Bryan, Philip H., Ark. National Forest, Hot Springs, Ark.
Christopherson, Clifford, 1129 West Lawrence, Appleton, Wis.
Hoar, Walter G., Coeur d'Alene Nat. Forest, Coeur d'Alene, Idaho.
Kribs, D. A., Yale Forest School, New Haven, Conn.
Leffelman, L. J., Experiment Station, Wooster, Ohio.
Lynne, Victor A., City Forester, P. O. Box 382, Winona, Minn.
Maturen, Hubert, Alabama Forest Service, Montgomery, Alabama.
Nelson, Albin C.
Ostergaard, Harold, Baudette, Minn.
Pillow, M. Y., Forest Products Laboratory, Madison Wis.
Ritchie, Wm. A., Badger Glove Mill, Neenah, Wis.
Sheffield, Ernest F., Robbinsdale, Minn.
Upton, Nelson, 4505 York Avenue S., Minneapolis, Minn.
Weswig, Carl, 1456 Branston Street, St. Paul, Minn.
Youngers, P. W., 4540 Vincent Avenue S. Minneapolis, Minn.

1925

Barrett, Wilford.
Baumhofer, L. G., Box 636, Coeur d'Alene, Idaho.
Blandin, H. M., 546 River Street, Niagara, Wis.
Cooper, Geo. Proctor, United Fruit Co., Almirante, Republica de Panama.
Flanagan, Clement.
Gay, Chester, 1305 Pioneer Bldg., St. Paul, Minn.
Gordon, J. R., 1511 Belmont Road, Duluth, Minn.
Jensen, Victor S., Yale Forest School, New Haven, Conn.
Litchfield, Wickliffe, Mankato, Minn.
Maughan, Wm., Yale Forest School Camp, Urania, La.
Peel, Wm. F. Firestone Plantations, Monrovia, Liberia, W. Africa.
Racey, Chas., 1003 8th S. E., Minneapolis, Minn.
Thomson, Roy V., U. S. F. S., Mt. Shasta, Calif.
Wilson, Walt, Firestone Plantations, Monrovia, Liberia, W. Africa.

1926

Bjornstad, E. G.
Blage, Arland C., 396 Curtis Street, St. Paul, Minn.
Christianson, D. A., Hinckley, Minn.
Erickson, Eugene T., Millbrook, New York.
Everts, Ambrose, U. S. F. S., Quincy, Calif.
Goldberg, Hyman M., 711 Dayton Avenue, St. Paul, Minn.
Henry, Leslie, U. S. F. S., DuNoir, Wyo.
Hyatt, H. H., 3700 Penn Avenue N., Minneapolis, Minn.
Ilstrup, Marshall, deceased.
Jackson, Lyle, Office of Forest Diseases

Investigation, B. P. I., Washington, D. C.
Janssen, K. R., 911 Carroll Avenue, St. Paul, Minn.
Kelsey, H. B., 2817 17th Avenue S. E., Minneapolis, Minn.
Kuenzel, J. G., Minn. Forest Service, Old State Capitol, St. Paul, Minn.
Lindgren, R. M., Office Forest Pathology, Customs House, New Orleans, La.
Lystrup, Herbert, Warrendale Greenhouse, Como Ave., St. Paul, Minn.
Manual, Ronald, 114 Orlin Avenue S. E., Minneapolis, Minn.
Shadduck, Nobel, Fort Bragg, Calif.
Sargent, Geo., U. S. Forest Service, Tuolumne Ranger Sta., Groveland, Calif.
Umbehocker, Kenneth, 4633 Oakland Ave. S., Minneapolis, Minn.
Watts, Paul Kenneth, 619 Washington Ave. S. E., Minneapolis, Minn.
Whitehurch, Gale M., 2618 Polk Street N. E., Minneapolis, Minn.
Zierke, E. A., Princeton, Minn.

1927

Carlson, C. Homer, c/o Anderson Lumber Co., Bayport, Wis.
Chapman, Roy A., So. Exp. Station, Customs House, New Orleans, La.
Chase, W. Warren, Div. of Forestry, U. of M.
Clement, Raymond, Minn. Forest Service, St. Paul, Minn.
Duclos, E. P., 3225 Bryant Avenue S., Minneapolis, Minn.
Eaton, J. J., 2228 Langford Avenue, St. Paul, Minn.
Hartupee, Chas. H., Red Wing, Minn.
Himebaugh, W. K. Route 2, Hopkins, Minn.
Holmberg, R. E., Hastings, Neb.
Horton, Gerald S., U. S. F. S., Mio, Mich.
Kaner, Arnold, Cloquet, Minn.
Knutson, Clarence E., Blair, Wis.
Kolbe, Ernest, U. S. F. S., Portland, Ore.
Krueger, Carl G., U. S. F. S., Ishawooa, Wyo.
Lawson, Edward L., Minn. Forest Service, Tower, Minn.
Leaf, Geo., 932 Westminster Street, St. Paul, Minn.
Marttila, Uno, Firestone Plantations, Monrovia, Liberia, West Africa.
Nelson, Stanley C., 3241 18th Avenue So., Minneapolis, Minn.
Orr, Leslie W., School of Forestry, Univ. of Michigan.
Sheridan, E. P., 2526 Bloomington Ave., Minneapolis, Minn.
Swanbeck, H. J., 813½ 12th Avenue S., Minneapolis, Minn.
Verrall, Arthur F., Division of Plant Pathology, University Farm, St. Paul, Minn.
Whitney, Fenton, Prairie City, Ore.
Wilson, Earl G., Division of Forestry, University of California, Berkeley, Calif.

1928

Blatter, Paul, 336 East 5th St., Lewiston, Idaho.
Clark, Edgar, 1006½ South Dakota Ave., Sioux Falls, S. Dak.
Cook, Oliver, 1415 16th St., Minneapolis, Minn.
Cooper, Arthur, Park Board, Minneapolis, Minn.
Deen, Lee J., Yale Forest School, New Haven, Conn.
Deters, Merrill, 1141 Hague Ave., St. Paul, Minn.
Fischer, Wm., Div. of Forestry, U. Farm, St. Paul, Minn.
Foster, Ellery, U. S. F. S., Hayfork, California.
Grant, Albert, Scott Pole Company, Minneapolis, Minn.
Halvorson, George, Page and Hill Pole Co., St. Paul, Minn.
Harvey, Harry, Montgomery Ward & Co., St. Paul, Minn.
Homola, Jerome, Pysht, Washington.
Kirkham, Dayton, Superior National Forest, Ely, Minn.
Knudson, Ray, Manistique Bank Bldg., Manistique, Mich.
Knutson, Clarence E., U. S. F. S., Federal Building, Missoula, Mont.
Knutson, Clifford J., 3236 18th Ave. So., Minneapolis, Minn.
Limstrom, Gustaf, U. S. F. S., Albany, Wyoming.
Lotti, Thomas, Harvard Forest School, Peterham, Mass.
Norgorden, Emil, Veronia, Oregon, P. O. 41.
Piras, Stanley, 83 Douglas Street, St. Paul, Minn.
Rathbun, Harold, National Pole & Tie Co., Minneapolis, Minn.
Rudolf, Paul, Southern Forest Experiment Station, New Orleans, La.
Sheridan, Edgar, 2526 Bloomington, Minneapolis, Minn.
Strimling, Harry, 27 Hyland Ave. N., Minneapolis, Minn.
VanAlstine, J. Neil, U. S. F. S., White Mountains, New Hampshire.
Whitehill, Benjamin, Washakie National Forest, DuNoir, Wyoming.

1929

George, Ernest, Northern Great Plains Exp. Station, Mandan, North Dakota.
Kaufert, Frank, Plant Pathology, Univ. Farm, St. Paul, Minn.
Robinson, Winfield R., James D. Lacey Co., LaSalle Street, Chicago.
Anderson, Waldemar, Division of Forestry, U. Farm, St. Paul, Minn.
Christenson, Clyde, Pathology Dept., U. Farm, St. Paul, Minn.
Crew, John, 3233 21st Ave. S.
Chapman, Dale, Forest Products Laboratory, Madison, Wis.
Hallin, William, Yale Forest School, New Haven, Conn.
Light, James, Indian Agency, Keshena, Wisconsin.
Marks, Elmer, Univ. of Minnesota.
Neetzel, John, Div. of Forestry, Univ. of California, Berkeley, Calif.
Parr, Thaddius, Armstrong Tire Service, Thomasville, Ga.
Peterson, Harry A., 750 Huron Road, Cleveland, Ohio.
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Roan, Audray, c/o Gamble Store, Moorehead, Minn.
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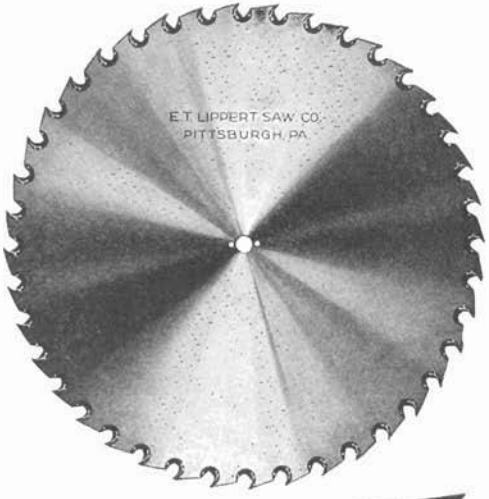

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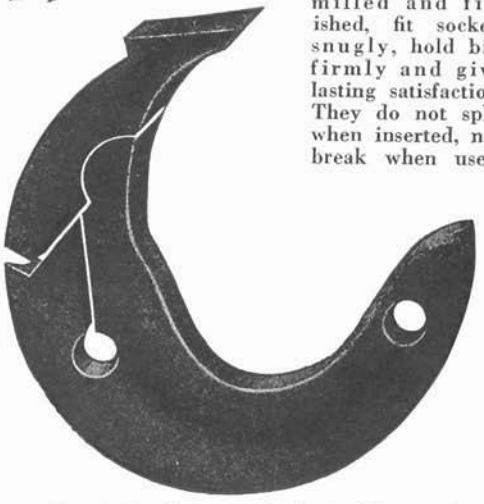

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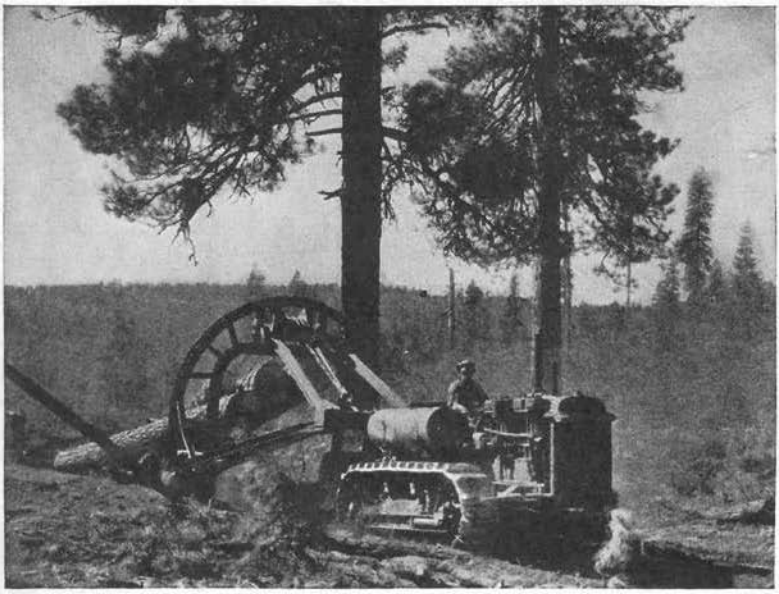

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