

# The Idaho Forester



Associated Foresters

University of Idaho

Moscow, Idaho

1921







IDAHO WHITE PINE



To

Dean FRANCIS GARNER MILLER

*whose high ideals, untiring efforts, friendly cooperation and boundless patience afford a constant inspiration not only to every member of the School of Forestry but also to the entire University of Idaho, this Annual is affectionately dedicated.*



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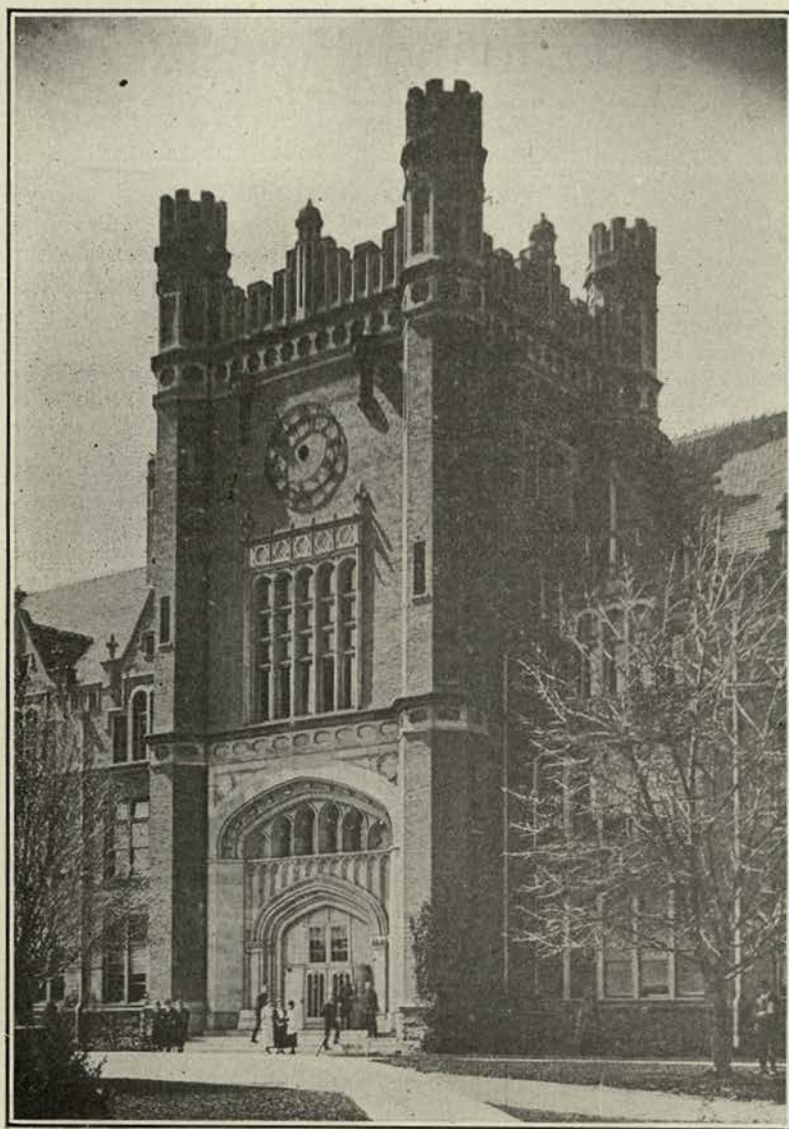
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## CONTENTS

	Page
Idaho White Pine (Illustration) .....	1
Dedication .....	2
Editorial Staff .....	3
Administration Building, University of Idaho (Illustration).....	4
Forestry—Now or Later? C. L. Billings .....	5
The Condition of Our Forests, Earl F. Bradfield, '24.....	8
State Forest Policy, Ben E. Bush .....	9
The Development of the Recreational Features of the State Forests of Idaho, Frank A. Brown, '22 .....	11
The Cut-Over Land Problem, Arlie D. Decker .....	14
The School in 1920-21, Dean F. G. Miller .....	17
Activities of the Associated Foresters .....	19
The Timber Beast Hoedown .....	20
Fifth Annual Banquet .....	20
Movement of Stumpage Prices in the Lake States and the Inland Empire, C. Edward Behre .....	21
Some Unusual Wood Derivatives, Dr. Henry Schmitz .....	26
Time Study of Motor Truck Logging of Yellow Pine, J. P. Drissen, '21 .....	28
Personals .....	29
Xi Sigma Pi .....	31
The Toxicity of Zinc Chloride to Wood Destroying Fungi, C. R. Patrie, '21 .....	31
Stem Form Studies of Western Yellow Pine (Preliminary Report), J. P. Drissen, '21 .....	34
Roster of Students .....	36
Alumni and Former Students .....	37
Advertising .....	38-48



ADMINISTRATION BUILDING  
University of Idaho



## FORESTRY—NOW OR LATER?

### A Plea for a Constructive National Land Exchange Policy

By C. L. BILLINGS, *Land Agent, Edward Rutledge Timber Company,*  
Coeur d'Alene, Idaho

For over twenty years the subject of a National forest policy has in greater or less degree agitated the public mind. Foresters and forest economists have tried persistently to hammer home this great basic truth—that if the United States, as a nation, is to continue to saw lumber, it must, as a nation, provide trees to saw it from.

Yet this same period of agitation has marked the finish of the lumber industry in states which once led the nation in the annual cut of lumber and has marked the serious decline of the industry in many others. And this period, too, has witnessed the growth to high rank of the lumber industry in the Western States.

During this epoch-making period what constructive accomplishments mark the progress of the forestry idea? Two things that overshadow all others: One, the establishment of the vast system of National Forests under the direction and supervision of the Forest Service; and the other, the birth, growth, and finally the enormous expansion of cooperative forest protection by private owners started by a few Coeur d'Alene Timbermen in 1906.

The National Forest idea was transformed into a working national policy in spite of the emphatic protest of the states in which the National Forests were located. So great was the hue and cry and so determined the opposition that when the issue was finally decided the public mind was quite ready to think of other things—and was allowed to do so.

A great victory had been won. A vast national store house full of timber for the nation's coming needs had been placed in competent hands. What more was there to do? With the enormous task of organizing the National Forests for administration before them small blame can be attached to the few foresters available for that task if they did not look about for other fields to conquer. Indeed the private owners had seen the light in the forest protection idea and had started on their own initiative a comprehensive timber protection policy.

A number of history making years in forestry passed by—years in which the facts hammered home in the early agitation had proved themselves and the alleged facts of the same period had also proved themselves—to be wild guesses; years in which to a marked degree foresters had shown themselves competent to run the business of forestry.

But during these same years foresters and forest economists had been slowly taking in the nation's timber store house, and had been carefully measuring the consumption of forest products throughout the land, keeping an anxious eye, too, on the annual fire loss.

Finally the time came to agitate the public mind again. Unfortunately, or fortunately, according to the point of view, the splendid achievements of the foresters during the years immediately preceding were discounted by a few members of the profession who assumed that it would again be necessary to combat the private interests in order to subdue and convert them. At any rate another hue and cry was raised, this time also by the foresters, to hammer home the same basic truth about the relation of the production of lumber to the supply of trees to cut it from.

It was shown quickly and convincingly at the outset that the vast national store house of timber in the National Forests was not so vast after all for after stock had been taken it was necessary to discount liberally enormous areas of water surface, mountain tops, brush and non-commercial timber which were included in the Forests and which, while having a rather indefinite but none the less positive value for recreation, will never produce any lumber for the nation's needs. Speaking in terms of potential forest land—land adapted to and best suited, economically, to the continuous production of forest crops—the supply wasn't going to go around. There wasn't land enough in the National Forests to grow timber in sufficient volume to meet the nation's annual needs.

If this was true, and if the nation's needs were to be met, it was obvious that it was going to be necessary to introduce the prac-



tice of forestry on lands not at the time in government ownership.

In the minds of nearly everyone in touch with the subject this meant that to change the method of handling the forest growth on the land it was going to be necessary to change the ownership of the land itself. Under present tax, economic and financial conditions it is entirely infeasible in most western states, at least, if not in all states, for private capital to interest itself seriously in the uncertain returns available from the practice of forestry. It follows then that if forestry is not now within reach of the private owner the states or the nation or both must undertake it on a scale commensurate with the country's requirements. Since the National Forests provide a splendid nucleus around which to build, government ownership of potential forest land has commended itself to many as the easiest solution of the problem.

Thus the problem itself has become fairly well defined. It involves the transfer to government ownership of a sufficient quantity of potential forest land to provide enough area in the aggregate, with what the government already has, to yield an annual crop at least equal to the nation's annual consumption of forest products.

Various other important factors have a bearing on the problem. One involves the protection of areas of young growth from fire. Enormous areas of reproduction in private ownership have been saved from fire by the cooperative forest protection work of private owners. How much longer will it be possible for the private owners to hold on to these lands? The cost of taxes and protection is out of all reasonable proportion to any value which can be put on these lands under the conditions of past years. They are decidedly expensive lands to own. Yet the lack of a market for them has naturally resulted in no value having been placed on them and carrying charges have mounted steadily higher until they are dangerously near the breaking point. Forest protection by private owners is, and must be, under present conditions, based on the idea of protecting a present asset—merchantable timber. It is fortunate that in some states, notably Idaho, it has been possible incidentally to protect reproduction also. At the present time the larger acreage in the western states is in merchantable timber but this condition is rapidly changing and inevitably the time will come when the larger acreage will be in cutover lands. Right then pri-

mate forest protection will begin to be in danger of falling of its own weight unless some constructive policy is evolved which will fix both a value and a market for this class of land.

The reversion for taxes of thousands of acres of desolate barren wastes in the lake states and in other once forested communities is ample, and should be convincing proof of this.

The time to protect forest growth is undoubtedly when the forest growth is on the land but there must be, for the private owner, some incentive to have it and keep it there.

Another factor involves a phase of the problem which is so important as to be often mistaken for the problem itself—the perplexing question of private ownership of potential forest land within the National Forest boundaries, and immediately adjacent to them on the outside. The location of the National Forest boundaries originally was based not so much on a careful classification of land as on matters of political expediency and compromise and matters of land ownership. Boundaries were often located to exclude large areas of potential forest land because the land was in private ownership and parts of the public domain were left on the outside in deference to local sentiment. Inevitably, however, a large acreage of privately owned land was included inside the boundaries.

The ownership of this land ranges from the individual claim owners with a quarter section or less, to small blocks owned by the lumber companies and on upwards in extent to the enormous checkerboarded grants to the railroad companies.

These lands under the present ownership are an effective bar to the most efficient management of the National Forests just as in many cases the creation of the National Forests placed an effective barrier before the possible development of the privately owned lands. Each is in the other's way in every respect affecting the management of either.

The small claim owner surrounded by National Forest land has no opportunity whatever to either log his claim or sell it except as a part of the natural operating unit in which it may be situated and in the determination of the selling policy of the government as affecting this unit he can naturally have no voice.

What is true of the small owners is true in the same degree of the larger owners. The checkerboard situation has often prevented



large drainages, some of them containing several hundred million feet of timber from being properly administered and developed by either owner.

Still another aspect of the problem is the effect if any which the proposed exchanges would have on local tax receipts. Unquestionably the states and counties stand to win in the long run through the placing of additional areas of forest land under management. The share in the gross receipts from the National Forests which is distributed to the counties on an acreage basis already in some localities amounts to more than the taxes would come to if the land were privately owned. As cutting progresses and the present areas of private timber are changed into areas of cutover land this condition would undoubtedly in time be universal if the history of the older forested regions is to be repeated in the new.

And so with the problems and all its various corollaries, before the nation some program must be worked out in solution. Much has already been done in outlining a policy which has received the cordial support of the lumbermen, pulp and paper people, the wood using industries, foresters and thru the forestry associations the general public. The point of attack centers in the Snell Bill introduced in the House of Representatives at the last session by Representative Snell of New York. This bill provides for two things of especial interest and importance so far as this article is concerned. One is the proposal for a very greatly increased participation by the Federal government in private forest protection; and the other is a provision for the authorization of a general land exchange policy.

Increased Federal participation in private protection work is to be predicated largely on the extension of this work to include areas of immature timber and while it will be appreciated and welcomed by the private owner, had the bill not also included the land exchange section, he might well have wondered why the private owner should protect young growth at all if he could never realize on his investment in it.

The land exchange section of the bill is as follows:

"That the Secretary of the Interior be, and hereby is, authorized to accept on behalf of the United States, title to any lands within or adjacent to exterior boundaries of National Forests if in the opinion of the Secretary of

Agriculture, the public interests will be benefited thereby and the lands are chiefly valuable for national forest purposes, and in exchange therefor may give not to exceed an equal value of such national forest land or timber or assignable certificates for timber within the national forests as may be determined by the Secretary of Agriculture and accepted by the owner as fair compensation, consideration being given to any reservations which either the grantor or the government may make of timber, minerals, or easements. Such assignable certificates for timber shall be issued under the authority of the Secretary of Agriculture, shall be for the agreed value at their face value when accompanying bids for the purchase of national forest timber or in payment for national forest timber purchased under existing laws and regulations. Any timber given under such exchanges shall be cut and removed under the direction and supervision and in accordance with the requirements of the Secretary of Agriculture. Lands conveyed to the United States under this section shall, upon acceptance of title, become parts of such national forests as the Secretary of Agriculture shall designate:

"Provided: that the Secretary of the Interior shall report to congress annually the quantities of such land exchanges as are consummated and the names of the parties thereto."

The wording is broad and sufficient and avoids the restricting limitations which were the faults of the bills passed some years ago. One of these, the Forest Reserve Lieu Selection Act, provided for exchanges on the basis of equal area. Obviously it was nearly impossible to work out a fair trade on that basis. Another law required both equal value and equal area. Trades on this double basis were as a general rule physically impossible.

The bill would supplant some thirty other local bills now pending in Congress which affects an individual National Forest or two. It is broad in the sense of territorial application.

The authorization is provided in sufficiently broad wording to take care of all the embarrassing situations we now have. The small claim owner who cannot now dispose of his claim could exchange it all—land and timber—for an equal value of assignable certificates or for an equal value of timber which he could log himself. Large drainages now checkerboarded could be blocked out for operation by the private owners or for more effi-



cient administration by the Forest Service. Relief for both the government and the private owner could be had for a distressing situation which obtains throughout the National Forest region.

But, far more important than the vexing local problems of operation and administration, the bill, through its land exchange section, will show daylight ahead to the private owner in the protection of his cutover lands at the same time that it provides on an adequate scale for the growing of the nation's timber of the future. This will be the saving factor in the whole present situation of the

national forestry idea. While ways and means, policies and practices, responsibilities and liabilities are being worked out, it will be possible to go ahead and keep trees growing on the areas which are to hold the nation's timber supply of the future.

Now is the time for the inauguration of a policy under which the young timber now growing can be kept green by providing its owners with an incentive to protect it. This is much more important than any question of responsibility or of methods at this time. As the Milwaukee Sentinel has most aptly said, "The time has now come, not to quibble, but to grow trees."

## THE CONDITION OF OUR FORESTS

By EARL F. BRADFIELD, '24

In order to decide for ourselves whether the statement that our forests are nearing exhaustion is a bugbear created by the large timber owners, or not, let us consider the following facts.

The original forests of the United States are estimated to have covered 822 million acres. In a little more than three hundred years over two-thirds of this area has been cut over, culled, or burned. We have left 463 million acres of forest land of all sorts which contains about 2,214 billion feet of merchantable timber. Three-fifths of the timber originally in the United States is gone.

Our annual wood bill includes more than 40 billion feet of lumber, 87 million hewed railroad ties, 4 1-2 million cords of pulpwood, besides that which is imported, and 110 million cords of fuel. The pressure of the war brought the per capita consumption of timber down to 300 board feet yearly and the country has suffered for it in the shortage of homes and the curtailed output of many industries.

In the face of these figures, Mr. Average Citizen will raise the cry—"But we are just commencing to use the enormous timber supply of the western states." In answer to this, it can be said that we have already made large inroads into the timber of the western states. As the forests of the East gave out, the forests of the South and then those of the West were called upon to supply the deficiency and now that we must look to the Northwest for a

large part of our timber supply, the average cost of transportation of our lumber to consuming markets in the middle west has risen from \$3.00 per M ft., board measure, in 1905 to \$13.00 per M today.

The true index of timber depletion is not quantity but availability. Our remaining timber is so localized that its availability to the average user of wood, and therefore its national utility, is greatly reduced.

With these facts in mind, Mr. Average Citizen, when you consider that three-fifths of our timber resources have been squandered; when you have to pay an increase in rent to the landlord, who takes advantage of the shortage of homes; when you have to pay the increased price on lumber due to the rise in transportation cost; don't you think that it is time for some action to be taken on the question? Are you willing to stand idly by, wringing your hands and crying out what a shame it is that our forests should be so wastefully managed or will you put your shoulder to the wheel, advocating that Congress provide for:

1. The reforestation of the denuded lands, which at the present time are doing no one any good;
2. Protection of the remaining supply of timber;
3. The insuring of a fair priced crop of timber for the future; and do your very best to see that the measure is passed?



## STATE FOREST POLICY

By BEN E. BUSH, *State Land Cruiser*

In considering the question of a state forest policy for Idaho, a simple statement of the basic facts about Idaho's timber is necessary. Of the total land area of Idaho, 43 per cent. is timbered, thickly or sparsely. Of this timbered area, about 80 per cent is included in the National Forests of which there are 19 wholly or partially within the state. The remaining 20 per cent is owned by the State or private individuals. The acreage in the National Forests is approximately 18,000,000 and that outside about 5,000,000. Of this 5,000,000 acres outside of the National Forests about 40 per cent is held by operating companies in large blocks of from 20,000 to 200,000 acres. This comprises the choice timber of the state and was acquired by men of long experience in the lumber business after careful consideration of availability, stand and quality. Altho only 40 per cent of the area, this represents approximately 75 per cent of the timber value in the state outside of the National Forests. The State owns 700,000 acres of timber land or 41 per cent of the forested area outside the National Forests. The value of the state holdings is better than the average value of the timber lands of the entire state, but not so high as that of the lands owned by the large companies. The balance belongs to small holders of all kinds, persons holding from a forty acre tract to two or three sections. This last is of poorer quality and stand of timber and probably worth only 10 per cent of the total value outside of the National Forests, altho comprising 46 per cent of the area.

There are 130 billion feet of timber in the entire state. The state holdings amount to 11 billion feet, 3 billion feet of which are white pine.

There are four large interests affected by the state's forest policy; first, the National Forests; second, the state; third, the larger operating companies; and fourth, the individual owner of the small tract.

The Forest Service through its several National Forests is interested in a supply of timber for the industries of the entire nation for all future time and this will necessitate reforesting both burned and cutover land. This can be done through keeping down fireing the young growth and in sales made at

losses, by proper methods of silviculture, and possibly by planting.

The state is interested in a future supply of lumber for industries in a minor way, but is primarily interested in the state, a permanent institution and securing revenue from its grant lands to apply to funds for which these grants were made.

The larger operating companies are interested in a minor way with perpetuating the lumber supply and with keeping the lumber business at its present large scope but their primary interest is revenue from their operations.

The individual owner is interested in a minor way with the first two agencies, but his primary interest is revenue from the sale of his timber. In a great many cases, the individual owner is interested in the agricultural value of the land and is anxious to get the timber removed so that he can clear the land and in some cases he is slashing the timber and clearing the land where he gets no return from the timber.

The state is heartily interested in keeping the timber supply such that it will be one of the main industries for all time to come.

It is not the policy of the state at this time either to purchase land for reforesting or to do planting, though this may come at some future time. It is not believed that planting is practical at this time.

The state is now, and has for the past fifteen years, been carefully guarding its own timberland, both green and cutover, from fire and encouraging private owners to do the same. As a whole, the state now has a very effective system of fire prevention and the writer has no hesitancy in saying that the state and the larger private holdings are more effectively protected than the National Forests.

Until the last few years, the greater part of the timber cut for lumber has been from land that is naturally agricultural and there has not been much attention paid to preserving young growth, but as operations gradually work back into the more mountainous districts that are only fit for reforestaton and grazing, the state is looking toward preserv-



this time is requiring the purchaser to pile and burn brush in such a way as to preserve the timber too small for logging.

This is an established policy of the state in sales of state timber and so far as possible the state is trying to get operators to follow this course on their own land. It is doubtful if operators can be compelled by law to do their logging in any certain way as long as they do not endanger other owners in the district where they are logging.

The conditions are quite different in the district north of the Salmon River from that south of the river in two ways. The reforestation conditions are much better in the northern part of the state where the rainfall is greater and the soil is more adapted to growing timber. The waters in the northern part of the state are not used for irrigation purposes and we are not particularly interested in conserving forested watersheds for this purpose. In South Idaho, the reforestation is much slower, but the state is much interested in keeping the higher ranges timbered to conserve the snow for a later run off for irrigation purposes.

The writer thinks that it is necessary that a law be passed by the next legislature to enforce an adequate patrol of all timbered lands. However, it is very necessary that this be an equitable law that will not work hardship on the owner of inferior timber. Many of the smaller owners would be too glad to have their timber burned as they see no chance of getting any value from the stumpage but are anxious to clear the land.

There is naturally a conflict between the four classes of owners in the way of securing title to timbered lands and the proper disposition of them after the title is secured

and for this reason the state will naturally have to be independent in its actions.

As an outline of what the writer thinks should be done by the state toward shaping a forest policy, the following might not be out of place:

(1) The state should act alone as outlined above through its constituted authority, "The State Board of Land Commissioners."

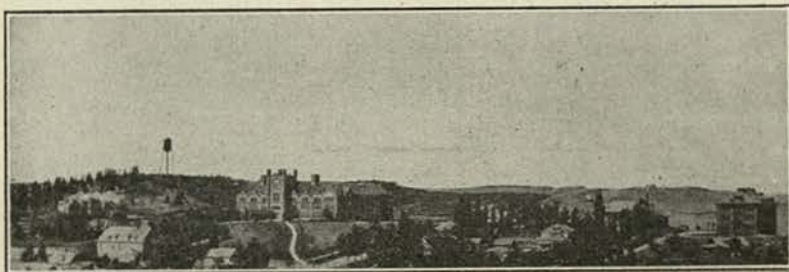
(2) The state should prepare and submit to the next legislative session a Forestry bill.

This bill should provide for a State Forester.

To avoid conflict of authority, and comply with the constitutional provisions affecting the handling of state lands, this forester should be the State Land Commissioner, an officer of the State Board.

The state should be divided into two districts. The lands of the northern part of the state present entirely different conditions from those of the south. In the north, the soil is more of a volcanic ash, the rainfall is greater, the soil holds moisture better and the reforestation conditions are much better. In the south, the soil is more of a decayed granite nature, the rainfall is less, the runoff is quicker and the reforestation conditions are much slower. All the streams in the south have irrigation dependent upon them and the preservation of the green cover on the watersheds is vital to the people. Each of these districts should have a deputy forester. Each deputy should have two or three men under him in training for forestry work, and these should constitute the state's timber force, and serve as an advisory board to the State Board of Land Commissioners on timber matters.

Should these ideas be carried out, the state can then approach and solve other problems which may come up from time to time with confidence of acting wisely.





## THE DEVELOPMENT OF THE RECREATIONAL FEATURES OF THE STATE FORESTS OF IDAHO

By FRANK A. BROWN, '22

The people of America are awakening to the value of the recreational use of the public forests. In the older countries, where public forests have existed for centuries, their recreational use has always been recognized. The mountains, glaciers, lakes, streams, woods and natural parks contribute largely and effectively to human health and enjoyment.

Up to the last few years, little attention has been given to the recreational value of the forests of the west because of their abundance and the lack of development of the country. Now, however, with the more intensive development of towns and cities in the west, the need and demands for outdoor recreational facilities greatly increase. This means that the public forests, which are the property of the people, should be developed so as to make them accessible and useful to the great majority of citizens.

The Federal Government has recognized the need and value of the use of public lands for recreation by the establishment of National Monuments and National Parks. The former are established by presidential proclamation, a notable example being the Grand Canyon of the Colorado in northern Arizona; the latter are created only by act of Congress, and are more extensive in area. National Parks and National Monuments are set aside for the primary purpose of preserving and protecting for all time the nation's best points of scenic attraction in order that they may be enjoyed by everyone.

The National Forests, on the other hand, were created for the primary purposes of timber production, grazing and watershed protection. The fundamental policy on which the National Forests are operated is to develop their resources for the greatest good to the greatest number in the long run. In line with this policy, the U. S. Forest Service has recognized that recreation should stand with timber production, grazing and watershed protection as one of the major utilities of the National Forests and now considers the development of the recreational features one of the more important lines of activity.

Many cities over the country have taken leases on forest tracts for municipal play-

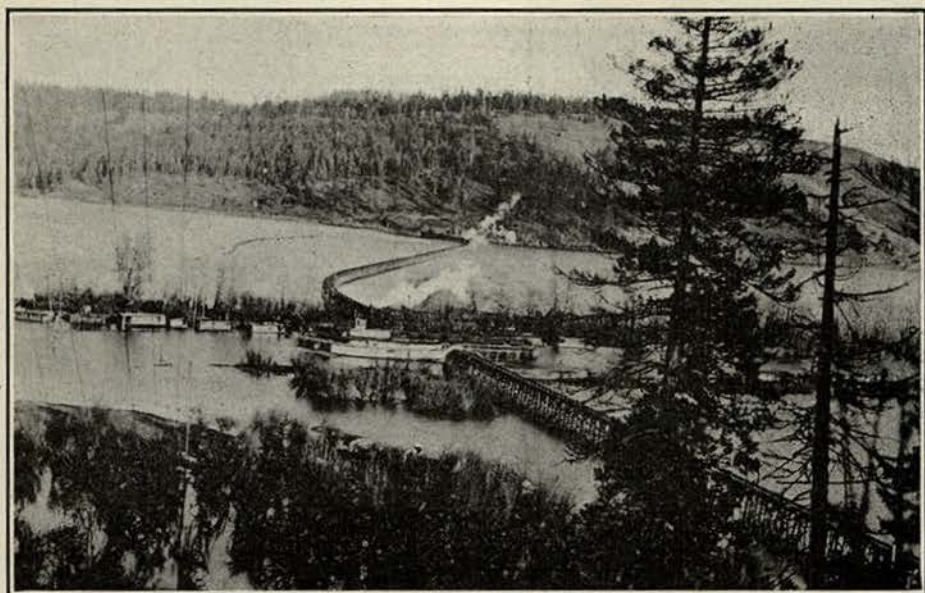
grounds. And, of course, many cities have extensive parks within their limits for such purposes.

State activity along this line has been largely confined to the East where the more intensive development of the country has made the need more urgent and apparent. The western states, altho possessing large area of forest land, have given little attention to their development for public recreation and little pressure to do this has been felt because the activities of the Federal Government in the National Monuments, National Parks and National Forests have taken care of the needs of this new country well in advance of the demand. Now, however, the western states are realizing that a great service can be rendered the people within their borders by opening up the forest lands for park purposes and making state forests more accessible for public use. Idaho has taken the lead in this work in the West by planning the development of two areas of state land, one in the northern and one in the southern part of the state.

### Heyburn Park.

In 1909, the State of Idaho purchased an area of 7,840 acres, including land and water, in the northern part of the state and dedicated it to the people for their use and enjoyment. This area is called Heyburn Park in honor of the late Senator Heyburn. It was created out of the Coeur d'Alene Indian Reservation by Act of Congress passed April 30, 1908, and purchased by the State of Idaho by Act of Legislature, approved March 16, 1909. This park embraces Chatcolet, Hidden and Benewah Lakes, all of which are tributary to Lake Coeur d'Alene. It is easily accessible to a large population, including northern Idaho and eastern Washington. The ideal summer climate, beautiful scenic features and its accessibility is rapidly making it very popular as a summer playground. The park is under the control of the State Department of Public Works, and is governed by rules and regulations provided by the department, and enforced by the Park Superintendent. The camp grounds have been developed considerably for the convenience of the public. These improve-





DRAWBRIDGE AT CHATCOLET, HEYBURN PARK, IDAHO

ments include the construction of roads and trails, building of boat landings and the development of watering places.

At the request of the State Department of Public Works, the School of Forestry of the University of Idaho in the summer of 1920 made a reconnaissance of Heyburn Park. A careful estimate of the timber on the tract and a topographic map of the entire area were made as a basis for future management. It was recommended as a result of this reconnaissance that lots for summer homes be laid out in certain favorable localities which were designated upon the map, and that a system of uniform lot rentals be adopted. The construction of cooking fire places, making of sanitary improvements, the development of drinking water supplies and the construction of better landing facilities on the lake shore were also recommended. In addition, plans for the construction of an attractive archway at the entrance to the park, for swamping out of camp sites and drive ways and for road development were submitted.

#### Big Payette Lake.

Payette Lake is situated about 90 miles north and 5 miles east of Boise. It is easily accessible, both by auto roads and railroad. It has an altitude of 5000 feet, ideal climate for a summer resort, wonderful scenic attractions and splendid recreational features. The state lands about Big Payette Lake are being

extensively used as playgrounds by the people of southwestern Idaho. These lands consist of about 15,000 acres, which include some 14 miles of lake front, one-half to two-thirds of which are suitable for camp grounds. The rest of the lake front, comprising 6 to 7 miles, is owned privately and generally used for summer home purposes. The number of tourists visiting Payette Lake has been increasing annually till they now number many thousands per season. This resort is destined to become one of the most popular playgrounds of the Northwest.

In the summer of 1918, protests were entered by tourists against the cutting of the timber along the lake shore. The Columbian Club of Boise took up the fight and carried it to the State Board of Land Commissioners. The Land Board called on the School of Forestry to make an investigation of the cuttings. This was done the latter part of February, 1919, by Dean F. G. Miller, who reported that aside from a narrow strip along the lake shore the rest of the tract should be cut, provided the cutting was done under regulations which would protect the young forest from damage due to logging and insure forest renewal.

In the latter part of May, 1919, a party of foresters and practical lumbermen, at the invitation of the State Land Commissioner spent three days in a tour of inspection of the tract and reported back to the land commissioner its findings and recommendations. One of this



committee's recommendations was that a topographic survey and timber estimate of all the state lands adjoining Big Payette Lake be made and that a definite policy for the development of the recreational features of these lands be compiled at the same time.

Accordingly, in the summer of 1919, under a cooperative agreement between the State Land Board and the School of Forestry of the University of Idaho, the School of Forestry put a party in the field for the purpose of making the studies recommended. As a result of these studies, the following recommendations, among others, were made: That the

timber sales be managed so as to conserve the scenic features of the area as much as possible; that the area be made into a state park and designated as "Payette Lake Park"; that a Park Superintendent be appointed; that sanitary conditions be improved; that additional domestic water supply be provided; that a permanent survey be made which would locate and stake the lots, additions, roads and trails, mark the location of public camp grounds, wells, sanitary latrines, garbage pits, cooking fire places, public landing places and such other improvements as will be necessary for the development of this area as a permanent recreational center.

#### FLY SPECKS

"Ten little flies  
All in a line;  
One got a swat!  
Then there were —

Nine little flies  
Grimly sedate;  
Licking their chops;  
Swat! Then there were —

Eight little flies  
Raising some more;  
Swat, swat! Swat, swat!  
Then there were —

Four little flies  
Colored green-blue;  
Swat, swat! (Ain't it easy?)  
Then there were —

Two little flies  
Dodge the civilian—  
Early next day  
There were a million!"



## THE CUT-OVER LAND PROBLEM

By A. D. DECKER, *Land Agent, Potlatch Lumber Company, Potlatch, Idaho*

One of the greatest and most perplexing problems now confronting lumbermen, foresters, forest economists, conservationists, as well as federal and state authorities is the question as to the proper policies to adopt in the administration and economic usage of the thousands of acres of cut-over lands of the nation. It is axiomatic, of course, that all land should be put to its highest usage and on this judicious usage depends the welfare and prosperity of the country. With reference to cut-over lands much thought has been given but a great deal remains to be done in furthering its reclamation or reforestation. At this time, however,—as never before—much public attention is being given toward the reclamation of large areas of unproductive land having potential agricultural value and the reforesting of such areas as are typical forest land. Well defined bills embodying the above policies are now before Congress.

It is self-evident that in the determination of any land policy for any particular tract of land or forest the underlying problem is that of land classification. What constitutes potential agricultural land and what is true forest soil are much mooted questions among foresters, agriculturists and soil experts. Ultimate decision must be guided by the future economic needs to be served as well as the present demand. By improved methods of husbandry and more urgent demands on the soil our barren unproductive areas of today may be the garden spots of tomorrow.

In the three northwestern states alone it has been conservatively estimated that over one-half million acres are cut annually. It is perfectly safe to assume that at least one million acres are added to this area every three years. A survey of these lands throughout the country shows that among the thousands of acres of timbered lands that are being transformed annually into logged-off areas there is a large acreage of potential agricultural land capable of reclamation and development. These lands in several of the northern counties of Idaho, as well as in other timbered regions of the West, represent one of the greatest latent assets. The ultimate reclamation of these lands will, in a measure, offer a partial solution to the problems confronting us of in-

creasing our supply of food stuffs and the perplexing condition of unemployment and industrial unrest.

The gradually increasing demands upon the soil of America can well be shown by a glance at the late census reports. The constantly increasing population of the United States has grown from 5,000,000 in the year 1800 to 106,000,000 at the present time and during this period has pushed in its westward movement from the Alleghenies to the Pacific. With this gradual but constant westward movement of our settlement the agricultural demands of the people have been met by drawing harder and harder on our new lands. The original settlements closely followed the prairie lands along the river banks and gradually pushed upwards to the higher and poorer upland soils. The late reports with reference to Idaho show an increase of 36.7 per cent in the number of farms during the past decade. In the complete list of states showing increases in new farms Idaho stands third, having 12.7 per cent of the total increase of the United States. Naturally the larger increases are found in the irrigated districts where new lands are being reclaimed, large farms divided and more intensive methods of agriculture practiced. The growth is not here alone, however. In Latah County, as in a few other counties having a large percentage of improved wheat lands, many new farms are reported but the consolidation of wheat land into large ranches outnumber the new farms and no increase is shown in the reports. Old Bonner County which is now Bonner and Boundary, and was almost totally a timbered county, shows an increase of 357 farms. Kootenai, another timbered county out of which Benewah was created, shows an increase of 525 farms since the year 1910. These figures are conclusive proof of the demand for unimproved cut-over land and are a criterion of the success being obtained in their reclamation. We have reason to believe the demand for new land will continue to grow.

From the standpoint of food production there are numerous opinions with respect to the present-day need of encouraging the extension of the farm area of the country. Agricultural economists contend—and it is



generally admitted—that the agricultural output of the United States could be doubled by thorough and more intensive farming methods without reclaiming an additional acre of raw land. To accomplish this, however, would necessitate double the available farm labor. Even though the demands for this increased production existed the supply of labor would be problematical. If transient labor were to be depended upon entirely our labor conditions would not be bettered. The division of our larger ranches into smaller farms would offer a partial solution since there are thousands interested in agricultural pursuit who are only desirous of working on land which they own or will eventually acquire title to. Many of these are men of very ordinary means who cannot meet the swollen values in the better agriculturally improved regions. They prefer to join the pioneer class, buy unimproved land on easy terms and eventually acquire title to it.

At this time there is much agitation encouraging the young men and especially the ex-service men back to the farm. The Government encourages this movement and in furtherance of its policy has under consideration extensive plans and legislation for the securing of homes for these men. Several colonies and settlements for these ex-service men have been started which are meeting with varying degrees of success. The United States Chamber of Commerce has gone on record recently as favoring a national system of reclaiming waste area and provision for the work is embodied in the McNary Western reclamation bill now before Congress.

The McDevitt soldier settlement project, located in Southern California, is attracting considerable attention at this time. This tract constitutes 6,000 acres of reclaimed land recently put under irrigation. Many ex-service men enrolled in vocational agriculture at the various colleges throughout the country under the provisions of the rehabilitation act are now being transferred to the project. These men will be assigned a piece of land, receive instruction in agriculture and eventually gain title to the tract they operate. Directors of vocational training in the Northwest are looking into the practicability of such a plan on some of the logged-off tracts.

In any settlement plan the first problem of the State and private operators is to induce only country-minded settlers of the right kind to take up this land. They must then give

them the proper inducements, guidance and cooperation in furthering their development work. To the man who has been struggling against adverse city conditions with neither money, equipment nor experience the task of subduing new land is a difficult one. If it were not, the trend of settlement would not have been from the country toward the cities. The right kind of stuff has won and will win however, even under the adverse conditions. All localities, to a certain degree, have gone through the same stage of pioneering that the stump ranchers are enduring today. We have only to look over our better developed agricultural districts and look at the transformation and development during the past twenty years. Those farmers who were then combating stumps, adverse markets and poor transportation and have stayed with their land have been transformed from struggling interest payers to money loaners.

In the appraisal of these lands all factors and conditions affecting the land must be given careful consideration and a final price set at such a figure that a reasonable return of interest on the capital invested can be expected after all costs incidental to the subduing of the land have been considered. Since practically all settlers are not in affluent circumstances, most of the lumber companies and large owners of logged-off land have adopted the policy of selling these lands on easy terms covering a period of ten years with a low rate of interest on deferred payments. These lands sell at prices ranging from \$10.00 to \$20.00 per acre for the better lands. Lands suitable for grazing are sold at prices ranging from 50 cents to \$10.00 per acre. Purchasers of this class of land have been having varying degrees of success throughout the West depending largely on their ability, initiative and methods pursued. Those familiar with the problems to be met generally discourage the process of a large outlay for teams and equipment at first. In the process of subduing land there is an intermediate stage between waste and complete reclamation where the land can be utilized as pasturage and made to produce the first year. This is accomplished by burning the brush and slashing late in the autumn and seeding the land to timothy and clover. This system lends itself admirably to the dairy and poultry business and is equally good from the standpoint of meat and wool production. This pasturage system greatly improves the land by the addi-



tion of nitrates to the soil. By this system the land is soon put into a state of production and the stumps can generally be worked out without a large expenditure. Such a deferred system of clearing gives the settler an opportunity to avail himself of additional employment in the camps and lumbering operations and at the same time gradually gain his objective of complete reclamation and eventual ownership.

After a few years improvement work on the property the land values rise so that the debt may be taken over by the Federal Land Bank of the district on its usual basis of loans, equal to fifty per cent of the sale value of the farm checked up by its earning capacity. This system gives the settler a very low rate of interest and extends the time of payment over a period of from thirty to forty years under the amortization plan of retiring interest and principal. Many settlers avail themselves of these loans.

Up to this time the future use of cut-over land with potential agricultural value has only been discussed and nothing said regarding the problems incidental to the administration of the vast acreage of typical forest lands suitable only for grazing purposes or reforestation. In the latter class falls the larger percentage of cut-over lands in the West. If this forest land were owned by the public the administration for future forest crops would be comparatively simple—but such is not the case. When we come to consider that 97 per cent of the total amount of timber and other wood products cut and used in the United States are taken from privately owned lands; that less than 2 per cent of the sawmills of the country are operated on public forests, and further that the private owners hold four-fifths of the standing timber, one realizes that the large bulk of the cut-over land is privately owned. Any policy, therefore, dictating the management, protection and reforestation of these lands must have the support of the majority of the private owners. It is not supposed that an owner can be compelled to develop and perpetuate his timber land at a financial loss. If reforestation on privately owned land is desired, concessions must be made by the State and the enterprise made to pay, as it has done in other countries.

It is readily seen that this land in the cut-over condition is not profitable to the State, community or the individual owner. It pays but little in taxes, is a great fire risk and is rather a menace than an asset to a community.

The carrying charge on land in this condition is a dead expense to the private owner and the only chance for revenue is through scanty grazing fees. With the constantly increasing taxes and expenses of fire protection the natural policy to pursue is to dispose of the lands as soon as possible. However, at this time progressive lumbermen are entirely in sympathy with sound forestry policies and are ready to encourage, eager to initiate and anxious to participate in any program likely to lessen the future possibilities of forest depletion. The very stability of the industry depends upon such action. Practically all operators feel, however, that under existing taxes fire risks, markets and business conditions they cannot change their present methods. These lands were purchased to exploit the timber with no thought of securing a second crop and the mere appeal in behalf of the public good does not interest the stock holder to the extent that he cares to invest his money in such a long time investment with its uncertainties. As stated before it must be made to pay. Under these conditions, therefore, it is reasonable to assume that the practice of forestry must be made a function of the State and Federal government to a large extent.

It is a commendable fact, however, that most of the cut-over lands of the West are embodied in well organized and efficiently administered timber protective associations which in cooperation with the State and Federal authorities have these lands under some system of patrol. As a result of careful protection large areas of cut-over lands are reforesting naturally. Experiment station records show that in the case of white pine and Douglas fir—our two most valuable western species—second crops may be secured naturally by careful brush disposal and fire protection. The germination starts from the seeds stored in the forest floor which remain fertile for several years. These seed must be protected from heavy fire, however. Some protective associations, however, pay but little attention toward the protection of cut-over areas but with additional funds more effective methods can be adopted. Effective fire protection is the keynote of any reforestation plan.

The extent to which private capital can be interested in the administration of these cut-over areas for reforestation is as yet problematical. As an inducement, however, certain legislation is now proposed by Congress and several states to cooperate with the private



owner in a forestry program. Realizing that confiscatory taxes is one of the great hindrances in interesting private initiative in reforestation, some states now propose tax reforms by which an annual tax will be levied on the land only and all taxes on growing timber will be deferred until cut. The timber tax would then be figured as a certain percentage of the market value of the stumpage. Others propose legislation whereby all taxes both on land and growing timber would be exempted until the timber is cut. The total tax would then be levied against the timber. In this connection it is interesting to note that California now proposes to amend its Constitution to enable the separate taxation of forest land and timber on the land. The specific resolution now before the legislature provides that "the legislature shall have power to provide by general and uniform laws for the taxation of land, on which there is standing young timber or mature timber, separately from the timber and for the taxation of the timber at the time it is cut or utilized only."

In the furtherance of any national policy a broad program must be initiated providing for the cooperative administration of public and private forests. Holdings will have to be consolidated and exchanges made between owners for administrative reasons. A very comprehensive national forest policy embodying the general land exchange plan and designated as

the Snell Forestry Bill is now before Congress and will undoubtedly receive favorable action. This bill provides for a national forestry policy covering such features as cooperation between the federal government, states and private owners in fire protection and forestry measures. It further provides for a general timber survey and study of the requirements of the nation, arranges for forest research and investigations including the study of forest taxation, affords funds for the reforestation in the national forests and authorizes the acquisition of lands by exchange when clearly in the interest of the public. This bill has been referred to as "the greatest forward step in forestry in many years". It is receiving the support of practically every interest by virtue of the fact that the legislation contained therein is sane, conservative and fair to all concerned.

Such legislation will enable large acreages of cut-over lands suited only for tree growth to be acquired and included in our national forests for reforestation. It will further encourage fire protection on all forest areas. These accomplishments together with the centering of the attention of the public upon the importance and need of forest conservation should have a profound beneficial influence on a forestry program with reference to these one time forest areas which are now lying idle and unproductive.

## THE SCHOOL IN 1920-21

By F. G. MILLER, *Dean*

The current year has again shown substantial growth in the School of Forestry. This is reflected first of all in the fact that the enrollment this year represents an increase of about 60 per cent over that of last year both in the number of resident students majoring in the School, and in the total number under instruction in forestry.

### Enrollment for the Past Two Years.

	1919-20	1920-21
Students in Regular Curricula	37	55
Students in Ranger Course	6	14
Students in Correspondence Course	19	45
Students from other departments	34	38
Total under forestry instruction	96	152

The national character of the School is indi-

cated by the fact that the 69 resident students majoring in forestry the current year come from 15 different states, and if the 45 correspondence students are added, we find 25 different states and Canada represented, facts which show that the School is becoming widely known.

### Additional Instructor.

The rapid growth of the school made it necessary to add an instructor in forestry January 1, and through the courtesy of the U. S. Forest Service the University secured the service of Mr. J. B. Taylor, Forest Examiner, for a four months' period. Mr. Taylor filled the place so acceptably as to cause general regret that he could not see his way clear to accept a permanent appointment. The position will, however, be filled before the opening of the university next fall.



### Special Lecturers.

Other assignments from the Forest Service included J. A. Fitzwater, Lecturer on Forest Management; C. K. McHarg, Lecturer on Forest Administration; and C. C. Delevan, Lecturer on Forest Protection, each giving a series of eight to ten lectures, all of which were highly instructive, and proved to be a feature of the year's work.

### Courses for Federal Board Students.

At the request of the Federal Board for Vocational Education, the school is offering forestry courses especially designed to meet the needs of men receiving instruction under

County. It is planned to make similar studies of the rest of the University timber holdings in the near future. These reconnaissance studies have been an important factor in the development of the school and have served to emphasize the state wide character of its field.

### Research.

With due appreciation of the importance of research in forestry, the University has adopted a policy whereby the forest faculty will be given the summer months for work of this character. The work of instruction will very properly continue to occupy the major portion



CLASS IN TIMBER ESTIMATING IN THE FIELD

the Rehabilitation Act. The courses cover two years and are arranged in units consisting of approximately nine weeks each. About 25 men are taking advantage of these courses this year, and another contingent will enter next fall. Their objective is primarily the position of forest ranger.

### Reconnaissance Studies.

In response to a request from the Department of Public Works, a reconnaissance study was made last summer of Heyburn Park, and recommendations have been made for the development of the recreational features and for the management of the timber resources. The school also cruised and mapped, in the summer of 1920 over 18,000 acres of state timber land, mostly that of the University, in Clearwater

of the time of the faculty during the University year. However, it is hoped that enough time will be available outside of class-room duties, which with the summer period will enable the members of the faculty to give approximately one-third of their time to research work.

The coming summer Dr. Schmitz will remain at the University to continue his researches in forest products, while Prof. Behre and Dean Miller will cooperate with the U. S. Forest Service in a study to determine the minimum silvicultural requirements to secure forest renewal following logging operations. Dr. Schmitz has been permitted temporary use of a separate building as a Forest Products Laboratory, and equipment will be installed this summer. The building has concrete floors



and is otherwise so constructed as to answer quite well till a permanent Forest Products Laboratory can be provided. An additional laboratory for forest engineering and mensuration will be fitted up in Morrill Hall this summer.

#### Student Employment.

Practically the entire student body will be employed in some phase of forestry work this summer, the most of them with the U. S. Forest Service. They will not only acquire much practical experience in this way, but will earn a considerable part of their expenses for the coming year. There is thus empha-

sized the importance of attending school where the forests are found. Situated near extensive national, state, and private forests, and large logging and saw mill operations, as the Idaho School is, there is afforded unusual opportunity for summer employment, and the expense to the student of getting to and from the field is slight.

#### Prof. Behre and Dr. Schmitz Promoted.

In recognition of their very efficient service since identifying themselves with the school, Prof. Behre has been advanced to the position of Associate Professor of Lumbering, and Dr. Schmitz to that of Associate Professor of Forest Products.

## ACTIVITIES OF THE ASSOCIATED FORESTERS

The Associated Foresters of the University of Idaho have completed another successful year of their history. The plan of holding regular meetings once each week during the afternoon was abandoned in favor of biweekly meetings in the evenings because of conflicts in schedules of classes. These evening meetings combined the social features of the special meetings of last year with the business and educational features of the regular meetings.

In addition to the regular meetings, several special meetings were addressed by men prominent in the lumber industry or the U. S. Forest Service during the year. The year's social activities included a dance and a banquet, detailed accounts of which may be found below. One of the special events of the year was a two reel motion picture depicting the methods of creosoting wood for various purposes, secured thru the courtesy of the Barrett Company. The attendance at all the meetings was excellent and the success of the club will be assured as long as a good attendance can be maintained at the meetings.

The officers who led the club through the year were: President, J. P. Drissen, '21, Harrison; Vice President, J. W. Farrell, '22, New Meadows; Secretary-Treasurer, Edward T. Nero, '22, Moscow.

The following calendar of the club's meetings gives the speakers and the subjects of their addresses.

November 18. Prof. F. W. Gail, "Meteorological Studies of the Distribution of Tree Species near Moscow, Idaho".

December 2. Prof. H. C. Dale, "Factors Affecting the Downward Trend of Commodity Prices".

February 4. J. B. Taylor, "The Forest School at Edinburg University, Scotland".

February 9. N. H. Coleman, President, Loyal Legion of Loggers and Lumbermen, "Present Conditions in the Lumber Industry".

February 11. Fred Morrell, District Forester, Missoula, Montana, "Problems of Personnel in Organization". H. R. Flint, Forest Examiner, Missoula, Montana, "Fire Protection Plans for the Coming Season".

February 14-19. District Forest Inspector, J. A. Fitzwater, of Sandpoint, Idaho. Ten lectures on timber sales and working plans for the Pend d'Oreille National Forest.

February 31-March 5. C. K. McHarg, District Forest Inspector of Coeur d'Alene, Idaho. Series of lectures on policy and activities of the U. S. Forest Service.

March 7-9. C. C. Delevan, Fire Assistant, Coeur d'Alene National Forest. Five lectures on "Fire Protection".

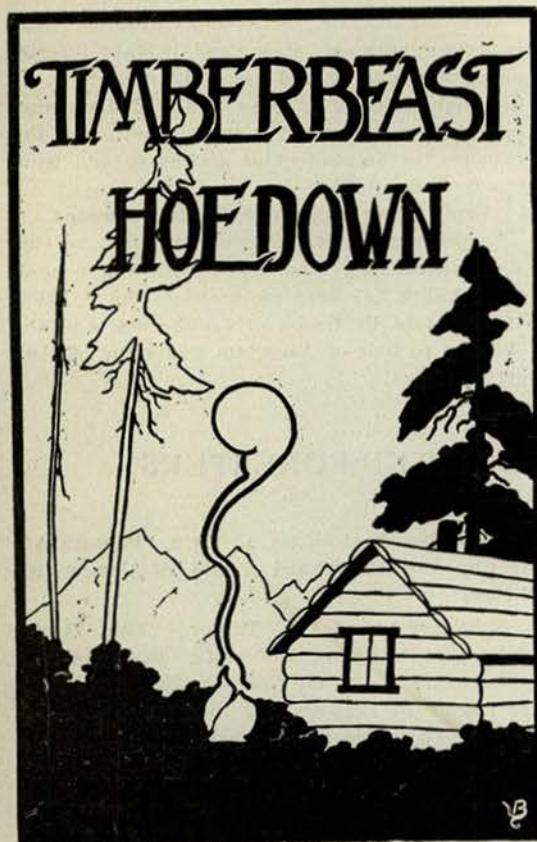
March 12. Thomas Jackson, Logging Engineer, Rutledge Timber Co., Clarkia, Idaho, "Wire Rope for Logging Use."

March 17. C. L. Billings Land Agent, Edward Rutledge Timber Company, Coeur d'Alene, Idaho, "Land Exchange Legislation".

April 28. Prof. J. W. Barton, "Applying Psychology to Industry". Motion Pictures, "Preservative Treatment of Wood".

May 25. W. D. Humiston, Assistant General Manager, Potlatch Lumber Company, Potlatch, Idaho "Fire Protection to Save our Forests".





The fifth annual dance of the Associated Foresters, known on the campus as the "Tim-

berbeast Hoedown", took place on March 5 in the University gymnasium. As predicted last year when circumstances forced the foresters to put on a civilized dance and allow attendance in dress suits and boiled shirts, this year's affair was a reversion to type and all the Timberbeasts were on hand in full regalia, except that hobnailed boots had to be checked at the door in deference to the basketball floor.

Well in advance of the event, the Timberbeasts had gathered their forces and brought in from Moscow Mountain an abundance of evergreen branches which were used to decorate the hall, and transform the prosaic lines of gymnasium apparatus into a veritable glen of verdure.

The programs were novel souvenirs and attracted the admiration of all who attended—consisting of thin pieces of Idaho white pine, upon one side of which the accompanying cut was reproduced in its exact size and upon the other the order of the dances was arranged under a modified "Form 820-U. S. F. S."

The dance was one of the most successful of the college year in point of attendance and "pep" and maintained the enviable record which the Timberbeasts have made for themselves in college circles. The patrons and patronesses were Dean and Mrs. Miller, Prof. and Mrs. Behre and Prof. and Mrs. Schmitz.

## FIFTH ANNUAL BANQUET

The Associated Foresters of the School of Forestry of the University of Idaho held their fifth annual banquet on Wednesday evening, March 16, at Lindley Hall, the University's new dormitory building. The affair was attended by over fifty of the students, alumni and faculty and guests of the School of Forestry and a most interesting and valuable program was enjoyed by all.

The list of speakers included A. H. Upham, newly appointed president of the university, who spoke on "Forestry and the University". J. H. Forney of Moscow, the university's first president, who congratulated the School of Forestry on the remarkable progress which had been made in the last few years; J. P. Drissen of Harrison, President of the Associated Foresters, who outlined the activities of the

Forest Club; A. D. Decker, an alumnus now with the Potlatch Lumber Company at Potlatch, Idaho, who discussed the training of a forester; L. F. Parsons of Moscow, Executive Secretary to the President of the University, who pointed out the great influence the forests of Idaho had exerted upon the development of the state and stated that they were contributing one-fourth of the cost of maintaining the state and the university; Ben E. Bush of Moscow, State Land Cruiser, whose topic was "Forestry and the State" and Chas. L. Billings of the Edward Rutledge Timber Company of Coeur d'Alene who discussed forestry legislation.

The policy of the state board of land commissioners in regard to the state lands was stated by Mr. Bush to aim to protect these



lands and conserve their productive capacity and potential value with the object of ultimately turning them over to the U. S. Forest Service in exchange for National Forest timber or assignable timber certificates of equal value.

Mr. Billings stated that the forestry bill which had been introduced in the recent session of the state legislature and supported by the University, the U. S. Forest Service, the

Protective Associations and the lumber manufacturers had failed because of lack of confidence and understanding on the part of the general public. He stated that it was the duty of every man with forestry training to help educate the public to a fuller realization of what forestry means and of its economic importance to the nation and he called on each man present to shoulder his share of the responsibility in furthering the forestry movement.

## MOVEMENT OF STUMPAGE PRICES IN THE LAKE STATES AND THE INLAND EMPIRE

By C. EDWARD BEHRE, *Associate Professor of Forestry*

Within the last year several valuable contributions have been made to our knowledge of the economics of lumber prices which enable us to forecast with some assurance the probable general course of prices for the future. Professor R. C. Bryant of the Yale School of Forestry in a paper on "Lumber Prices" in the *Annals of the American Academy of Political and Social Science* for May, 1920, pointed out that past movement of lumber prices had been in cycles corresponding to the movement of the center of production from one section of the country to another. At the beginning of these cycles, the center of production is moving to a point relatively distant from the center of consumption and the prices of lumber tend to rise rapidly and diverge markedly from the level of the "all commodity" group. Toward the end of the cycles, the movement of the center of population westward nearer to the center of lumber production and further from the point of manufacture of the other commodities tends to retard the rise of lumber prices and bring the level of the "all commodity" group up to it. Toward the end of the cycles, moreover, lumber from more distant regions begins to compete with that near by and this interregional competition tends to keep prices down until the exhaustion of the supply in the nearer region removes the competition and enables the producer in the more distant region to pass on to the consumer increased freight rate and production charges which he has been shouldering to some extent in order to market his product.

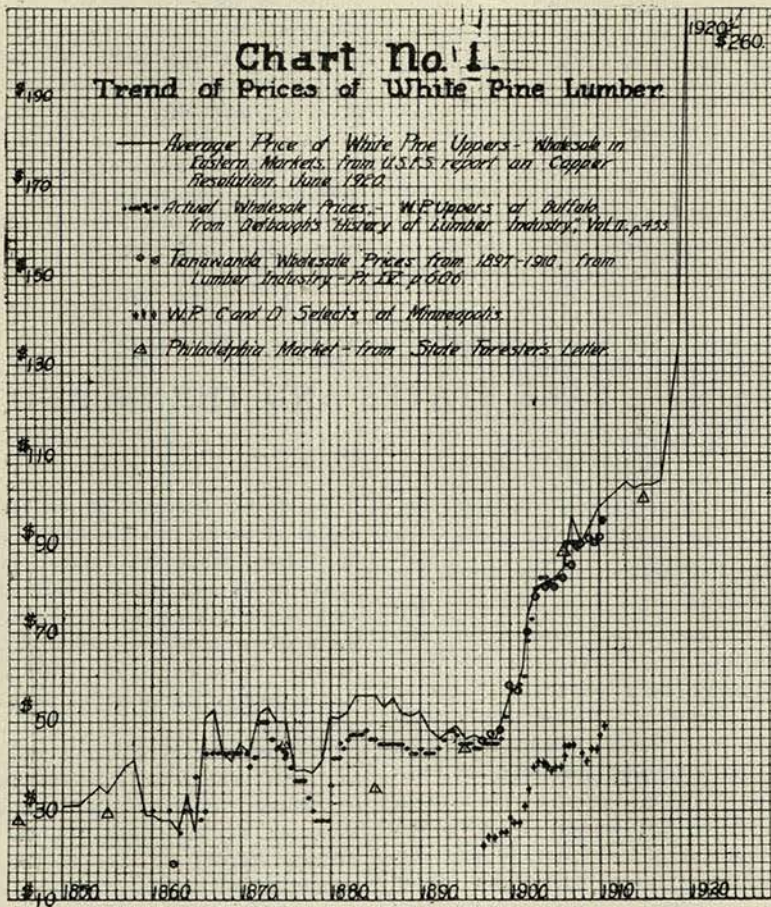
Such a cycle was observed from 1860 when the lumber industry of the northeast failed

to meet the demands of the country and the center of production moved to the Lake States, until 1880, when the lumber industry in the Lake States was at its height, and again from 1880, when the center of production moved to the southern pineries, until 1916. All indications point to the opening of a third cycle now that the center of production is moving to the northwest.

The periodic fluctuation of lumber prices has also been ably discussed under the head of "Forest Depletion and Lumber Prices" by Forester W. B. Greeley in the U. S. Forest Service Report No. 311 to the Senate, commonly known as the "Capper Report," and in a paper on "The Movement of Softwood Lumber Prices in the Middle West," by O. M. Butler of the U. S. Forest Products Laboratory at Madison, Wis., which appeared in the *Timberman* for Jan. 1921. The cycles described are shown graphically for white pine upper grades on eastern markets in Chart No. 1.

From these studies we can conclude that when the instability of the reconstruction period is passed a new level of lumber prices will be established which will hold with only slight fluctuations for a considerable period into the future while the level of the "all commodity" group may be expected to continue to rise according to general economic laws. This comparatively level period will not be followed by another steep rise as in the past but a more gradual rise of prices following more closely the general trend of the "all commodity" group may be expected because the last great reservoir of virgin timber has been tapped and interregional competition will not operate as in the past. R. B. Goodman be-





lieves that the future advance of lumber will raise its position in the commodity scale at the rate of 1 per cent per year.

It is the object of this paper to analyze the relation between these movements of lumber prices and stumpage prices in different sections of the country in order to indicate what may be expected in the future and how the conditions as we find them may effect the future of forestry in this country.

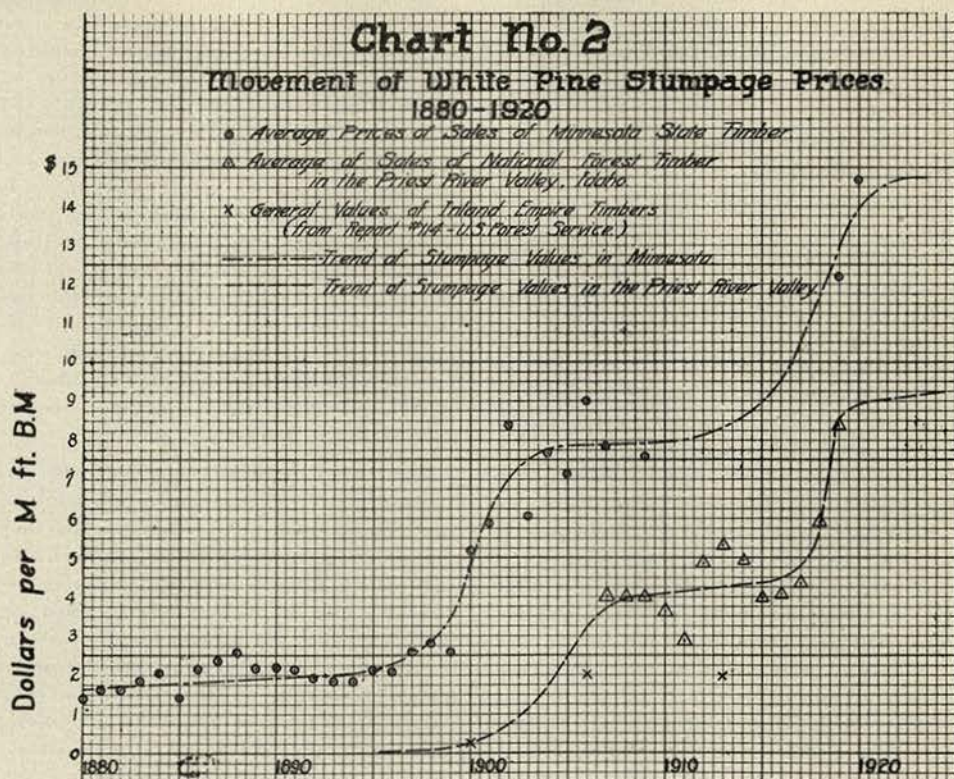
Reliable information on the movement of the average stumpage prices in any region is quite scarce. However, general information secured from various publications and letters from the State Foresters of some of the eastern states are interesting in indicating possible and probable future trends in stumpage levels. The average stumpage prices received from the sale of state white pine timber in Minnesota from 1880 to 1920, and the average of sales of National Forest Timber in the

Priest River Valley, Idaho, since 1907 are shown in Chart No. 2.

The data compiled by D. T. Mason in his report on the Lumber Industry in the Inland Empire show a general decline of stumpage prices on the national forests in that region between 1907 and 1915 but since that time prices have advanced rapidly to more than the 1907 levels. Mason's data show an average stumpage price of \$4.00 per M in 1909 on sales with more than 25 per cent green white pine which falls to \$2.00 in 1915. At present, the stumpage price of white pine in the Inland Empire ranges from \$6.00 to \$11.00 per M and prior to 1900, stumpage had almost no value, purchases of large areas being made at prices averaging \$0.25 to \$0.50 per M.

Mr. W. O. Filley, State Forester of Connecticut, states that stumpage for white pine in Southern New England had advanced from \$1.00 per M 30 years ago to \$10.00 to \$17.00





at present. The class of material being sold at these prices is small second growth stuff practically all of which is cut into round edges box boards.

J. H. Foster, State Forester of New Hampshire, states that stumpage prices in that state have increased from \$2.00 per M to an average price today of \$8.00 to \$12.00 per M for a greatly inferior grade of pine.

In Minnesota the following average stumpage prices are given by W. T. Cox, State Forester:

1870-1880	\$2.00 per M
1880-1890	3.00 per M
1890-1900	3.00 to 5.00 per M
1900-1910	5.00 to 10.00 per M
1910-1920	10.00 to 15.00 per M

Gifford Pinchot, State Forester of Pennsylvania states that even as late as 1860 to 1875, large quantities of white pine timber were sold at 50c per M stumpage in Pennsylvania while it is fair to assume that the present average stumpage price of virgin white pine in that state is around \$60.00 per M. But in regard to the way in which the rise in stumpage took place Mr. Pinchot says, "The increase in

stumpage prices did not keep pace with the increase in market prices. It lagged behind and it was not until the virgin supply of timber was practically exhausted that a marked increase took place in stumpage prices."

The interesting points that may be deduced from Chart No. 2 and this information are that the price curve for the Priest River Valley is similar to that of Minnesota sales but from 10 to 15 years behind it, that second growth box board material in New England is bringing nearly twice as much as the best of the virgin timber in Northern Idaho, and that marked stumpage increases in eastern states took place following the removal of the center of production to a more distant region.

The influence of the cycles of the general lumber price movement is reflected in the data available on stumpage prices. The sales of Minnesota state timber were at practically a constant price level from 1880 until 1899, which corresponds to the period of level prices of white pine lumber indicated in Chart No. 1. Then Minnesota stumpage prices took a rapid rise and fluctuated between \$7.00 and \$9.00 per M from 1902 until the end of the



record in 1909. The figures quoted by the Minnesota State Forester, however, show that within the past decade another rapid rise in price has taken place corresponding to the beginning of the third cycle in the general price movement of lumber.

The data on Priest River, Idaho, sales follow the same tendency. Before 1900, stumpage in the Inland Empire was practically worthless, very few sales being recorded, and from 1900 to 1906 there was a rapid rise which Mason attributes to the general business prosperity of the country during that period which was marked by the rapid buying of stumpage in the Inland Empire. This rapid buying of stumpage in the West, however, was also directly the result of the exhaustion of the supply of the Lake States, and so comes back to the original correlation of the stumpage price movement with lumber price cycles.

From 1907 to 1917 prices fluctuated about \$4.00 per M, becoming considerably lower as pointed out by Mason in the period of depression and overproduction between 1909 and 1915. Naturally enough, the level of Priest River prices during the second cycle was lower than the Minnesota price level, because of the relative inaccessibility of the region. With the coming of the new cycle, however, differences in price levels between the two regions will probably be lessened by the movement of the center of population and consumption westward, the relocation of wood using industries in the West and the reduction of the relative difference in the length of haul to market from the two regions. That this may be expected, is further indicated by the fact that at present, prices in the Lake States are about the same as prices in New England, whereas at the beginning of the second cycle they were much lower, just as prices in the Inland Empire are now much lower than those in the Lake States.

In order to understand what the developments in the future will probably be we must consider the relation between stumpage prices, lumber prices and the accessibility of the timber. The price of lumber in any market is directly dependent upon the cost of getting it to that market and in this cost will be included the cost of logging just as much as the freight charges on the manufactured products. In other words, lumber prices will go up when the cost of logging is increased by the necessity of going further into inaccessible timber, because stumpage values will not go

down except as they may be influenced temporarily by excess mill capacity and potential over-production, which Mason points out caused the decline of stumpage prices in the Inland Empire between 1909 and 1915. Thus, altho the stumpage price in any locality is figured from the average selling price of lumber less the costs of production, in reality it is dependent upon the cost of the marginal product of zero stumpage value because the price of lumber is determined by the cost of getting to the market the most inaccessible timber which must be logged to fill the demand of the market. This relation was very forcibly discussed by R. B. Goodman in a lecture on "The Price of Lumber" before the Yale School of Forestry, 1920.

Thus, when between 1890 and 1900, the exhaustion of the supply of white pine in the Lake States made it necessary to log the relatively distant timber of the southern pineries and Inland Empire, lumber prices in eastern markets rose to a point determined by the cost of getting the southern and western timber to them, and the stumpage prices on the remaining stands of local timber in the Lake States took a rapid rise, because they were then relatively much more accessible than before. In the same way, before this took place, stumpage prices in the Lake States were kept rising with the general rise of other commodities by the fact that the accessibility of the stands within that region was decreasing and exerting a restraining influence on the rise of prices and because inter-regional competition was tending to hold lumber prices down. Now again prices on eastern markets are pushed up by the moving of the center of production to the northwest, and with this new move, the remaining stumpage of the Lake States, altho it was all inaccessible in 1880, is again placed in a position of much greater advantage, and so takes a new bound to the present levels. For the future, it would seem that stumpage prices in the Lake States and the East will not take another rapid rise for the same reason that lumber prices will not do so, but that a gradually increasing advantage in relative position will accrue to stumpage in the Lake States and therefore a gradually increasing price may be expected. This increase will take place as the price of lumber is forced up by the gradually increasing cost of the marginal product from the more inaccessible areas in the West.

At the same time that stumpage for the



region in general is enjoying this increasing advantage, individual stands within the region itself and individual trees within given stands are reaching the point where they can be profitably harvested because the marginal product is coming from every region and as R. B. Goodman puts it, "zero stumpage is found in the most remote tree or the most inaccessible tree, or smallest sized, or the poorest quality tree of every region now being logged." This means also that new stands which may be grown in this region on the more accessible areas, which can be harvested at much less cost than the marginal product described by Mr. Goodman, will have a margin between selling price of lumber and costs of production sufficiently large to cover all the costs of establishing, protecting and carrying them to maturity. Therefore as each increase in price bid for lumber creates additional supply by making it possible to market lumber bearing higher costs of production and transportation, or timber of poorer quality, it also justifies the expenditure of an increasing amount for the production and protection of new stands and places forestry on a more profitable business basis for the private owners.

That then marks the probable tendency in the East as determined by conditions in the West, but how will stumpage prices move in the West? Mason shows that because of the enormous area of timber land per capita in the Inland Empire, this section must always be an exporting region, and therefore its stumpage prices will be determined by the price of lumber on markets of the Mississippi Valley. The studies of lumber prices showed that lumber prices will remain fairly constant for a period after reconstruction and then will gradually increase because of the increasing costs of getting the more inaccessible timber to the mill. We have assumed that this would be necessary to keep stumpage from falling or in other words, the stumpage in the West would probably remain about on the same level as at present. Mason points out also that stumpage values in the West will be held relatively low by potential overproduction in the industry, and by the high freight rates which it will always have to pay to markets. Mason did not foresee the recent rapid rise in prices, altho he allows for a probable increase of Inland Empire stumpage to \$8.00 to \$12.00 per M, not considering what fluctuations may take place in the dollar standard.

The recent rapid rise may be attributed to two reasons: first, another period of stimulated demand for stumpage similar to that of 1905, caused by the decline of the southern pine region as the lumber producing center of the country, and by relatively high profits in the industry attracting new capital into it and creating additional competition for the raw material; and secondly, by the decrease in purchasing power of the dollar which has caused a rapid rise in all commodities in this period. This period of rapid increase has now been passed, however, stumpage has fallen somewhat and when readjustment is completed the factors will be working in the same way as described above and outlined by Mason, so that we may look for nothing but slight increases in stumpage in the future, which will be caused more by changes in the gold supply of the world, and the standard of the dollar than by scarcity of timber.

But this statement which applies to average stumpage prices for the region, does not alter the general proposition of the difference in position of individual stands and individual trees within the stands of the region. Therefore the future will find inferior trees now unmerchantable coming into the market and also second growth stands of no present value, being logged with as much profit as the then remaining virgin stands in less favorable positions. In addition growing trees as a crop in the more accessible areas will become more and more attractive to capital because the costs of growing the crop will offset the increased cost and greater investment in improvements required to log the more inaccessible virgin stuff which will in turn become poorer in quality and smaller in size, and therefore more comparable to the second growth, as logging recedes up into the mountains.

But in the Capper Report it is pointed out that lumber of the same grade is selling at a much lower price in forested regions close to the source of supply than in the distant markets. If this is so will not the second growth as it becomes merchantable have to sell at a lower price than the virgin timber imported from distant regions? In answer to this it can be said that in the importing regions the second growth will not have to sell in this way unless its volume is sufficient to transform the locality once more from an importing to an exporting section because the price advantage which forested regions now have over



non-forested regions holds only while these regions are exporters with abundant supplies of raw materials in which growing costs have not figured. By the time this easily reached virgin supply is exhausted from the last of our exporting regions the cost of the marginal product will have advanced to the point where growing of forests as crops will have become

the general rule throughout the country, timber production will not be concentrated in any one or two regions but will be quite generally distributed and the price of lumber will be determined not by the marginal product as defined at present but by the cost of growing, protecting and carrying the new crops to maturity under the most adverse conditions required to meet the demand of the market.

## SOME UNUSUAL WOOD DERIVATIVES

By HENRY SCHMITZ, *Associate Professor of Forestry*

During the last few years, we have grown quite accustomed to hearing about unusual products made from wood. For example, we are no longer surprised to walk into an operating room and see the doctor use a wood pulp substitute for absorbent cotton. And I do not use the word substitute in any other sense than to indicate that it is used in the place of absorbent cotton. It is in no way inferior to absorbent cotton and even excels the latter product in its rate of absorption and in the total absorbing capacity.

We are no longer surprised to find that the artificial fibre silk hose which we wear may be a product of wood cellulose. Even dresses, shirts and many other articles of wearing apparel have their ultimate origin in some stately tree of the forest. It is not claimed that fibre silk is superior to silk, it having only about 40 per cent of the wearing qualities of the genuine article, but it is much cheaper, looks very well and is easily dyed.

Then, too, it is quite common to read of paper underwear, and even of outer garments made more or less from paper pulp. Paper rugs adorn our floors and we only too often walk on them with the paper heels of our shoes. Wood flour, a substance made by finely grinding wood is an important constituent of linoleum. Paper wash lines are very common and indeed superior to all others, their surface being much smoother and consequently easier to keep clean. These lines are, of course, waterproofed. The packages we receive from the grocer may be wrapped with the aid of paper twine and, if we can take as true that which we read about conditions in Germany during the war, these packages may have contained some form of wooden food.

If a hardwood such as beech, maple, or birch be heated in a closed vessel in the absence of air and the gases which are evolved

passed through a condenser several products are formed. First, a gas is obtained which is inflammable and which may be used as a substitute for coal gas; secondly, a liquid is formed; and lastly, a charcoal residue remains. This charcoal is used in the manufacture of steel, it may be used in medicine, and we may even feed it to our chickens.

We are primarily interested in the liquid obtained, for this contains the beginnings of an almost infinite number of chemical substances. To begin with, the liquid contains an aqueous and an oil fraction which may easily be separated. If ordinary lime is added and the mixture be redistilled, the wood alcohol may be separated from the mixture and a substance known as calcium acetate remains. Some twelve gallons of alcohol may be obtained per cord of wood and this product will be referred to later.

Let us confine ourselves to the calcium acetate and see what can be done with it. If it be treated with an acid, acetic acid may be obtained. As is well known, ordinary vinegar is merely a dilute solution of acetic acid. Acetic acid is also an important organic chemical. If the acetic acid be treated with ordinary ammonia, ammonium acetate is formed which is used in medicine as a sudorific. When ammonium acetate is distilled acetamid, another important organic chemical is formed. When acetic acid is treated with the proper iron salt, ferrous acetate is formed which is used as a mordant in dyeing. Aluminic acetate may also be formed directly and this substance is used in calico printing, in dyeing and in medicine as an astringent. By treating the acid with metallic lead, lead acetate, or sugar of lead is formed. This is quite a poisonous salt and also finds application in the treatment of various ailments such as the effects of poison ivy or poison oak.



Sodium acetate may be still further treated with phosphorous oxychloride and acetic anhydride is produced. Acetic anhydride is a chemical reagent of great importance.

If now we refer back to calcium acetate and heat it, an important liquid known as acetone is produced. Acetone is extensively used as an organic solvent, for example to remove spots from clothes, in the manufacture of smokeless powder, and as a solvent in the manufacture of varnishes. It is also interesting to note that during the war acetone was practically the only solvent used in the manufacture of aeroplane dope, which is nothing more than an acetone solution of cellulose acetate, also a wood derivative.

Acetone may be treated with ordinary bleaching powder and chloroform is produced. Besides being a valuable anesthetic, the liquid is also an important organic solvent. Then, too, acetone may be heated with iodine and lye, and iodoform, a very important disinfectant is produced.

Let us now consider briefly the case of methyl or wood alcohol. Wood alcohol is, of course, extensively used as a fuel and in the manufacture of paints, varnishes and paint and varnish removers. It can also easily be oxidized with formic acid and formaldehyde, an important preservative and disinfectant, produced. Going a step further, formaldehyde may easily be converted into para-formaldehyde, also an important disinfectant. Methyl alcohol is used in the manufacture of coal tar colors as a denaturent for grain alcohol, and it may be converted into methyl ether which is extensively used in the manufacture of ice.

The oily fraction obtained in the original distillation of the beech wood also has some uses. In the crude form it is, to a limited extent, used as wood preservative, as fuel, or it may be separated into its component parts, one of which is the well known beech wood creosote.

If a resinous wood such as pine wood is heated as previously discussed, little or no wood alcohol or acetic acid is produced, but substances of an entirely different nature. One of the more important products is oil of turpentine, which is most widely used in the manufacture of paint. At the present time, however, considerable quantities of camphor are synthesized from turpentine. Oil of turpentine is also quite widely used in medicine.

After the turpentine is removed from the

distillate, wood creosote and wood tar remain. These substances also have enormous economic value. Mixed with various pigments, they form the common shingle stain; used directly, they act as wood preservatives, embalming fluids, or tree sprays, and have many other similar uses. They may be, and are, also used in the flotation process in the separation of metals such as zinc, nickel, lead, etc.

Ordinary wood sawdust may also be treated with acid and a part of the cell wall substances are converted into fermentable sugars. The acid is neutralized, the sugar solutions concentrated and fermented. Thus ethyl or grain alcohol may be produced from wood with a yield of eighteen to twenty gallons per ton of wood. The sawdust residue also has a value as a cattle food and recent tests show that they not only like it, but get fat on this food.

Starting with ethyl or grain alcohol, an almost infinite number of substances may be produced. To go through this list, would be more or less repetition of that which has been said before and it will be sufficient to merely enumerate the most important of them. Treating it with sulphuric acid, ethyl ether is produced, which is an important anesthetic, and used in medicine as Hofmann's drops, for ice machines and in the manufacture of collodion or "new skin". Grain alcohol may be oxidized to form acetaldehyde and then para-aldehyde used in medicine as a soporific. Indirectly chloral hydrate, also a soporific and antiseptic, may be made. An endless list of other products may also be formed.

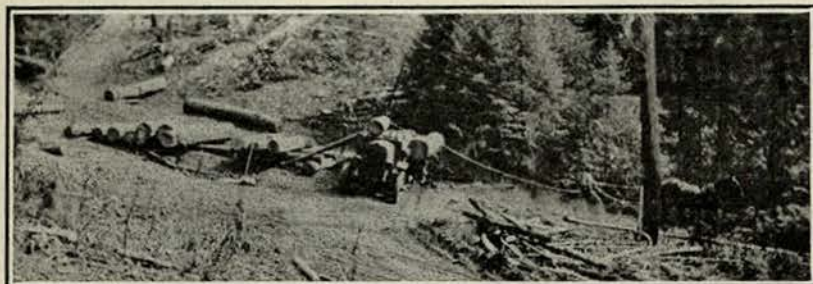
If wood cellulose be treated with nitric and sulphuric acids, cellulose nitrates or gun cotton are produced, which recent tests have shown to be quite equal to that produced from cotton. Cellulose nitrate is not only the basis of smokeless powder, but it is also the basis of celluloid, artificial ivory, artificial leather and numerous other important products.

Thus, it can easily be seen to what an extent we are dependent upon the forest for many substances not ordinarily associated with it. The reason this fact is so often overlooked is because of the great number of steps between the raw product and the ultimate substance. However, were we denied all the products obtained either directly or indirectly from wood, we would immediately realize to what extent our daily activities are associated with the forest.



## TIME STUDY OF MOTOR TRUCK LOGGING OF YELLOW PINE

By J. P. DRISSEN, '21



During the summer of 1920, the writer made a detailed study of the operation of motor trucks for hauling logs. The operation studied was in a yellow pine forest near St. Maries, Idaho, in timber averaging 5.82 logs per M. A 3 1-2 ton Day-Elder truck without trailer was used to haul the logs from skidways in the woods over an ordinary country road to a landing on the river bank. The object of this time study was to determine accurately just how much an auto truck will haul at different distances. The logs hauled were cut in 12, 14, and 16 foot lengths, but mostly 16. The timber was chiefly western yellow pine, together with a smaller amount of white fir and white pine. The logs were skidded by horses from 1-8 to 3-8 of a mile and loaded on the truck from the skidways. Loading was by cross haul, the truck driver and tail-down man doing the loading. During the first nine days of this study, corner bind chains were used to hold the load to the trucks. Then automatic drop stakes were put on the bunks reducing the net time of trips about 1.1 per cent as well as making it much easier to load. Wrapper chains on the loads were not used.

Hauling was done from three principal skidways, over a country road and the logs dumped directly into the river. Some little time was lost at the river due to the landing becoming jammed but no allowance has been made for that because circumstances made it impossible to go with the truck and record the time spent at the landing. For convenience, the skidways will be called Numbers 1, 2, and 3, and represent a haul of 440, 560 and 1160 yards respectively. All distances were paced. Skid-

ways 1 and 2 were each about 80 yards off the main road and at a considerable elevation above it. It was necessary to turn the truck around on the main road and then back up to skidways. In wet weather, the cross haul team was required to help the truck up from the main road to the skidways. The main road was in good condition with no adverse grades. However, it was narrow and had many sharp turns, which caused considerable delay due to slowing down and sometimes having to stop in order to pass cars going in the opposite direction. The last 100 yards out to the landing was over a rough corduroy which had to be pulled in low gear.

The weather for the most part was dry and clear. In all, there were about 6 days when the roads were slick or soft enough to interfere with the hauling. On these days, lighter loads were hauled and tire chains put on. Three skidding teams were used to stock the skidways, but there was a great deal of lost time due to the fact that the skidway crew was not sufficient to get the logs to the skidways as fast as the truck hauled them away. There was on the average 8.16 minutes lost per trip. This time of waiting for logs was longest on the shorter hauls. The truck could haul between 15000 and 16000 ft. per day of 8 hrs., and 4 teams should have been used to bring out this amount without delay.

The operation of the truck was timed from July 19 until September 10, during which time 379 trips were made, hauling a total of 400,370 ft. log scale. The actual time spent in hauling was 209 3-4 hours, or an output of 1908 ft. per hour.



Table I is a summary of the results obtained. The time of hauling was taken as the time consumed in hauling the load to the landing, unloading and returning to the skidway. The time of loading was measured from the time the motor stopped until it was again started, but time lost waiting for logs was not included in these figures.

Table I.

Skidway No.	1	2	3	Total all Skidways
Distance hauled (yards)	440	560	1,160	
No. loads .....	42	190	147	379
No. logs .....	287	1,034	1,009	2,330
Total scale .....	47,660	195,110	157,600	400,370
Av. logs per M.....	6.02	5.30	6.40	5.82
Av. logs per load....	6.83	5.44	6.86	6.15
Av. scale per load ....	1,135	1,051	1,073	1,056
Av. scale per hour....	2,191	2,098	1,658	1,908
Av. time of hauling per M. ....	27.38	28.59	36.18	31.43
Av. net time of trip..	31.07	29.36	38.78	33.20
Av. net time of loading	15.62	11.85	14.12	13.15
Av. net time of hauling	15.45	17.51	24.66	20.05
Av. lost time per load..	14.26	7.93	6.73	8.17

Table II shows the output per effective hour and the time required to haul one thousand feet board measure for different distances.

Table II.

Distance Hauled in yards	Output per hour B. M.	Time of hauling per M. ft. B. M. in minutes
300	2320	26.0
400	2230	27.0
500	2140	28.0
600	2060	29.1
700	1980	30.2
800	1900	31.4
900	1830	32.6
1000	1760	33.9
1100	1690	35.3
1200	1630	36.8
1300	1570	38.3
1400	1510	39.8
1500	1460	41.4
1600	1400	43.0
1700	1350	44.7

For Table II, the output per hour was plotted on cross-section paper as ordinates, with distance hauled as abscissae and a smooth curve drawn thru the three points furnished by the data from each skidway. Values for distances from 300 up to 1700 yards were read from this curve. As a check, the time of hauling per M feet was plotted upon distance, as before. These values were then divided into 60 to give output per hour. It was found that these computed values correspond very closely to those read from the first curve.



## PERSONALS

H. W. Staples, '20, and C. R. Patrie, '21, have been reengaged for the summer for timber sale administration on the Coeur d'Alene National Forest. J. P. Drissen, '21, will accept a temporary appointment with the U. S. For-

est Service for either brush disposal work on the Coeur d'Alene or fire protection on the Pend d'Oreille. Staples, Patrie and Drissen all passed the Forest Assistant examination in March with good grades.



Frank A. Brown, '22, will have charge of an extensive survey to secure working plan data on the Selway National Forest this summer. The country will be covered by a four-man crew, working individually and running strips at one-half mile intervals with drainage for control. Russel Parsons, '22, will be a member of Brown's party for this survey.

Floyd Cossitt, ex '21, gave up his scaling for the Potlatch Lumber Company in order to go back to the Selway National Forest where he will act as assistant ranger this summer. He will return to school again in the fall.

A. S. Daniels, '23, will also return to the Selway for the summer to handle the commissary at Pete King Station.

W. Byron Miller, '22, took the examination for Grazing Assistant in April and has been notified that he passed with a good margin of safety. Pending an appointment, he will be employed on grazing reconnaissance in Utah for the summer.

James W. Farrell will be a member of a party to lay out a series of sample plots on the Cache National Forest.

The Clearwater National Forest will have a large quota of Idaho men this summer. Edward Nero, '22, has accepted an appointment as Forest Ranger for the Mussellshell District and plans to hold this position for next year and then return to complete his course in the Forest School the following year.

Harold Barto, '23, will be Assistant Ranger, Leslie Eddie, '24, smokechaser and J. W. Stoneman, '23, and M. J. Markham, '24, lookouts on the Mussellshell District this summer. Leonard King and Robert Johanson of the Ranger Course will also be engaged in fire protection on the Clearwater. Willard Storms, '23, will complete our representation on the Clearwater by returning to the commissary on the Chamberlin Meadows District.

J. W. Rodner, '23, will again occupy an important lookout station for the Coeur d'Alene Timber Protective Association this season.

Fred Chamberlin, '23, will be reengaged for work with the Blackwell Lumber Company of Coeur d'Alene.

Ivan Melick, '22, will work at home on his ranch during the summer.

Arthur Yaggy, '23, has accepted an appointment for protection work on the St. Joe National Forest.

Herman Baumann, '23, will spend the summer at his home in Wisconsin.

Harry Fuller, '24, goes to the Challis National Forest in District 4 for the summer.

Raymond Peterson, '24, has taken a lookout position on the Falls District of the Kaniksu.

Earl Bradfield, '24, has a position as bookkeeper for the Boise Payette Lumber Co. at Blackfoot, Idaho.

Elva A. Snow, '24, will be engaged on grazing reconnaissance on the Beaverhead National Forest in Montana.

Edwin Chamberlain, '24, has an appointment for duty on the St. Joe National Forest for the summer.

Robert Kelly and Verne Hallcraft of this year's Ranger Course are both on the Payette National Forest at present and are finding the work much to their liking.

Ralph Rudesill, (R. C.) has gone to the Payette National Forest.

R. L. Hand, (R. C.) has been working in the Forest School arboretum all spring and will take a position on the St. Joe National Forest for the summer.

L. L. Darrah dropped from the Ranger Course to take up a farm near Moscow early this spring.

Howard Humm, (R. C.) has gone to New Mexico where his folks own property, expecting to get a position with the Forest Service in District 3.

Wesley Melzian (R. C.) was married in Moscow soon after the first of the year and has been teaching school in Montana since.

Joseph Maruska dropped from the Ranger Course early in the term to accomplish the work on his homestead necessary to hold his claim.

Practically all of the men taking the Vocational Course under the Federal Board for Rehabilitation have been placed for summer training with the U. S. Forest Service.

Laurence Autrey, Howard Higgins and George W. Clark will go to the Umatilla Forest in eastern Oregon for work in fire direction.

Assistant ranger positions on the Payette for the coming season will be filled by Glenn C. Perkins at the High Valley Station, Parley Perkins at the South Fork of Salmon Station, C. E. McGrath at the Garden Valley station, and V. V. Cherry at the Crawford Station. Glenn Perkins' work will be general administration. Parley Perkins will spend most of his time on grazing and fire protection. McGrath in addition to the general routine of the ranger will help harvest the hay crop at his station and Cherry will be used as commissary assistant.



Charles M. Adkins has been assigned to the Coeur d'Alene National Forest.

Norman E. Taylor will be stationed on the Middle Fork District of the Selway National Forest. The Clearwater will take France Reuterskiold, Byrl Wheeler, Howard Holler and Joseph Hamil for training in fire protection and forest improvements this summer.

Lawrence Luby has been assigned to the Caribou National Forest at Montpelier, Idaho.

Lester Eby and Frank Folsom will go to the

Gallatin National Forest at Bozeman, Montana.

Frank Moses will be obliged to drop forest ranger work, because of his health, but will be put under training for clerical work in connection with the National Forests.

Recent visitors at the School of Forestry include: Frank Jefferson, Supervisor, and Andrew J. Devan, Fire Assistant, Selway National Forest and I. W. Cook, Logging Engineer for the Winton Lumber Co. of Coeur d'Alene, Idaho.

## XI SIGMA PI

Three students and two members of the faculty of the School of Forestry of the University of Idaho were elected to membership in the National forestry honorary fraternity, Xi Sigma Pi, during the school year which has just been completed. The following were elected to Epsilon chapter at this university: Oscar Charles Munson, '21, William Byron Miller, '22, James W. Farrell, '22, John B. Taylor and Prof. C. Edward Behre.

Xi Sigma Pi, the oldest of honorary forestry fraternities, was founded at the University of

Washington in November, 1908. The object of the fraternity is to secure and maintain a high standard of scholarship in forest education, to work for the upbuilding of the profession of forestry and to promote fraternal relations among earnest workers engaged in forest activities. The results obtained have been most satisfactory and the future of the fraternity is assured. Election to this fraternity is based on scholarship, personality, and activity in the various enterprises of the university and School of Forestry.

## THE TOXICITY OF ZINC CHLORIDE TO WOOD DESTROYING FUNGI <sup>1</sup>

C. R. PATRIE, '21

With the impending scarcity of wood and the high prices already prevailing, the preservation of wood is becoming more and more important. With the growth of this industry the question of cheap preservative, easily handled and readily available becomes an important one. Coal-tar creosote at present is the most extensively used preservative but its cost has increased somewhat since the war and the other preservatives are coming into greater use. The water soluble salts of the heavy metals are toxic to the growth of wood destroying fungi and relatively cheap and hence of great importance in preservation. They have however certain disadvantages as for example their corrosive action on iron and others. For this reason they will perhaps never entirely replace coal tar creosotes as a wood preservative.

Zinc chloride is the most extensively used

inorganic wood preservative in the country. It was first extensively employed in England by Wm. Burnett in 1838 and is now used in most of the European countries. Zinc chloride is quite toxic to wood destroying fungi having about the same degree of toxicity as coal-tar creosote. Its solubility in water makes it inadvisable to use under certain conditions but under other conditions it has decided advantages over all other preservatives. Zinc chloride corrodes iron in concentrated solutions but the concentrations used in the treatment of wood are dilute enough to make corrosive action negligible.

In considering any substance as a wood preservative the concentration necessary to inhibit the growth of wood destroying fungi is an important point.

1. Thanks are due Dr. Henry Schmitz not only for suggesting the problem but for his kind assistance throughout.



The toxic point of zinc chloride has been previously determined by Humphry and Fleming<sup>2</sup>, Rumbold<sup>3</sup>, and others<sup>4, 5</sup>. All of these workers however employed the Petri dish method using nutrient agar or gelatin media. In a recent unpublished paper by Schmits and Zellar<sup>6</sup> the errors of the Petri dish method to determine the toxicity of certain chemicals to wood destroying fungi have been pointed out. The action of electrolytes on agar and gelatin is of course well known and therefore results obtained by the Petri dish method need not necessarily hold when Zinc chloride is injected into the wood. For this reason finely ground wood was employed as the culture medium. Results obtained under these conditions have a direct application to actual practice.

#### METHODS

In the experimental work here reported Douglas fir, (*Pseudotsuga taxifolia*), white fir, (*Abies grandis*), and chestnut, (*Castanea dentata*) were used as the culture medium. They were chosen as typical of the more extensively used conifers and hardwoods used in this country. Since these woods are widely used in situations where preservative treatment is a decided advantage, the results obtained may have a direct application.

Sawdust of the above mentioned species was carefully ground and then sifted thru a sieve having a two mm. mesh. Thus a sawdust of standard size was secured. The sawdust was then allowed to dry at room temperature for several days.

Stock solutions were made up in the following manner: Chemically pure zinc chloride was placed in weighing flasks of known weight and dried in an electric oven at 120° C. for

twenty-four hours weighed. A sufficient amount of water was added to make a five per cent solution of Zn Cl<sub>2</sub>. It was found however that a precipitate, presumably zinc carbonate, remained in the solution. This was filtered, dried and weighed and enough zinc chloride added to the solution to make the per cent desired. It was found that twenty grams of wood would just absorb fifty cc. of solution without any free water remaining. Consequently as fifty cc. of five per cent solution would contain two and one-half grams of zinc chloride, the fifty cc. of solution when added to twenty grams of wood would produce a concentration of 3.57 per cent calculated on the weight of sawdust plus the water. Using the 3.57 per cent solution as a base the other concentrations desired were made in the usual manner, i.e. by dilution and on the same basis as above.

An objection might be made that the concentrations as determined are based on the wet weight of wood rather than the dry weight of wood and that the dry weight of wood should be the real basis of determining concentrations. To meet this objection the two concentrations are given in the following table: However, under natural conditions wood is often used in places such that it would absorb considerable moisture and the concentration would have to be based on that.

The sawdust in 20.00 gram lots was vigorously stirred while the solutions were being added so that an even mixture was secured. Approximately 5 grams of sawdust was then transferred to each of two 3 ounce flasks and the flasks plugged with cotton. The flasks were then sterilized for twenty minutes at fifteen pounds pressure and inoculated with small squares of *Lenzites saepiarina* in the usual manner. The bottles were incubated for twelve days at room temperature.

*Lenzites saepiarina* is a common fungus causing the decay of structural timbers. It is a wide spread and cosmopolitan fungus. In general growth was least rapid on the white fir wood and greatest on the chestnut wood. After incubation the cultures were carefully examined with the hand lens to determine whether or not the mycelium has penetrated the wood and if so to what extent.

In the following table the growth at the respective concentrations for the three woods and the toxic point for each wood is shown,

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- Rumbold, Caroline. Über die Einwirkung des Saure und Alkaligehaltes des Nahrbodens auf das wachstum der holzersetzenden und holzverfarbenden Pilze; Mit einer Erörterung über die systematischen Beziehungen zwischen Ceratostomella und Graphium. In Natw. Ztschr., Forst u. Landw., Bd. 9 Heft. QP. p. 429-465. 22 fig., 1911.
- Falck, Richard. Wachstumsetze, Wachstumfaktore und temperaturwerte der holzzerstörenden Mycelien. In Moller, Alfred. Hausschwammforschungen. Heft. 1, 53-154. 1907.
- Weiss, J. M. The actions of oils and tars in preventing mould growth. In Journal Soc. Chem. Indus. v. 30, No. 4. p. 190-191. 1911.
- Schmitz, Henry and Zeller, S. M. The toxicity of various fractions and combinations of fractions of coal-tar creosote to wood destroying fungi. Unpublished paper.



TABLE I.

SHOWING THE EFFECT OF VARIOUS CONCENTRATIONS OF ZINC CHLORIDE ADDED TO WHITE FIR, DOUGLAS FIR, AND CHESTNUT SAWDUST ON THE GROWTH OF LENZITES SAEPIARIA.

Concentration of Zn Cl		Growth of Lenzites Saepiaria		
Based on Wet Weights of Wood	Based on Dry Weights of Wood	Chestnut	Douglas Fir	White Fir
.055	.195	very good		
.055	.195	very good		
.069	.244	very good		
.069	.244	very good	slow	good
.083	.293	luxuriant	slow	good
.083	.293	luxuriant	good	
.097	.342	very good	good	good
.097	.342	good	doubtful	good
.111	.39	good	good	good
.111	.39	good	slow	good
.139	.487	good	good	good
.139	.487	good	good	good
.166	.585	good	good	slow
.166	.585	good	slight	slow
.195	.683	slow	slight	moderate
.195	.683	slow	slight	no growth
.223	.78	slow	no growth	good
.223	.78	good	no growth	very slight
.278	.98	slow	slight growth	no growth
.278	.98	very slow	no growth	no growth
.333	1.17	no growth	no growth	no growth
.333	1.17	no growth	no growth	no growth
.389	1.36	no growth	no growth	no growth
.389	1.36	no growth	no growth	no growth
.445	1.56	no growth	no growth	no growth
.445	1.56	no growth	no growth	no growth
.556	1.95	no growth	no growth	uncertain
.556	1.95	no growth	no growth	uncertain
.667	2.34	no growth	no growth	no growth
.667	2.34	no growth	no growth	no growth
.778	2.73	no growth	no growth	no growth
.778	2.73	no growth	no growth	no growth
.89	3.125	no growth	no growth	no growth
.89	3.125	no growth	no growth	no growth
1.11	3.91	no growth	no growth	no growth
1.11	3.91	no growth	no growth	no growth
1.33	4.69	no growth		
1.33	4.69	no growth		
1.53	5.47	no growth		
1.53	5.47	no growth		
1.78	6.25	no growth		
1.78	6.25	no growth		

## CONCLUSION

The results here reported tend to indicate that the species of wood has little effect on the toxicity of zinc chloride to wood destroying fungi. Zinc chloride when impregnated in Douglas fir, white fir, and chestnut wood is toxic to the growth of *Lenzites saepiarina* at the concentration of .333 per cent based on the wet weight of wood. This result differs considerably from the previous results of others. Humphrey and Fleming employing the Petri dish method find that the toxic point of zinc chloride to wood destroying fungi, particularly

*Lenzites saepiarina*, lies between 1 per cent and 2 per cent. This difference in result is probably due to the effect of the electrolyte zinc chloride on the colloidal agar or gelatine.

Schmitz and Zeller find a similar difference in their results. They find the toxic concentration of creosote when impregnated in wood to wood destroying fungi is not lower than 1 per cent and is usually higher.

From the results here reported it is evident, that when the concentration of zinc chloride in wood treated with this chemical is reduced thru leaching below .333 per cent of the wet weight of wood, the wood will be left susceptible to decay.



## STEM FORM STUDIES OF WESTERN YELLOW PINE (Preliminary Report)

By J. P. DRISSEN, '21

The object of this work is to test the application of Jonson's form quotient as an expression of stem form in stands of Western Yellow Pine in North Idaho.

To express the variation in stem form or taper Jonson uses the absolute form quotient

$q = \frac{d}{D}$  in which  $d$  is the diameter at  $\frac{1}{2}$  height above breast height. The advantage of this method of expressing the form is that the classification is made independent of height, the two form determining elements having the same relation to each other. It has been definitely shown by Jonson, Schiffel and others that trees of the same form quotient taper according to a fixed law. Jonson has also shown that the taper of trees of the same form class is independent of height provided the measurements are made at proportional places along the stem. He says "The percentic taper is the same in all normal spruce of the same form class, notwithstanding differences in height and diameter. A large tree is developed exactly as a small tree, provided both have the same absolute form quotient." Jonson has also shown this to be true for Scotch Pine, and L. Mattson-Marn has found scarcely any difference between his figures for larch and those of Jonson for spruce and pine. Jonson's volume tables for spruce and pine are also applicable to larch.

If it can be shown that the absolute form quotient is as reliable as an expression of form in this continent as it is in the Scandinavian countries much of the time, money and energy now spent in the construction of volume tables would be saved. Claughton-Wallin has found that both Eastern white and red pines in Ontario follow very closely the taper for Scotch Pine computed from the algebraic formula used in Europe and McVicker in British Columbia has shown that Douglas fir also conforms closely to the European taper series in the portion of the stem above the root swelling. The stump flare however in the western trees was found to affect the stem curve up to 20 per cent or more of the total length and so made results based on actual d. b. h. very erratic.

### Data Used

Taper series were analyzed for each tree by dividing the d. b. h. into the measured diameters at each tenth of the stem above breast height. These measurements were obtained in two ways. First, by actually measuring the felled trees at the proportional intervals and second, by plotting taper measurements made at log lengths on cross-section paper and reading off the diameters at the desired intervals. Eleven Douglas fir and ten Western yellow pine were measured on the Huesby homestead, twelve miles east of Harrison, Idaho. One of the yellow pines was discarded due to an abnormal swelling of the trunk at one of the measurements. These trees were in a fairly dense, mixed stand and ranged from ten to twenty-seven inches in diameter.

Twenty trees were measured near Manson's mill 8 miles north of Moscow, Idaho. These trees were in a dense second growth stand in site quality II, and averaged 7.2 inches d. b. h. 38. feet in height and 36 years old.

Taper curves were plotted for twenty-nine western yellow pine and the d. b. h. and the diameters at each tenth of the height above d. b. h. read off. The measurements used were made at log lengths, by the U. S. Forest Service in connection with logging operations on the Kootenai National Forest. These trees ranged from 12 to 25 inches d. b. h.

### Computations

$\frac{d_5}{D}$

The form quotient — was found for each tree and the trees grouped by .05 classes. An average tree for each locality was determined for each form class by adding the diameters at corresponding sections. From these average trees percentic taper series were computed for each of the three sets of figures. This was also done with the average data from all three localities. The taper series for the three localities and the series for the average of the three were plotted on cross-section paper and the points connected up by curves in order to study their eccentricities and the relations between them.

### Observations

A possible source of error in basing the



taper series on an average tree found from averaging diameters was noted. Instead of being based solely on the number of trees, the average is affected materially by the size of the trees. A tree 12 inches in diameter has just as much weight as two 6 inch trees. A better average could be obtained by averaging the percentic tapers of each tree. This was the method apparently used by Jonson in Sweden and Claughton-Wallin in Ontario but McVicker's figures for Douglas fir were averaged in the manner described in this article.

In the case of the large trees from the Harrison and Kootenai localities the plotted curves show that the taper series are much distorted, due to the d. b. h being affected by the stump flare. The average for form class .60 on the Kootenai was plotted on cross-section paper and a curve representing the taper of the tree drawn thru the known points. This showed that at 20 per cent above d. b. h. the curve began to swing outwards. The curve was prolonged downward from the 20 per cent point according to its natural trend and a "normal" breast height diameter was obtained. This changed the average diameter from 19.0 inches to 16.4 inches and raised the form quotient from .603 to .701. The new taper series obtained from this "normal curve" corresponds very closely to Jonson's computed series for the Norway spruce.

The same was done for form class .70 from the Harrison plot with like results. The d. b. h. was reduced from 14.9 inches to 13.9 inches and the form quotient was raised from .704 to .755. The new percentic taper series corresponded verly closely to the average for white and red pine in Ontario and quite closely to Jonson's computed series for Scotch pine.

This is in very close harmony with the results from measurements on Douglas fir in British Columbia.

The averaged series in the .70, .75, and .80 classes nearly all fall short of the computed series in the top measurements. This fact has also been noted by Prof. Jonson in his work. Claughton-Wallin and McVicker also observed this in their work in Ontario and British Columbia.

Due to the abnormal d. b. h of the large trees from Harrison and the Kootenai it was deemed advisable to make a detailed comparison only for the trees from the younger second growth stand near Moscow. The percentic series for each form class were plotted on cross section paper and the points used as a basis for a set of harmonized curves.

The curves for the even form classes were drawn in by interpolation. These values were then compared with Jonson's tables for Norway spruce and Scotch pine and also with Claughton-Wallin and McVicker's table for red and white pines in Ontario.

The first eight trees were from a section of the stand which was not so dense so that from which the last twelve were measured. The average form quotient of the eight trees was .604 while that of the twelve trees was .669, a difference of .065.

Following is a detailed comparison with Jonson's computed tables for Spruce and Scotch pine and Claughton-Wallin and McVicker's table for red and white pines. The absolute form factors are computed by the formula.

$$F = \frac{\frac{1}{2}D^2 + d_1^2 + d_2^2 + d_3^2 + \dots + d_n^2}{10 D^2}$$

where D=100; d<sub>1</sub>=90; d<sub>2</sub>=80, etc.

FORM CLASS 55 (2 Trees—Average d. b. h 9.4 Inches)

Section	B. H.	1	2	3	4	5	6	7	8	9	Absolute Form Factor
Western Yellow Pine	100	91.6	83.4	74.5	65.2	55.0	45.0	34.3	23.6	12.6	.371
Norway Spruce	100	91.6	82.9	74.0	64.7	55.0	44.9	34.4	23.5	12.0	.368
Variation per cent			+5	+5			+1	-1	+1	+6	+003

FORM CLASS 60 (5 Trees—Average d. b. h 8.5 Inches)

Section	B. H.	1	2	3	4	5	6	7	8	9	Absolute Form Factor
Western Yellow Pine	100	93.0	85.6	77.8	69.8	60.0	50.0	38.5	27.0	15.2	.404
Norway Spruce	100	93.0	85.5	77.6	69.1	60.0	50.1	39.4	27.7	14.6	.404
Variation per cent			+1	+2	+7		-1	-9	-7	+6	
Scotch Pine	100	93.1	85.7	77.8	69.3	60.0	49.9	38.7	26.0	12.0	.403
Variation per cent			-1	+1	+5		+1	-2	+1.0	+3.2	+001
White and Red Pines	100	93.2	85.8	77.9	69.4	60.0	50.0	38.4	25.9	12.9	.403
Variation per cent			-2	-2	-1	+4		+1	+1.1	+2.3	+001

FORM CLASS 65 (8 Trees—Average d. b. h. 7.5 Inches)

Section	B. H.	1	2	3	4	5	6	7	8	9	Absolute Form Factor
Western Yellow Pine	100	94.2	87.6	80.5	73.2	65.0	55.3	44.0	31.6	18.5	.439
Norway Spruce	100	94.2	87.8	80.9	73.4	65.0	55.6	45.0	32.7	18.0	.443
Variation per cent			-2	-4	-2		-3	-1.0	-1.1	+5	-004
Scotch Pine	100	94.3	88.0	81.1	73.5	65.0	55.4	44.3	31.1	15.0	.441
Variation per cent			-1	-4	-6	-3	-1	-3	+5	+3.5	-002
White and Red Pines	100	94.3	88.0	81.0	73.6	65.0	55.4	43.8	30.6	15.6	.440
Variation per cent			-1	-4	-5	-4	-1	+2	+1.0	+2.9	-001



## FORM CLASS 70 (4 Trees—Average d. b. h. 4.7 Inches)

Section	B. H.	1	2	3	4	5	6	7	8	Absolute Form 9 Factor	
Western Yellow Pine	100	95.5	90.1	84.4	77.4	70.0	60.5	49.0	36.5	22.4	.481
Norway Spruce	100	95.2	89.9	84.0	77.5	70.0	61.4	51.3	38.8	22.7	.485
Variation per cent		+5	+2	+4	-1		-9	-2.3	-2.3	-3	-.004
Scotch Pine	100	95.3	90.0	84.1	77.5	70.0	61.1	50.6	37.2	19.4	.482
Variation per cent		+2	+1	+3	-1		-6	-1.6	-7	+3.0	-.001
White and Red Pines	100	95.3	90.2	84.3	77.8	70.0	60.7	49.5	35.8	19.2	.480
Variation per cent		+2	-1	+1	-4		-2	-5	+7	+3.2	+.001

## FORM CLASS 75 (Interpolated Graphically—No Trees)

Section	B. H.	1	2	3	4	5	6	7	8	Absolute Form 9 Factor	
Western Yellow Pine	100	96.6	92.5	87.5	81.9	75.0	65.4	53.7	40.0	25.5	.523
Norway Spruce	100	96.1	91.7	86.9	81.4	75.0	67.5	58.2	46.3	29.3	.534
Variation per cent		+5	+8	+6	+5		-2.1	-4.5	-6.3	-3.8	-.011
Scotch Pine	100	96.2	91.9	87.0	81.5	75.0	67.3	57.6	44.8	25.6	.530
Variation per cent		+4	+6	+5	+4		-1.9	-3.9	-4.8	-1	-.007
White and Red Pines	100	96.2	91.8	87.0	81.8	75.0	66.7	56.0	41.5	23.2	.524
Variation per cent		+4	+7	+5	+1		-1.3	-2.3	-1.5	+2.3	-.001

## FORM CLASS 80 (1 Tree—d. b. h. 4.0 Inches)

Section	B. H.	1	2	3	4	5	6	7	8	Absolute Form 9 Factor	
Western Yellow Pine	100	97.4	94.3	90.2	85.6	80.0	70.5	59.0	45.0	29.1	.566
Norway Spruce	100	96.9	93.5	89.6	85.1	80.0	73.7	65.8	55.2	38.7	.591
Variation per cent		+5	+8	+6	+5		-3.2	-6.8	-10.2	-9.6	-.025
Scotch Pine	100	97.0	93.6	89.7	85.2	80.0	73.6	65.4	53.9	34.7	.586
Variation per cent		+4	+7	+5	+4		-3.1	-6.4	-8.9	-5.6	-.020
White and Red Pines	100	97.0	93.7	89.7	85.4	80.0	73.0	62.7	48.5	28.7	.573
Variation per cent		+4	+6	+5	+2		-2.5	-3.7	-3.5	+4	-.007

## Conclusions

1. Jonson's absolute form quotient is a fair index of stem form as applied to Western Yellow Pine trees in which the butt flare does not extend above breast height.

2. That in the larger trees the butt flare extends up into the first measurements, thus distorting the taper series. The effect is to lower the form class.

3. That trees in denser stands are of a higher form class than those standing more in the open.

4. Within an even aged stand larger trees have a lower form class than the smaller trees.

5. Western Yellow Pine conforms more nearly in taper inside bark to Eastern White and Red Pines than to Norway Spruce or Scotch Pine, particularly in the higher form classes.

6. That Jonson's absolute form factor and volume tables can be used in estimating even-aged stands of Western Yellow Pine provided d. b. h. readings are above the stump flare.

## ROSTER OF STUDENTS

The following is a list of students in actual attendance at the School of Forestry during the year 1920-21. The information after each name is in the following order: 1, name; 2, home address; 3, fraternity; 4, honorary fraternity; 5, scholastic achievements and athletics.

## Graduate.

Staples, Howard William, B. S. (For.) 1921; 109 S. Monroe Street Moscow, Idaho; Phi Gamma Delta; Xi Sigma Pi; Alpha Zeta; President Associated Foresters, Vice President A. S. U. I. and Business Manager "Idaho Forester," 1920.

## 1921.

Drissen, John Philip, Harrison, Idaho; Xi Sigma Pi; President Associated Foresters, 1920-

21; Associate Editor "Idaho Forester," 1920 and 1921.

Munson, Oscar Charles, Moscow, Idaho; Sigma Nu; Xi Sigma Pi.

Patrie, Carthon Roy, 7 Plymouth Street, Plymouth, Wisconsin; Xi Sigma Pi; Editor "Idaho Forester," 1921.

## 1922.

Brown, Frank A., 308 State Street, Boise, Idaho; Kappa Sigma; Sec.-Treas. Associated Foresters 1918-19; Associate Editor "Idaho Forester", 1920 and 1921; Vice President "I" Club, 1920-1921; Football "I", 1919 and 1920.

Cossitt, Floyd Morgan, 308 E. 10th Street, Weiser, Idaho; Elwetax; Xi Sigma Pi.

Farrell, James W., New Meadows, Idaho; Phi Gamma Delta; Xi Sigma Pi, Alpha Zeta; Sec.-Treas. Associated Foresters, 1919-20,



Vice-President Associated Foresters, 1920-21, Editor "Idaho Forester", 1920, Ass't Bus. Mgr., "Gem of the Mountains", 1922.

Melick, Harvey Ivan, Nampa, Idaho.

Miller, William Byron, Stevenson Washington; Xi Sigma Pi; Alpha Zeta.

Nero, Edward T., Moscow, Idaho; Vice President Associated Foresters, 1919-20; Sec.-Treas. Associated Foresters 1921-21; Associate Editor "Idaho Forester", 1921.

### 1923.

Baumann, Herman, 1314 Louis Avenue, Milwaukee, Wisconsin.

Barto, Harold, Spokane, Washington; Kappa Sigma; Football squad, 1920.

Chamberlin, Fred, Ceur d'Alene, Idaho; Sigma Nu.

Daniels, Albert Stanley, 601 S. Henry St., Bay City, Michigan; Phi Gamma Delta; President Associated Foresters, 1919-20.

Nicol, Henry Q., Reubens, Idaho.

Parsons, Russell M., Moscow, Idaho; Beta Theta Pi.

Rodner, Jack W., Moscow, Idaho; Sigma Alpha Epsilon.

Ryan, Cecil, Moscow, Idaho; Kappa Sigma.

Stoneman, John Warren; Sigma Alpha Epsilon; Track "I" 1921.

Storms, Williard Sidney, Rupert, Idaho; Kappa Sigma; Associate Editor "Idaho Forester" 1920.

Yaggy, Arthur, Nampa, Idaho.

### 1924.

Bradfield, Earl Francis, 303 S. Second St., Pocatello, Idaho.

Chamberlain, Edwin William, Moscow, Idaho.

Eddy, Leslie Eugene, Dietrich Idaho.

Fuller Harry E., Emmett, Idaho.

Griep, Kenneth, Fruitland, Idaho.

Madlinger, George Joseph, Poughkeepsie, New York.

Markham, Murle Joseph, Grangeville, Idaho; Sigma Alpha Epsilon.

Peterson, Raymond, Moravia, Idaho.

Snow, Elva A., Boise, Idaho; Kappa Sigma. Throckmorton, Michael Reed, Rupert, Idaho.

### Ranger Course.

Darrah, Lionel Leonard, Hillside Ave., Catham, N. J.

Flygg, Carl Jacob, Shelley, Idaho.

Hallcraft, Vernon R., Nampa, Idaho.

Hand, Ralph L., Ashville, New York.

Humm, Howard, Berkeley, California.

Johanson, Robert, Orofino, Idaho.

Kelley, Robert, Bradford, Pa.

King, Leonard Austin, Orofino, Idaho.

Maruska, Joseph, Sandpoint, Idaho.

Melzian, Wesley, Sleepy Eye, Montana.

Roeder, Charles, Streator, Illinois.

Rudesill, Ralph, Bradford, Pa.

Sievers, Lawrence, Milwaukee, Wisconsin.

Welker, Leonard, New Holstein, Wisconsin.

### Federal Board Vocational Course.

Adkins, Chas. M., Moscow, Idaho.

Autrey, Lawrence, Hauser Terry, Washington.

Ballou, Walter Grant, Portland, Oregon.

Berry, Burt Lawrence, Mountain Home, Ida

Cherry, Vane Gilbert, Whiteflat, Texas.

Clark, George Wm., Tousey, Washington.

Eby, Lester W., Walla Walla, Washington.

Folsom, Frank B., Elizabethton, Tenn.

Hamil, Joseph H., Bremerton, Washington.

Higgins, Howard Watkins, Fredricktown, Ohio.

Holler, Howard M.

Jones, Lloyd A., Monida, Montana.

Leonard, Louis P., Wisona, Idaho.

Luby, Lawrence Louis, Idaho Falls, Idaho.

McGrath, Charles Earl, Middleton, Idaho.

Mackey, J. B., Salmon, Idaho.

Moses, Frank, Iron River, Idaho.

Perkins, Glen C., Pocatello, Idaho.

Perkins, Parley P., Pocatello, Idaho.

Reuterskiold, France W., Fort Atkinson, Wis.

Snelson, Leonard F., Filer, Idaho.

Stroud, W. T., Salmon, Idaho.

Taylor, Norman Ellsworth, Oroville, Wash.

Wheeler, Byrl, Weiser, Idaho.

## ALUMNI AND FORMER STUDENTS

### Alumni and Former Students.

The following list of alumni and former students is not complete. Additions and corrections of addresses given will be appreciated as we desire to keep a complete and accurate list of all former students.

Allen, Thomas William, ex '22, Caldwell, Idaho.

Anderson, Mark, ex-'15, Provo, Utah.

Ashton, Allen White, ex-'22, Boise, Idaho.

Barger, Harold B., ex-'17, Browning, Montana.

Bedwell, Jessie Leonard, '20, Council, Idaho.

Berry, Waldo Lee, R. C. '15-'16, Post Falls, Ida.

Brockman, Cecil C., ex-'23, Bickelton, Wash.

Buckingham, William E. M., ex-'22, Gifford, Ida.

Ranger, U. S. F. S., Orofino, Idaho.

Burns, Robert Owen, ex-'15, Payette, Idaho.



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Cable, Guy Burr, ex-'22, Roberts, Idaho.  
Chamberlin, Gail B., ex-'22, Coeur d'Alene, Idaho.

Carlson, Oscar, '15, B. S. (For.), deceased.  
Cook, Jacob Miller, ex-'20, Oberlin, Kansas.  
Cooper, Alfred, ex-'20, Los Angeles, Cal.

Core, Glen R., ex-'23, Burley, Idaho.  
Cowan, Talmage Dewitt, R. C., '15-'16, St. Anthony, Idaho.

Cross, Sidney W., ex-'23, Sacramento, Cal.  
Cunningham, Russell H., '17 B. S. (For.), U. S. F. S., Grangeville, Idaho.

Darnall, Glenn McClellan, ex-'16, Payette, Ida.  
Dart, William Ellisworth, ex-'20, Moscow, Ida.  
Daugherty, Chas. Ira, ex-'22, Challis, Idaho.  
Davis, Roscoe Richard, ex-'21, Star, Idaho.  
Decker, Arlie Delos, '13 B. S. (For.), M. F. Yale University '17. (Land Agent, Potlatch Lumber Co., Potlatch, Idaho.)

Denning, Steward K., ex-'13.  
Dipple, Ralph, ex-'14. (Dentist, Springfield, Oregon.)

Dodge, Keith Allen, R. C. '15-'16, Challis, Ida.  
Duncan, Robert, R. C., '16-'17, Joseph, Oregon.  
Edwards, Kenneth Duncan, ex-'22, Nampa, Ida.  
Eldridge, Ferris Edwin, ex-'18, Almogordo, N. M.

Elhart, Carlton D., ex-'22, Caldwell, Idaho.  
Evans, Phillip Smith, ex-'20, Preston, Idaho.  
Faucett, Vernon, ex-'14.

Favre, Clarence Eugene, B. S., (For.), '14; M. S. (For.), '15. (District Forest Inspector Eiko, Nevada.)

Fenn, Lloyd Alfred, '11 B. S. (For.), Kooskia, Idaho; Attorney at Law; Manager "Kooskia Mountaineer"; Member of State Legislature, H. R. 1921.

Fields, Chas. Carlos, ex-'14.

Gerrard, Paul Henry, ex-'21, Vancouver, Wash. (Ranger, U. S. F. S. Orofino, Idaho.)

Gildea, Howard Cecil, ex-'14, McMinnville, Ore. (Lawyer.)

Gavin, C. H., ex-'23, Heise, Idaho.  
Gilman, John Elmo, ex-'19, Hailey, Idaho.  
Hamilton, William Howard, ex-'22, Santa Paulo, Cal.

Hamilton, Richard Alvord, ex-'19, Orofino, Ida.  
Hammond, George M., ex-'20, Pocatello, Idaho. (Retail Lumber Business, Pocatello.)

Hanzen, Maurice Henry, ex-'20, Moscow, Idaho.  
Hart, Irving Warren, ex-'22, Boise, Idaho.  
Haynes, Ralph M., R. C. '16-'17, Emmett, Ida.



Headick, Ralph Alonzo, R. C. '16-'17, Moscow, Idaho.

Heard, Herman Claude, ex-'13.

Helfrich, Will Edward, ex-'15.

Herman, Chas. Henry, '13, B. S. (For.), Enterprise, Oregon. (Manager East Oregon Lbr. Co. Enterprise, Oregon.)

Hillman, Wm. P., ex-'13.

Hockett, Robert Vestal, ex-'13.

Joke, J. A., R. C. '15-'16, Moscow, Idaho.

Haladay, Howard Wesley, ex-'16, Deceased.

Humphrey, Clyde Pearson, ex-'17, Coeur d'Alene, Idaho. (State Highway Department, Twin Falls, Idaho.)

Huestis, Clarence, R. C. '16-'17, Council, Idaho.

Hyde, Clarence Otis, ex-'19, Oreana, Idaho. (Bank clerk, Spokane, Washington.)

Jackson, Tom, '19 B. S. (For.), Clarkia, Idaho. (Logging Engineer, Edw. Rutledge Timber Co.)

Jensen, Irving R., R. C. '16-'17. (U. S. Forest Service, Essex, Montana.)

Johnson, Herbert Wm., ex-'17, Boise, Idaho.

Jones, Renaldo Vincent, ex-'15, Albion, Idaho.

Jones, William McKinley, Nampa, Idaho.

Kambridge, Antone J., ex-'16, Genesee, Idaho. (Farmer.)

Keefe, Frank, ex-'15.

Keyes, George W., ex-'22, Challis, Idaho.

Kingan, Fred, ex-'22, Boise, Idaho.

Lommason, Thomas, ex-'17, Colfax, Wash.

Lundstrum, F. J., '11 B. S. (For.), Lewiston, Idaho.

Martin, Ernest M., R. C. '19-'20, Weiser, Idaho.

Mason, Alvin Marion, (Special), Spokane, Washington.

Massey, Ivan M., ex-'23, U. S. F. S., Warren, Idaho.

May, Henry W., R. C., '19-'20, U. S. F. S., Warren, Idaho. (District Ranger.)

Malmsten Henry Elof, '17 B. S. (For.), U. S. F. S., Ogden, Utah.

McMullin, George Leiby, ex-'18, 251 Bush St., San Francisco, Cal.

Martin, Paul J., ex-'19, 1200 Old National Bank Bldg., Spokane, Washington. (Insurance Business.)

McNett, Gail, ex-'16, Rathdrum, Idaho.

Miller, Lilas Warren, ex-'22, Nampa, Idaho.

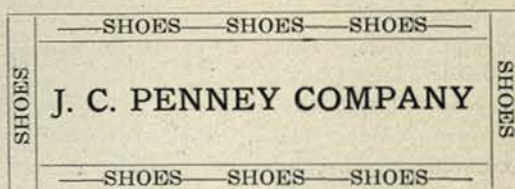
Miller, Robert Adolph, ex-'22, Twin Falls, Ida.

Moody, Virgil Carlton, '17 B. S. (For.), Hope, Idaho.

Morris, Leo Francis, ex-'16, Weiser, Idaho.

Morrison, Frank Bernard, ex-'22, Barber, Ida.

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- Pederson, Arthur R., ex-'22, Kootenai, Idaho.
- Post, Claud H., ex-'22, Blackfoot, Idaho.
- Rae, Chas. Arthur, ex-'14.
- Ramsburg, G. F., ex-'23, Weston, Va.
- Redinger, Clyde Edison, ex-'21, Adams Basin, N. Y.
- Rettig, Edwin Claire, '19 B. S. (For.), Orofino, Idaho. (With Clearwater Timber Protective Ass'n.)
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- Russell, Raymond E., ex-'22, Boise, Idaho.
- Rutledge, Walter T., ex-'16, Nyssa, Oregon.
- Salvin, Otis William, ex-'19, Carmen, Idaho.
- Schofield, Wm. Robert, '16 B. S. (For.), U. S. F. S. Logan, Utah.
- Schroeder, Bert H., ex-'16, Cottonwood, Idaho.
- Shanner, Wm. W., ex-'22, Sandpoint, Idaho.
- Shipman, Orville H., R. C. '16-'17, Boise, Idaho.
- Slavins, Erwin Howard, ex-'20, Spokane, Wash.
- Smith, Harley Roscoe, ex-'14.
- Space, Ralph, ex-'23, Weippe, Idaho.
- Staples, Howard W., B. S. (For.) '20, U. S. F. S., Coeur d'Alene, Idaho.
- Stevens, Arthur W., '15 B. S. (For.), 1830 Sharp Ave., Spokane, Washington. (Amalgamated Sugar Co., Engineering Dep't., Ogden, Utah.)
- Stillinger, Chas. Roy, Special '19, U. S. F. S., Spokane, Washington.
- Stone, Lawrence Fielding, ex-'15.
- Swan, Hugh Harris, ex-'15, Sherbourne, New York.
- Teed, Ryle, 428 P. O. Bldg., Portland, Oregon. (U. S. Forest Examiner.)
- Telford, Milton McKinley, ex-'20, Coeur d'Alene, Idaho.
- Thornton, Jas. A., ex-'12, Lewiston, Idaho.
- Oylear, Clarence H. ex-'21, Middleton, Idaho.
- Vick, Ernest Raymond, R. C. '19-'20, Watford City, N. D. (U. S. F. S., Luther, Montana.)
- Wadsworth, Herbert A., '11 B. S. (For.). (Major U. S. Inf., Office of Chief, Const. Div., Washington, D. C.)
- Walker, Everett Foster, ex-'23, Moscow, Ida.
- White, Albert C., R. C. '19-'20, Boise, Idaho.
- Williamson, Chas. Leonard, ex-'14.
- Webster, Roy Russell, R. C. '15-'16, Post Falls, Idaho.
- Williams, John, R. C. '16-'17, Boise, Idaho.
- Wiseman, Claude C., ex-'22, Middleton, Idaho.
- Wolfenden, William, ex-'23, Gooding, Idaho.
- Yates, Donald, B. S. (For.), Potlatch, Idaho. (Land Department, Potlatch Lbr. Co., Potlatch, Idaho.)
- Youngs, Homer Smith, '17 B. S. (For.), Deceased.



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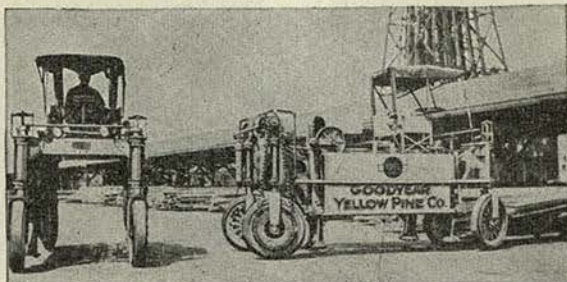
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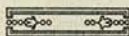
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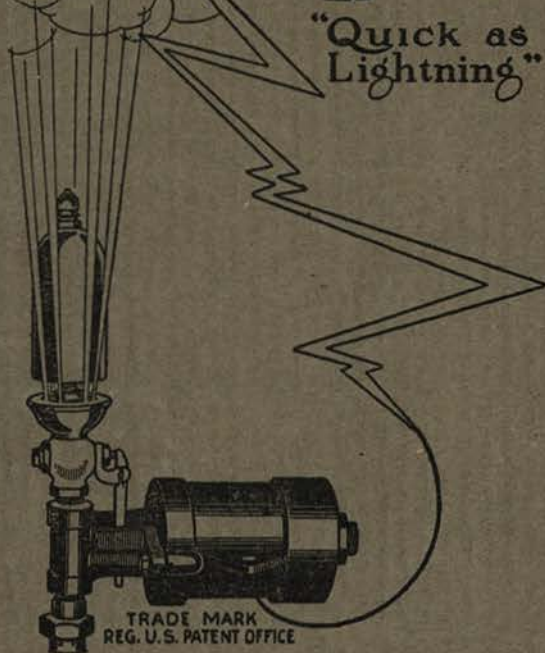


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