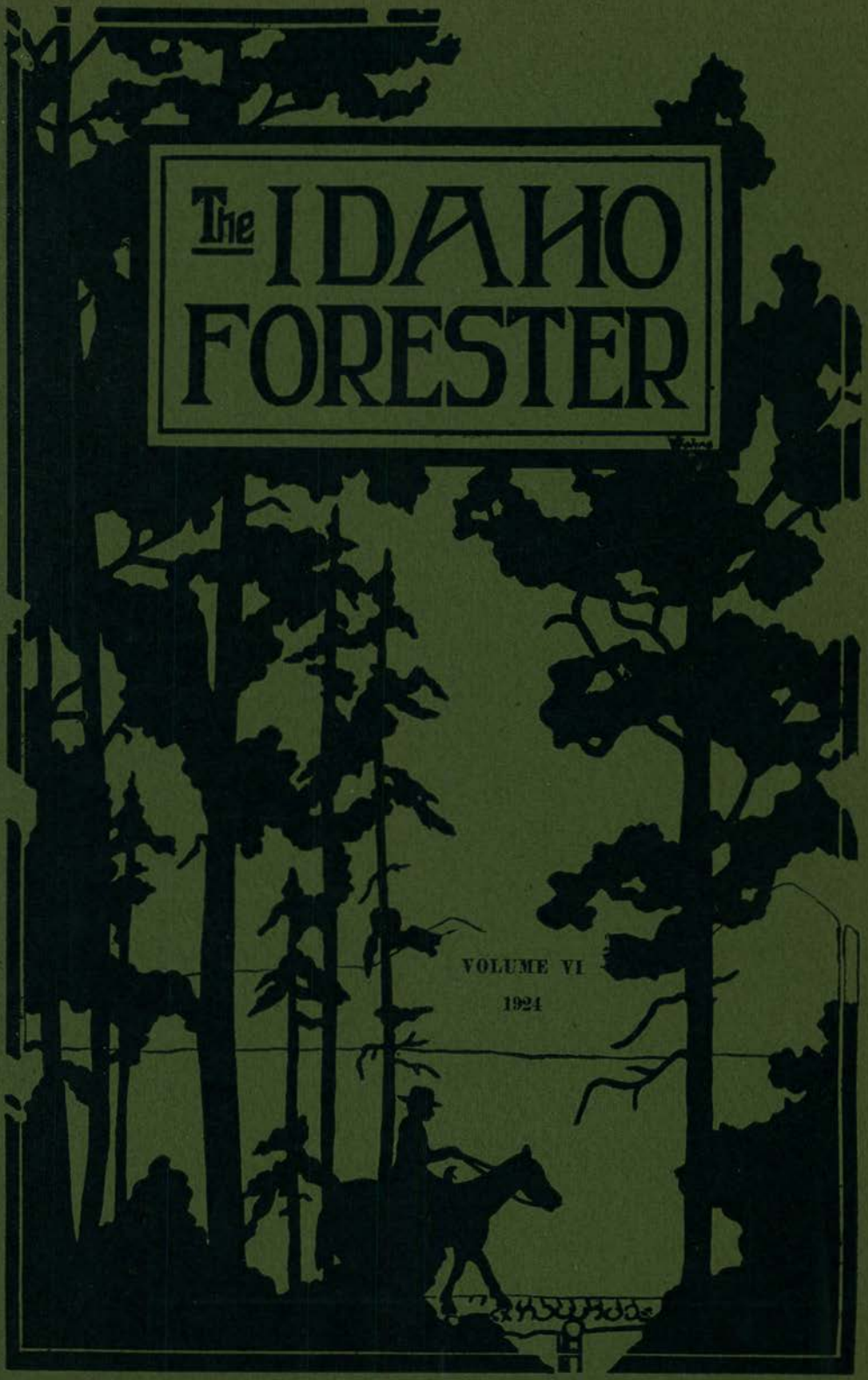
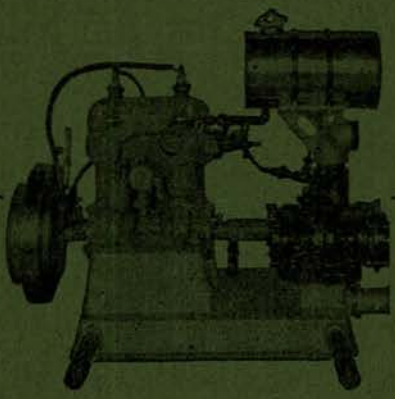
The IDAHO FORESTER



VOLUME VI

1924



Best! Again in 1924

In the test held at Longview, Wash., at the invitation of the Forest Service of the U. S. Department of Agriculture, on March 28, 1924, the Northern Forest Fire Engine not only surpassed the performances of all others entered in the test but proved conclusively that it is vastly more effective than any other.

It made the 305 foot vertical lift through 1450 feet of 1½" hose with the engine running at ⅔ speed. The nearest that any other contestant came to this record was to raise the water to the 200 foot level—this outfit was powered with the same engine as the Northern but with a far less effective pump.

The test proved conclusively the value of Northern Forest Fire Engines as protection against fire. Their simplicity, reliability, and the ease and speed with which they can be moved where needed makes them intensely practical equipment for the protection of standing timber, plants, and outlying estates.

Write for full descriptions.

NORTHERN ROTARY PUMPS

"More Gallons per Horse Power"

NORTHERN FIRE APPARATUS CO.

MINNEAPOLIS, MINNESOTA. U.S.A.

932 18th Avenue, N. E.

The Idaho Forester

Published by the Associated Foresters, University of Idaho
Moscow, Idaho, 1924

VOLUME VI ANNUAL EDITION

CONTENTS

In appreciation
of the valuable services he is rendering to the cause of forestry in Idaho, the Associated Foresters respectfully dedicate this volume of
The Idaho Forester to
BEN E. BUSH

IDAHO'S FOREST PROBLEM

By BEN E. BUSH

The present generation has seen the center of the lumber industry swing from Maine to Pennsylvania, from Pennsylvania to the Lake States, from the Lake States to the South, and in the past five years the South has passed her peak of production, so that at the present time the center of the lumber industry is in the western states—California, Oregon, Washington, Montana, and Idaho. For the next forty years these far western states will be compelled to furnish great quantities of lumber to the prairie states, as well as to many of the former lumber exporting states.

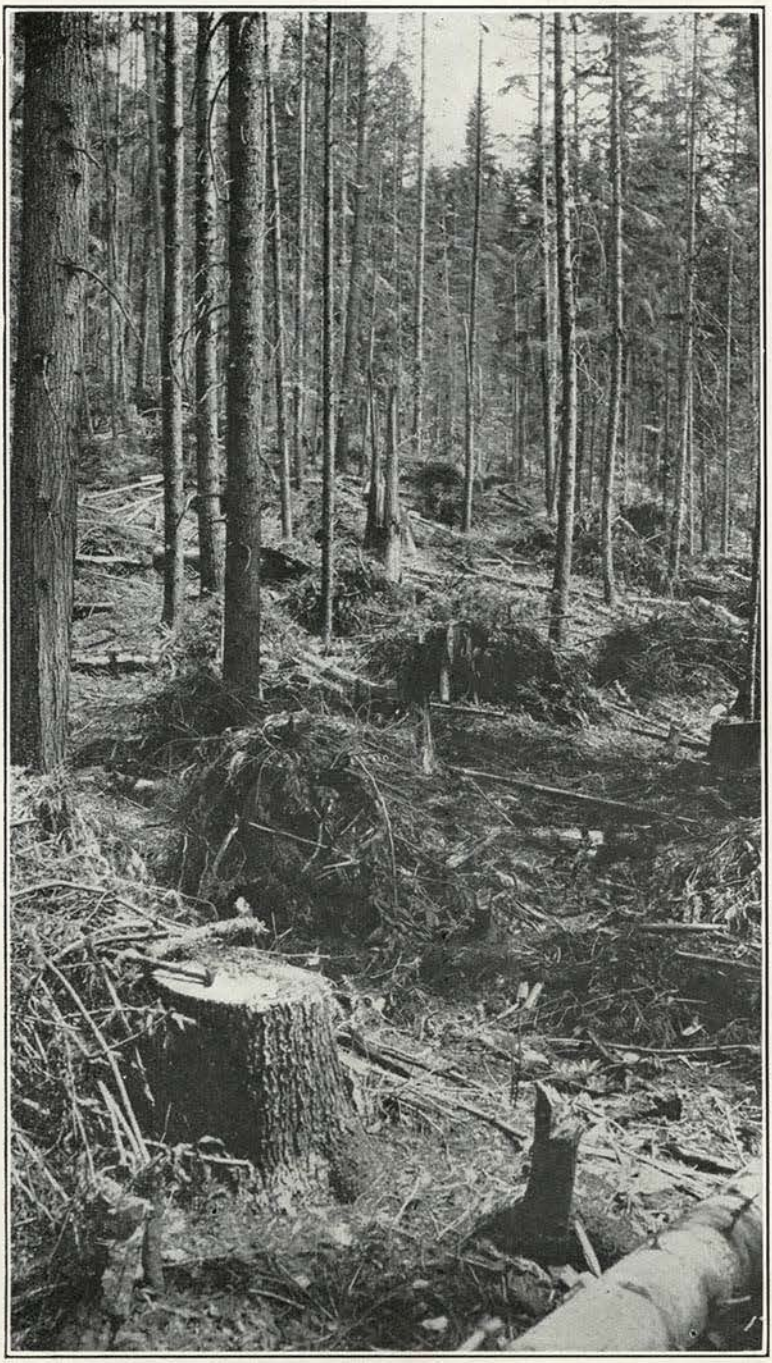
Even with our rapidly increasing population, and the many new uses for lumber, the production of the United States has decreased from its peak of 47 billion feet in 1917, until in 1923 we produced only 40 billion feet. Of this the western states furnished 12 billion, or 30 per cent of the total cut. Idaho furnished one billion, with an approximate value of $35,000,000.00 at the mill. Idaho, at the present time, is practically at the peak of her production, and will remain at the present cut for the next two decades. If proper reforestation measures are employed, the present forest area that is valueless for anything else, can easily grow one billion feet of merchantable timber annually.

Of the 23,000,000 acres of forest lands in the state, the government area, including the National Forests, public domain and Indian lands amounts to 20,700,000 acres, the private ownership covers 1,500,000 acres, and the state controls 700,000 acres. On the government lands there are approximately 52 billion feet of standing timber, on the private lands 25 billion, and on the state lands 7,700,000 feet. The private holdings are considerably better than those of the State and Government.

The pressing need for forest conservation may be best illustrated by citing the condition of the forest industry in Pennsylvania. It is estimated that Pennsylvania originally had 500 billion board feet of standing virgin timber. By 1860 this had been reduced 360 billion feet, while at the present time she has only 11 billion feet. Since 1890 her consumption has been more than her production, until at the present time, with her consumption at its peak, two and one-half to three billion feet per year, she is producing only one-half a billion feet, or less than 20 per cent of her consumption, importing over 80 per cent. Pennsylvania is today paying a freight bill of over $20,000,000.00, on imported timber alone —a product that but a few years ago she was literally exploiting, little thinking that she would not always have enough to supply her own needs.

The case of Pennsylvania brings home a strong lesson, especially when we know that, if she had carried on a reforestation program in proper manner, her millions of acres that are now waste lands would in a large measure supply her present demands, and maintain the profitable lumber industry. Pennsylvania is today realizing that she has lands fit only for timber growing, and is making a systematic, efficient effort toward reforestation. She has adopted the policy of keeping fires from running over her cut-over lands, and of reseeding in some places. This will assure her a continuous, larger cut of timber than they have now. This larger cut will probably not be realized inside of the next ten years, but then will increase for fifty years, and after that remain constant. They are spending a half-million dollars a year on this program. Had it been possible to anticipate this condition while Pennsylvania was cutting at her maximum, her forest lands could have been left in a far better producing state than they are today. Idaho may profitably learn the lesson from Pennsylvania, and from other eastern states. If we are wise enough to take advantage of our opportunity, we may retain our enviable position as a state producing lumber for future generations.

To provide, then, for the preservation of the lumber supply, and for the assured continuance of the lumber industry, a timbered area must have a definite and authoritative policy that will assure this future. All citizens of the State are interested in keeping the lumber industry what it is today. The Forest Service with its large acreage has a very constructive policy, and the State has a definite policy which conforms quite closely to that of the Government. The larger private operators are interested in the future supply of timber, but, largely on account of cost and the length



Showing a portion of the 10,000 acre sale of State timber lands to the Diamond Match Company, in the Big Creek area, a tributary to Priest Lake. This shows the brush piled, and ready to burn, and the timber remaining on the ground after the merchantable growth has been removed.

of time necessary to grow timber, are prohibited from handling their lands by methods similar to those employed by the State and Federal Government. The expense would be too great, including the taxes, to realize an income on the investment. If taxes on cut-over lands were adjusted properly, the lumberman could see his way clear in some cases to reforest this class of land.

It is necessary that the police powers, in executing a policy of any kind, must come from the State. However, the greater number of the lumbermen are heartily cooperating in every way they can.

Practically the entire timber area of the State is now covered by cooperative timber protective associations which have been functioning very efficiently for the past fifteen years under the present Fallon Fire Law. This has greatly minimized the loss of timber by fire. The present Fallon Law needs to be considerably strengthened in the matter of requiring operators to dispose of slashing, and in more rigid measures for fire prevention. To this end all owners of forest lands should be required by law on an equitable basis to give these lands such protection as would prevent the spread of fire to lands other than their own.

Nature is the best forester. For centuries the forest areas have been kept in timber by natural reforestation. While one piece of timber is coming into maturity, another adjoining it has passed maturity, debris has accumulated from mature and fallen trees, making a firetrap, finally leading to a fire which sweeps the district. In all cases, except where there has been an extremely devastating fire over a large area, enough seed trees have been left for Nature to begin her work of reforestation and this process has been going on through the ages. This burning which has always occurred may be compared to the present timber cut. In other words, we are not cutting enough timber to deplete our forests and, if we could so harvest the mature timber that Nature would replace it, the problem of making our forest production permanent would be solved.

Ninety per cent of the problems of reforestation is protection from fire. For a number of years after the first fire, there is more danger of another than when the timber was green, on account of the fire-killed debris that was not all consumed. After the first ten years the danger becomes less on this particular area, and is not bad again until sprinkled with dead and down trees as the new crop approaches maturity. If we can operate at all these stages, so that danger of fire is practically removed, we will approach the answer to reproduction through prevention from fire.

When mature timber is cut, if all the slashings and debris are removed, and the young stuff left unhampered, the first danger of fire is removed, and that section, with reasonable safeguards, will be comparatively free from danger from fire until it again approaches maturity and cutting age. If we put vigorous efforts on close surveillance of the present mature and overmature timber, to prevent and keep check on fire until it may be cut, and care for the young growth in proper manner, then in time we will have a good share of our forests in ideal condition for marketing and maximum growth.

The State has adopted a policy on its own lands of disposing of only mature timber, with disposition over as long a term of years as is practical under.. marketing conditions. Its purpose is to keep all state lands fit only for forestry in a perpetual state of production. In all sales at the present time no white pine is included under 14 inches in diameter, nor cedar under 12 inches in diameter, and the purchaser is required to burn the brush and slashings in such a manner as not to injure the immature timber reserved. In some districts other species are reserved, if conditions warrant. The State has not gone so far as the Forest Service in requiring worthless hemlock and white fir to be removed. This removal is good forestry, as the defective trees have no value, but remain on the ground and take room that might be growing valuable timber. The expense of removing these trees, however, is quite large, and it is a question if the benefits warrant the increased cost of logging.

Practically all the large owners, including the State, are members of the six timber protective associations. These associations have been very aggressive at all times in protecting practically the entire forested area. This organized effort has saved a very large area that would have burned over. The Federal Government has recognized our local efforts, and is now advancing, under the Week's Law, considerable money each year on the condition that it be used on non-merchantable advanced growth, and on old burns which are reseeding.

(Concluded on page 36)

FOREST ECONOMICS IN NORTH IDAHO

By FRED MORRELL, District Forester

North of the Salmon River in Idaho, are something less than ten million acres of forest lands. About forty-six per cent of this area bears merchantable timber. Approximately thirty-three per cent bears a stand of poles, young growth, and reproduction. Seven per cent is not re-stocking from burns and the remaining fourteen per cent consists of unmerchantable protection forests. (Figures are all approximate only). A conservative estimate of the stand of merchantable timber on these areas is 54,810,000,000 feet, board measure. North Idaho contains something over 12,500,000 acres of land of all description and there are probably between one and one and a half million acres of this that are not commercially productive at all, or are only suited to light grazing.

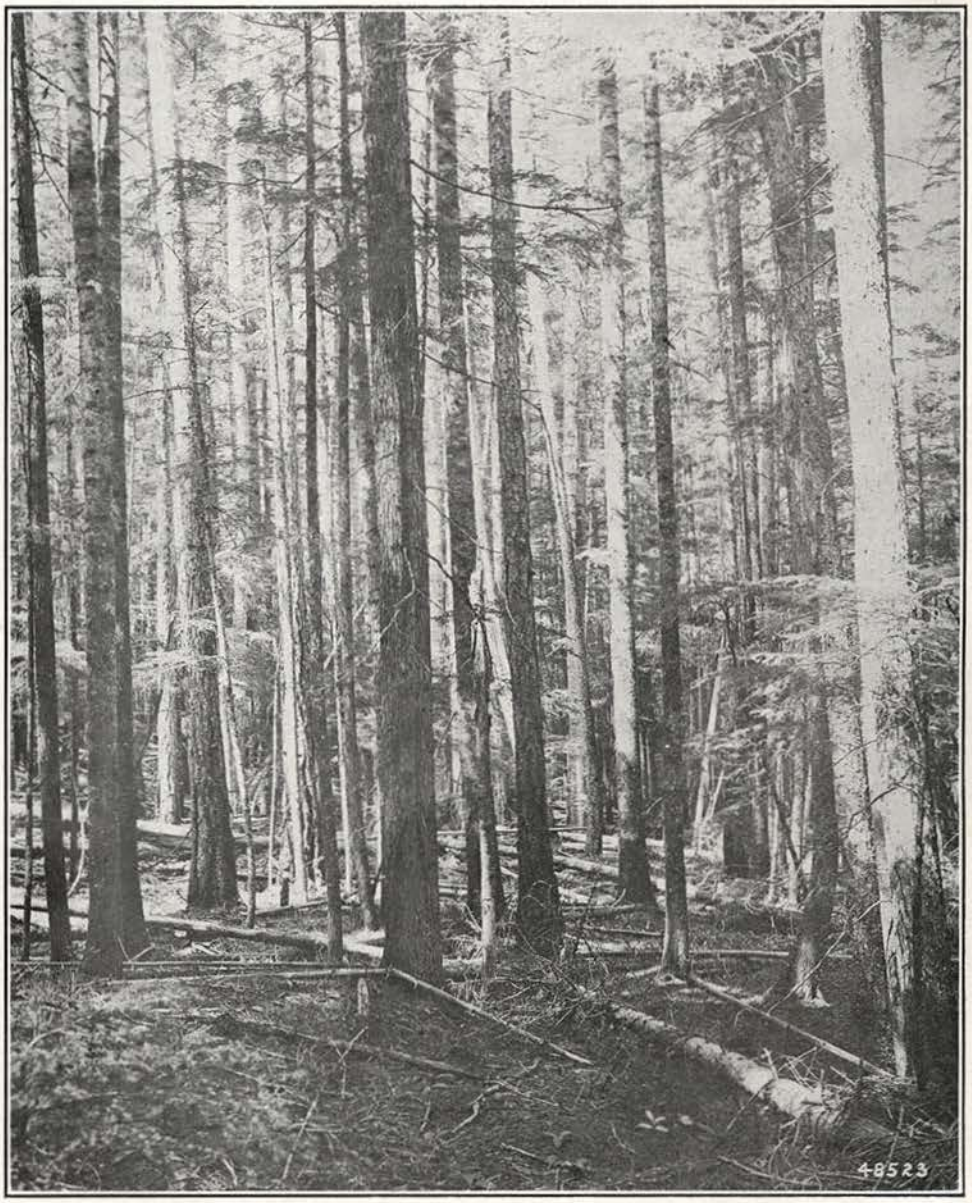
The lands capable of producing merchantable timber comprise approximately ninety per cent of the productive land. Assuming that within the next fifty years one million acres of this timber land may be converted to agriculture (and this is a very liberal figure), this, added to the present improved farm land, would make approximately two million acres under cultivation and would still leave eighty per cent of the land capable of producing crops, including timber, in timber production. The above figures are based on the best data available. They are not claimed to be accurate but will serve to give a general picture of the land situation. Possibly more than one million acres of present forest land should eventually be converted to agriculture. With small exception it is believed that lands suitable for agricultural crops, but now bearing timber, should be put to agriculture as fast as economic conditions warrant, but the great bulk of the forest lands are not suitable for that purpose and their future values will be for timber production.

It is, of course, apparent that a use to which three-fourths of the total area of a community's productive land is employed, becomes an important consideration in the economic development of that region. Estimating mill-run prices at $30.00 per thousand, the standing timber represents a value in manufactured products of $1,650,000,000. A big item of value in itself but not enough to make possible any great permanent development over so large a region. All foresters know, however, that this is not the way to look at the economic possibilities of forest lands; that if they are to play their full part in the permanent economic development of the region, it must be on the basis of permanent forest management and that the measure of economic value of the land is what it will produce on a sustained yield basis.

The timber lands of North Idaho are estimated as being capable of producing, under proper protection and management, one billion feet of timber annually (the figure is only roughly approximate since there are not sufficient growth and site data available on which to base an accurate estimate). On the basis of the present average mill-run values for the several species of timber in the state and adjusting the values in accordance with the percentage of each species that should theoretically be produced, this annual manufactured product should have a value of about $28,000,000. This income is approximately sufficient for the support of about eleven thousand wage earners, or a total industrial population of from thirty to forty thousand people. This figure is based on the approximate amount of money that would be paid for wages to those directly employed in lumber and timber products manufacture. According to the 1919 census report, the value of all agricultural crops produced in North Idaho was slightly over $25,000,000. The quantity and corresponding value of agricultural crops will probably increase steadily and may possibly double within a generation, so there is prospect for a growing support of the general community from this source. The general trend of lumber values will likely be upward and closer utilization will also serve to increase the value to the community from its manuufactured wood products. But whatever the future may develop, returns from timber products in the region are at present nearly equal to the value of its agricultural crops. In Bonner and Boundary counties timber products are worth over three times those of agriculture and dairying, and in Kootenai, Benewah, and Shoshone counties over twice. Going farther south, agricultural crops gain in relative importance. The value of all other manufactured products in North Idaho in 1919 was approxi-

mately $14,000,000. It is evident, therefore, that the timbered lands of North Idaho are now and will continue to be a very important factor in the economic life of the region.

The census figures for 1919 give the value of all manufactured products in the State of Idaho as $80,511,000. Of this, the value of lumber and timber products is $30,088,000 or 37.4 per cent. Of 13,917 wage earners in the manufacturing industries of the State, 8410 or 60 per cent were employed in the lumber and timber products industry. Of the $30,088,000 value of manufactured lumber and timber products, $8,478,000 represented the value of raw materials and $21,610,000 (or approximately seventy per cent of the total) the value that added by process of manufacture. The value of all other manufactured products in the State was $50,423,000, of which $35,471,000 is contained in the value of raw materials and



White pine, cedar, white fir and larch in mixed stand—North Idaho.

to which $14,952,000, or less than 29 per cent of the total, was added by process of manufacture. These figures are given because it is evident that an industry which sells manufactured products, the major portion of the value of which is added by process of manufacture, is more valuable to the community than one which adds by process of manufacture only a small portion of the ultimate value of its products.

About eighty per cent of the total cut of the State was from the region north of the Salmon River, so that of the 8291 employees engaged in the industry, about 6633 were presumably located in North Idaho. This figure represents nearly fifty per cent of all the wage earners employed in manufacturing industries in the whole State during the year.

The timber cut in 1919 for the whole State was 765,388,000 feet board measure. Figures for North and South Idaho separately are not available but from the proportion cut in each division of the State in other years it would appear that the cut in North Idaho was approximately 600,000,000 feet or about 100,000,000 feet less than the estimated sustained yield of the region when the Forests shall be put under proper management. Therefore, if the cut in North Idaho were limited to the estimated sustained yield, (and the probabilities are that it will not be), the lumber industry of North Idaho would continue for the few years just ahead at least to employ about fifty per cent of the wage earners of the whole State engaged in manufacturing industries.

It is evident from these general figures that North Idaho timber lands are playing an important part in the economic development of the State. From the general lumbering situation, it seems evident that they will play an even bigger part during the next two or three decades, in the course of which time the bulk of privately owned timber will be harvested. The timber on the National Forests will be cut on a sustained yield basis. The public owns twice as much land capable of producing timber as the combined private ownership, but the average stand of timber on the privately owned land is twice as much as the average on the public land. It is possible that in productive capacity for future crops the same ratio holds, i.e. the privately owned timber land, though only one-half of the area of the publicly owned land, is capable of producing an equal volume of timber. It is also true that it is capable of producing a better quality of timber. This is evidenced by the fact that sixty per cent of all of the white pine of the state—the most valuable species—is privately owned. An additional fact is that, on the whole, the privately owned timber is relatively much more accessible than the Government stumpage. It must, therefore, be apparent that the problem of a maximum future supply of timber in North Idaho cannot be solved alone by the management of the present National Forests and state timber lands; but that, on the contrary, what is done with the timber land in private ownership is, so far as lumber production is concerned, a relatively much more important question .

The total population of North Idaho, according to the 1920 census report, is 112,494. There were 8387 wage earners in manufacturing industries, or approximately the number that the timber lands of the region are estimated as capable of supporting permanently. About eighty per cent of the total employees engaged in manufacture in North Idaho in 1920 were in lumber and timber industries.. As nearly as may be estimated from the data available, approximately twenty per cent of the whole population of North Idaho is gaining its livelihood directly from lumber and timber products manufactured and, since eighty per cent of those engaged in manufacture are in this industry, it is evident that the prosperity of a large percentage of those engaged in agriculture and trade are dependent on it.

Foresters and lumbermen of North Idaho are well informed on the general economic situation as it is affected by the lumber industry and realize pretty fully that the question of future use of cutover lands is an important one. If the land is to be protected and made continuously productive, many questions of ownership, taxation, and cooperative effort are involved.

The writer has heard the question of practice of forestry in North Idaho by private interests discussed many times, and by a good many men engaged in the lumber industry. Without exception, they have claimed that it is not economically feasible under present conditions in North Idaho to hold land for a second crop, though some inquiry is now being made into the possibilities of white pine pole stands that will reach merchantable size, or nearly so, by the time that the operator will have cut over his virgin stand. A great deal has been said about taxation and other carrying charges, possible future stumpage values, risks from fire and disease, etc. In the

(Concluded on page forty-nine)

A MANAGEMENT PLAN
FOR THE
PRIEST RIVER WORKING CIRCLE

By J. A. FITZWATER, Forest Supervisor

The circle lies wholly within the Kaniksu National Forest, Bonner County, Idaho, and Pend Oreille County, Washington. It is bounded on the east by Priest River, Priest Lakes and Upper Priest River, and on the west by the Pend Oreille River divide. The northern limit is set by the Canadian bouudary, and the southern limit by the Forest boundary.

The balance of the Priest River drainage lying east of the river (with the exception of the Priest River Experiment Station, which involves some 4500 acres) comprises one of Idaho's State Forests. It is very similar in character to the Circle under discussion, and with present State policies it is probable the cut will be so distributed as to closely approach a sustained yield basis.

The Circle comprises an area of 245,900 acres of Government land, of which 240,000 acres are estimated to be productive forest land capable of growing crops of valuable trees; the balance is made up of barren alpine country and protective forest. In addition there are 88,400 acres of private land. Only the timber on Government land is taken into consideration in the plan. The acquisition of probably 75 per cent of the private land will gradually take place, but such additional land, due to it being cut over, will not materially affect the yield in the first rotation.

While moderately rugged, the area offers no serious obstacles to logging. Elevation varies between 2300 and 5000 feet. Priest River and Priest Lake offer excellent waterways for the transportation of logs and other forest products.

A well maintained county road extends from the south boundary of the Forest to Nordman Post Office, a point in the east-central part of the circle. This road with its secondary connections make the lower portion of the unit readily accessible and furnish an outlet for the movement of cedar poles.

Six miles of logging railroad have recently been constructed in the lower half of the unit, connecting a large body of timber on the Upper West Branch Creek with Priest River. Most of the timber in the unit can be moved to water transportation in this manner and it may be expected that this method of logging will see rapid development in the future. The nearest incorporated rail connection is the G. N. Ry. at the town of Priest River, Idaho, four miles south of the Forest boundary.

There are five mills adjacent to the circle which have a total annual capacity of 120 M. M. Two of these mills are at present largely dependent on Government and Northern Pacific timber for their supply and it can be expected that within the next thirty years competition will determine the existence of the mills to be supplied from the circle.

In addition to the above mills, two large cedar post and pole companies are largely dependent on the same area for their supply.

The Forest is composed of the following types, of which white pine is the most extensive and most valuable.

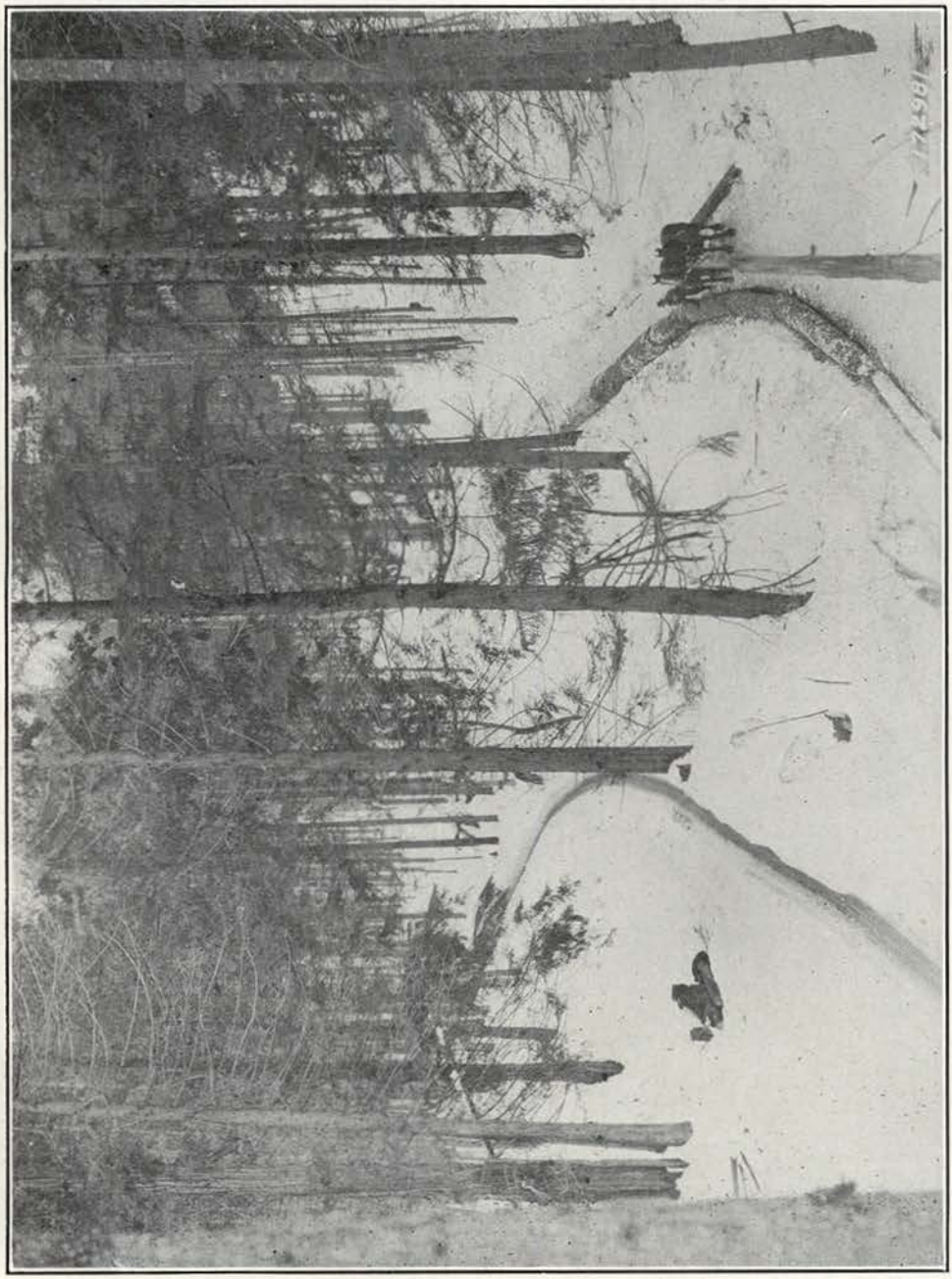
White pine	147,340 Acres
Larch-Douglas fir	39,340 Acres
Cedar-Hemlock	29,430 Acres
Spruce	12,300 Acres
Sub-Alpine	21,190 Acres
Non-productive	5,550 Acres

The distinction of the timber by age classes and volume is as follows:

	0-20	21-40	41-60	61-80	81-100	101-120	121-140	141-160	161-200	200 plus
Area	47,824	36,576	37,750	715	6,518	1,741	7,199	41,266	10,259	50,555
Vol. M. Ft				1,729	43,732	32,500	99,786	469,136	167,659	909,930

From a study of the above it will be readily seen that there is a fair distribution of age classes from 0 to 60 years, but that from this point to the mature classes a very small and irregular acreage is found.

Such yield tables as are available indicate 100 to 120 years as the proper rotation age. With the idea of maintaining a sustained annual yield, the cut of the present mature age classes (120 years and older) has been dis-



Cutting logs on Kaniksu National Forest, North Idaho.

tributed over the 60 year period which must elapse before the 41-60 age class becomes mature. It is appreciated that this method of regulating the cut is necessarily crude, but, with the lack of accurate data regarding growing stock, site, and yield, the use of the formula, increment or area methods appears out of place. The plan calls for a revision at the end of the present decade.

The lower half of the unit has been covered by a 10 per cent cruise some years ago: the upper half by an extensive cruise in 1921. As the earlier work did not include age class maps, these were obtained on the ground as a part of the 1921 cruise.

The total estimate for the circle, together with known required adjustments, follows:

White pine	517,000 M. bd. ft.
Fir-Larch	448,400 M. bd. ft.
Cedar	397,000 M. bd. ft.
White fir-Hemlock	276,000 M. bd. ft.
Other	86,000 M. bd. ft.
Total volume	1,724,400 M. bd. ft.
Volume in protection forest	62,800 M. bd. ft.
	1,661,600 M. bd. ft.
Growth on age classes below 120 yrs.*	71,300 M. bd. ft.
	1,732,900 M. bd. ft.
10% for seed trees	173,300 M. bd. ft.
Net volume	1,559,600 M. bd. ft.

*Growth was based on the normality of the 101-120 year age class as compared to the yield table prepared by F. I. Rockwell for the western white pine. Since the cruise figures do not include satisfactory board foot estimates for the younger age classes, the 101-120 was the only available basis:

Average actual acre .....18,700 bd. ft.
Average normal acre .....40,400 bd. ft.
Per cent normal acre 46%

Growth to maturity on the 61-80 year class would equal 46% of the normal increment added during this period on 715 acres (46% of 30,100 bd. ft. x 715 acres) or 9,892 M. bd. ft. Similarly, the 81-100 class would add, in 30 years to maturity, 56,368 M. bd. ft. (46% of 18,800 x 6518 acres); and the 101-120 class would add 5,000 M. bd. ft. (46% of 6,250 bd. ft. x 1,740 acres).

Total added increment, therefore, equals 71,260 M. B. M.

The record of fire during the past 10 years has been tabulated in the following form:

Year	No. of Fires	Acres Burned (Gov't Land)	
		Open	Timbered
1914	13	0	4
1915	37	36	160
1916	9	0	3
1917	24	20	338
1918	33	1343	427
1919	66	930	876
1920	60	480	490
1921	29	317	270
1922	39	242	421
1923	31	3	
		3371	2989

Causes of Fires

Lightning	65%
Brush burning	8%
Campers	9%
Incendiary	4%
Lumbering	3%
Miscellaneous	6%
Unknown	5%

The term "open" is construed as high, open alpine country, clean cut areas, or burns occurring within the last twenty years; areas which, if burned, will not affect the plan during the sixty year period. Applying the average stand per acre of productive forest land to an annual area of 299 acres burned over, gives an annual loss of slightly over two million feet. Assuming that one-half of this amount will be sufficiently accessible to be readily salvaged, one million is left for consideration in the plan. In case of an exceptionally destructive conflagration such as 1910, the entire plan would have to be revised.

The plan does not take into account the threat of blister rust in the white pine type. In general it is contemplated that, should the disease appear, Ribes eradication efforts will be directed primarily to young stands and to the more remote and inaccessible areas; the accessible stands can be harvested before serious damage can occur.

The mountain pine beetle, Dendroctonus monticolae, is the only species whose ravages have caused noticeable damage and these infestations rarely cover any extensive area. The removal and utilization of infested trees will take place wherever the stand is accessible.

The net volume of the circle, 1,560 M. M., divided by 60 (the gap which has to be spanned before the younger age classes reach maturity), gives an annual cut of 26 M. M. Taking

(Concluded on page sixty-two)

NOTES ON WOOD DECAY II

The Comparative Resistance to Decay of Edge-Grained and Flat-Grained Douglas Fir and Western Yellow Pine Lumber

By HENRY SCHMITZ (Professor of Forest Products)

Several years ago Mr. Parmeshwri Das Sharma, a graduate student working in this laboratory, investigated the action of various wood destroying fungi on edge-grained and flat-grained Douglas fir and western yellow pine lumber.*

I am taking the liberty of reproducing a table from Mr. Sharma's investigations which gives a summary of the results obtained by him.

A Table Showing the Average Loss in Weight of Douglas Fir and Yellow Pine Flat-grained and Vertical-grained Pieces When Subjected to the Action of Wood Destroying Fungi.

Fungus	Kind of Wood	Average Loss Per Cent (8 samples)	
		Flat-grained	Edge-grained
Lenzites saepiaria	Douglas Fir	2.5	1.0
	Western Yellow Pine	13.8	7.4
Fomes pinicola	Douglas Fir	11.0	8.0
	Western Yellow Pine	15.2	12.0
Polyporus lucidus	Douglas Fir	1.1	1.0
	Western Yellow Pine	6.9	5.5
Trametes carnea	Douglas Fir	7.8	5.4
	Western Yellow Pine	9.4	9.3
Dedalea confragosa	Douglas Fir	Contaminated	3.4
	Western Yellow Pine	6.2	6.4
Lentinus lepideus	Douglas Fir	0.5	0.3
	Western Yellow Pine	0.5	0.9

Mr. Sharma incubated his cultures at 27° C. for a period of four months and determined the loss in weight of all of the blocks after the total incubation period. A glance at the above table indicates that, in general, the edge-grained blocks lost less weight than did the flat-grained blocks. Mr. Sharma's conclusions are very conservative and he emphasizes the importance of further work before any very definite conclusions can be drawn. The purpose of the present investigation is to check the results obtained by Mr. Sharma.

General

The only factors which could influence the rate of decay in flat-grained, as compared with the rate of decay in edge-grained lumber, are of course the general position of the pits on the tracheid walls and the direction of the medullary rays. If the mycelium of a wood destroying fungus advances much more rapidly along the medullary rays than it does by penetrating the tracheid walls, then it is obvious that wood blocks so cut as to expose maximum number of medullary rays would become generally infected throughout in the shortest possible time. Such a condition exists in flat-grained boards, since they are cut at right angles to the medullary rays. In such cases not only are there an enormous number of medullary rays extending to the surface of the board, but the fungus would have penetrated them only a comparatively short distance in order to permeate the entire piece.

In vertical-grained material, on the other hand, still assuming of course that the mycelium advances more rapidly along the medullary rays than it does by penetrating the tracheids, it would be necessary for the mycelium to advance one-half of the width of the particular board before the entire volume of the board became generally infected.

Methods

Boards of dense and light Douglas fir heartwood and western yellow pine sapwood were obtained from a local lumber yard. From these boards edge-grained and flat-grained blocks were cut. In each case both were cut from the same board, in order that they might

*Sharma, P. D.: A report on a study of the action of various wood destroying fungi on flat-grained and edge-grained Douglas fir and western yellow pine lumber. Unpublished thesis on file at the School of Forestry, University of Idaho, Moscow, Idaho.

have as nearly identical properties as possible. These blocks were all of the same size, namely 1¾" wide, 3½" long, and ⅜" thick.

The sample of "dense" Douglas fir had an average of ten rings per inch which were composed of approximately 35% summer wood. The sample of "light" Douglas fir had an average of 15 rings per inch which were composed of approximately 20% summer wood. The western yellow pine had an average of 19 rings per inch with a low percentage of summer wood per ring. Specific gravity determinations were not made.

The blocks were dried to constant weight at 100° C. in an electric oven and weighed to the closest one hundredth gram.

Five of each of both the edge-grained and flat-grained blocks were placed in each of several two quart Mason jars partially filled with sugar maple sawdust. An excess of water was added to each of the jars, and the sawdust and blocks were allowed to soak for a period of two days, after which the excess water was drained off and the culture jars sterilized for twenty minutes under fifteen pounds pressure.

Two series of culture jars were prepared, one of which was inoculated with **Lenzites saepiaria** and the other with **Fomes pinicola.** Both series were incubated at 27° C.

The incubation period varied from five to thirteen months. One culture flask of each wood was taken down at five months, another at seven, another at nine months, still another at twelve months, and the last at thirteen months. After the incubation period the blocks were again dried to constant weight at 100° C. and again weighed. The percentage of loss in weight was based upon the original dry weight of the block.

Results

The results obtained from these experiments are recorded in Table I.

TABLE I.

Showing the Average Loss in Weight of Dense and Light Douglas Fir and Western Yellow Pine Edge-grained and Flat-grained Pieces When Subjected to the Action of Lenzites Saepiaria for Various Lengths of Time.

Kind of Wood	Fungus	Direction of Grain	Loss in Weight Per Cent After Incubation Period of				
			5 Months	7 Months	9 Months	12 Months	13 Months
Douglas Fir (Low Sp. Gr.)	Lenzites saepiaria	Edge	6.6	17.2	—x	24.6	37.1
		Flat	6.3	14.4	—x	18.7	36.1
	Fomes pinicola	Edge	5.4	20.6	28.9	32.6	42.1
		Flat	4.9	13.4	27.6	32.1	38.4
Douglas Fir (High Sp. Gr.)	Lenzites saepiaria	Edge	3.8	4.9	13.9	30.1	19.3
		Flat	4.0	5.5	16.3	31.6	22.4
	Fomes pinicola	Edge	1.1	2.1	4.5	14.2	29.3
		Flat	1.7	2.4	7.0	17.0	26.1
Western Yellow Pine	Lenzites saepiaria	Edge	13.4	26.9	30.9	24.5	49.0
		Flat	13.2	22.1	26.9	24.5	46.4
	Fomes pinicola	Edge	2.1	17.8	26.5	—x	39.3
		Flat	1.9	15.5	25.1	—x	40.2

(x Culture jars contaminated and results therefore not used.)

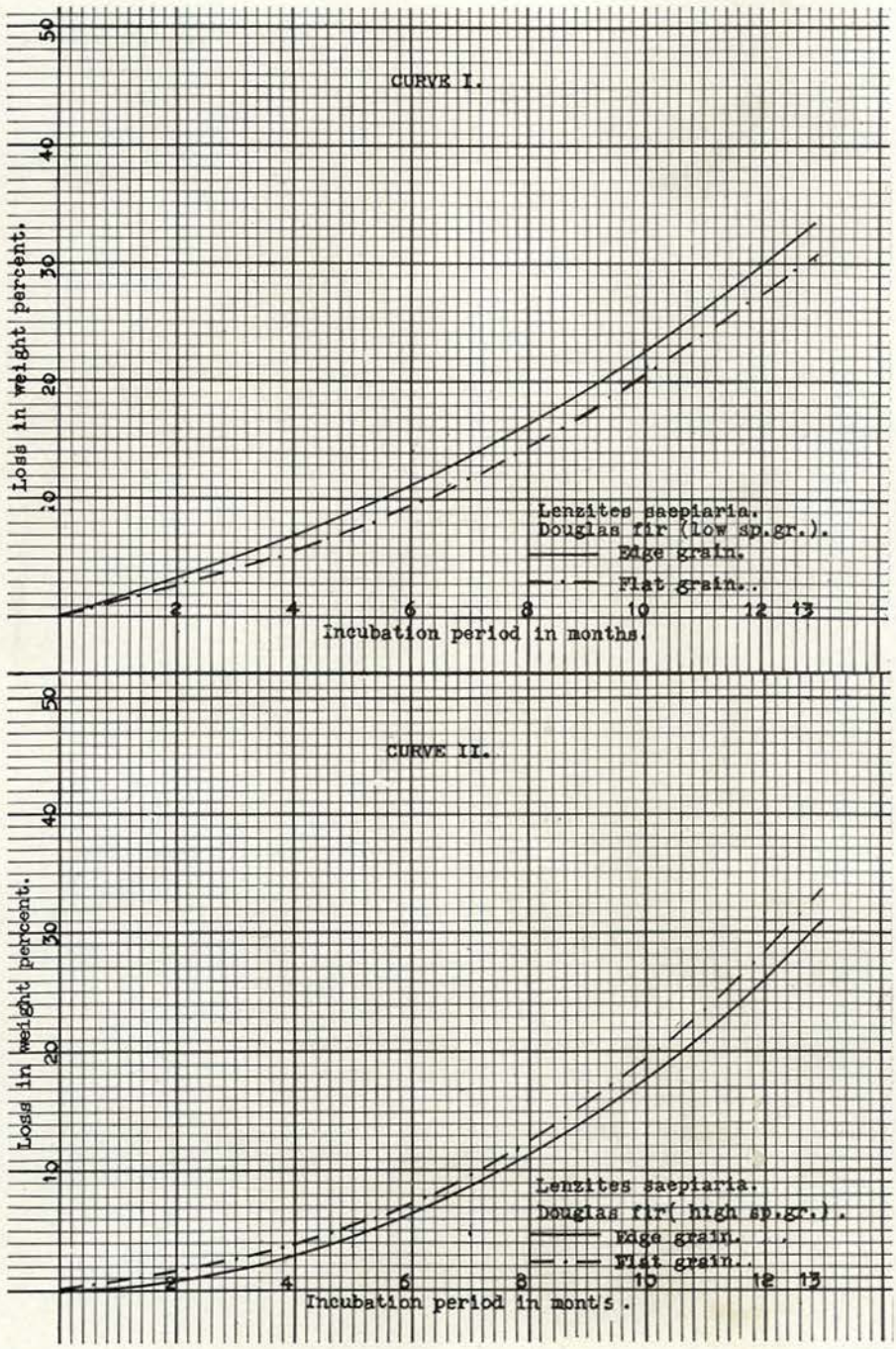
Discussion

An examination of the results recorded in Table I fails to show that there is any particular relation between the direction of the annual rings and the rate of decay. In certain cases the edge-grained blocks lost less weight than the flat-grained blocks. In other cases they lost more weight. When the results recorded above are plotted, this point is brought out more clearly. Curve I represents the rate of decay of edge-grained and flat-grained Douglas fir blocks of low specific gravity when subjected to the action of **Lenzites saepiaria.** In this particular case the rate of decay of the flat-grained blocks is just a little lower than it is in the case of the edge-grained blocks. Curve II represents the rate of decay of edge-grained and flat-grained blocks of Douglas fir of high specific gravity when subjected to the action of **Lenzites saepiaria.** In this case the rate of decay of the edge-grained blocks is just a little lower than it is for the vertical-grained blocks.

Although it is a little beside the point of this paper it is interesting in passing to note the rate of decay in the dense Douglas fir blocks as compared with the rate of decay in Douglas fir blocks of low specific gravity.

During the early stage of decay the loss in weight of the "dense" blocks is considerably less than that of the "light" blocks but after an incubation period of thirteen months the loss in weight is about the same.

When the results obtained with **Fomes pinicola** are plotted the curves are extremely interesting but, since it is impossible to include them in this paper, a discussion of them is omitted.



The results obtained from these pure culture experiments were substantially corroborated by another set of experiments in which a large number of similar blocks were placed in two gallon stone jars and covered with moist sawdust heavily inoculated with **Lenzites saepiaria.** Neither the blocks nor the sawdust used in this series was sterilized and the cultures were not pure. The jars were covered with several thicknesses of paraffined paper and incubated at room temperature for a period of ten months. The results obtained are recorded in Table II.

TABLE II

Showing the Average Loss in Weight Per Cent of Dense and Light Douglas Fir and Western Yellow Pine Edge-grained and Flat-grained Pieces When Subjected to the Action of **Lenzites saepiaria** in Impure Cultures.

Douglas Fir (Low Sp. Gr.)		Douglas Fir (High Sp. Gr.)		Western Yellow Pine	
Loss in Weight Per Cent		Loss in Weight Per Cent		Loss in Weight Per Cent	
Edge-grained	Flat-grained	Edge-grained	Flat-grained	Edge-grained	Flat-grained
6.6	5.3	4.1	4.5	5.7	5.2

Conclusion

It is felt that a conservative interpretation of the results here recorded will permit the conclusion that vertical-grained lumber is no more or no less subject to decay than slash-grained lumber of the same species and general properties when the relative ratio of the tangential area to the radial area does not exceed 5 or 6 to 1 and when the length of the piece, as compared to the width, is not great. Even were this ratio of 5 or 6 to 1 exceeded it is very doubtful whether it would influence the durability of the particular piece in question.

THE BUSINESS STATUS OF LOG SCALING

By H. I. NETTLETON

For the purposes of this article, log scaling may be defined as the measurement of logs to secure their contents in board feet.

The field of operations of a log scaler is rather wide and the following brief description of each phase of the work is given in the order in which the scaling technique is usually most easily mastered.

Many scalers secure their initial experience in scaling on flat skidways where each log is exposed to view and can be most easily studied for possible defects. One man can work alone to good advantage under such conditions and, where sufficient space is available, scaling on flat skidways provides the quickest, easiest, and most accurate of all methods.

A second and perhaps more common method on most operations is known as deck scaling in which the logs are decked on the skidways to conserve space. This method requires greater skill and experience on the part of the scaler inasmuch as only the ends of the logs are exposed. Two scalers can work to best advantage in deck scaling, working on opposite sides of the deck and taking one log at a time. The three greatest disadvantages of deck scaling are as follows: the difficulty experienced in reaching the ends of short logs in decks of mixed lengths; the necessity of judging lengths of inside logs by comparing the position of their ends to those of outside or top logs of known lengths; and the inability to see and deduct for defects appearing on the sides of inside logs.

A third method of scaling, commonly known as "woods scaling"', is carried on behind the faller and behind the buckers. In the first case, the scaler measures the diameter of the stump in inches and the falling crew is paid on the basis of such measurement. Loggers claim that this practice has a decided tendency toward cutting lower stumps and increasing the board foot cut per acre. On the other hand, such practice in species having a rapid stump taper or considerable butt rot has caused a loss rather than a gain in board foot production.

In the second case, the scaler works behind the buckers, and uses a caliper rule to get

the log scale. In rough, brushy country this method is most trying, especially in the winter, as the logs are hidden for their entire length, as well as at their ends, and it is impossible to detect and deduct for defects. The system is widely used, however, as a basis for paying off sawyers who quit the woods before their logs are skidded onto the rollways. Unless a given per cent is deducted for hidden defects, the woods and deck scale may differ considerably and the employer will pay for more footage than he himself receives.

The fourth phase of scaling known as pond scaling, has, to a lesser extent, the same disadvantages as scaling in the woods, because a considerable portion of the log is under water and requires rolling to detect defects along the sides and ends. In some cases a lump per cent is deducted from the full scale to take care of defects.

The fifth phase of scaling, known as mill scaling, takes place on the log deck of the mill and offers the best opportunity of checking one's judgment as to loss from defects. This added advantage is sometimes offset, however, by the necessity of hasty measurement and judgment when the mill is running full capacity.

Due to just such conditions, the woods and mill scale often differ by a wide margin and too often the blame is placed upon the woods or camp scaler. Taking two men of equal experience, it is the writer's conviction that the woods scaler has the better opportunity of close log inspection, so far as exterior indications are concerned, and he certainly has more time for careful stick work. The mill scaler, however, has the opportunity of changing his scale on a doubtful log when it is being sawed and this is one of the factors tending toward a lower mill scale as compared to the woods total.

Every log scaler, in whatever phase of scaling he may be engaged, should have an opportunity of scaling at the mill, in a check scaling capacity at least. This enables him to check his judgment on such end defects as he encounters in his regular work. There are too many woods scalers who have never had the opportunity of watching their logs opened up and consequently they continue making mistakes of judgment which may be slight on individual logs, but the sum total of which counts heavily on the weekly run.

The personal qualifications necessary for successful scaling are those which are generally essential to success in any other line of work and include good physical health, absolute honesty, tact, keen observational powers, judgment, and courage of convictions. The latter quality is especially essential in scaling work, as many honest and occasionally dishonest differences of opinion arise as to individual or total log scales and a vacillating scaler would not last a week, once his weakness was discovered.

The business qualifications of a high grade scaler who would work up and into the more profitable positions offered in the lumber business are, roughly, sixfold.

First, he should have a general knowledge of logging operations and a specific knowledge of falling and bucking. Scalers on small operations often have general charge of such work and should be thoroughly familiar with conservative methods which will cut down such production losses as fallers' and buckers' breaks and splits, "barber-chairs," high stumps, etc.

Secondly, he should have a general knowledge of lumbering and a specific knowledge of lumber grades and sawing methods. This knowledge can be secured only through actual mill work, and enables the scaler to judge his logs more effectively, both as to quantity and quality of contents. If the scaler knows how a mill sawyer handles certain crooked or defective logs, he is less apt to go wrong as to net scale of such logs.

In the third place, he should have a thorough knowledge of every term of the company's sale and logging contracts in order to enforce them, if he is so authorized, or to report violations to the proper authorities. Scalers are sometimes held responsible for the proper fulfillment of sawing contracts. In addition to such knowledge, the scaler should be absolutely familiar with the values on the scale stick in use, as occasions invariably arise, necessitating a rough estimate of log contents when no rule is available.

A fourth qualification is the ability to estimate lump scale on cars and skidways and in decks, rafts or ponds. Knowing the log run per thousand board feet for that particular locality, it is only necessary to estimate the approximate number of logs in the group in question in order to make a reasonably accurate estimate, provided the logs are running true to average size. Otherwise, an estimated per cent must be added or subtracted from the average run as the case may be. Such exceptions to the general rule usually

require considerable experience in order to accurately estimate the variation from the average run.

Another qualification is the specific knowledge of local defects, and a general knowledge of regional defects. The latter knowledge is of especial importance to scalers working out from grading bureaus and scaling for widely separated organizations.

The sixth and last qualification deals with the ability to estimate stumpage and to pick standing trees suitable for filling special orders. Cruising experience, a definite knowledge of the relative values of different tree species, and a clear idea of grade values in the "rough" are all necessary in order to meet this qualification.

A Laboratory in Log Scaling.

It is considered advisable at this point to warn the reader that all six qualifications outlined above are rarely found in the average scaler. They are nevertheless essential if one wishes to work beyond the position of routine scaling.

Scaling, in itself, as recognized by the average lumbering organization today, is neither of a highly professional nor of a remunerative character. It is the author's firm conviction that scaling is neither appreciated nor rewarded in proportion to the true importance of the job.

It makes no difference whether the man who employs the scaler is buying or selling logs, if the business is to be conducted on a fair and sound basis, neither party to the contract should receive more than the actual merchantable contents of the logs. If the scaler's judgment errs in either direction, someone will lose money, the amount depending upon the scale involved. The difference between a good and a poor scaler is, that the good scaler's errors compensate each other while the errors of a poor scaler usually accumulate and in the latter case someone will be the loser.

For the above reasons, therefore, the writer firmly believes that the encouragement of better, more careful scaling through a higher wage scale would keep good men in this important phase of the game who otherwise pass on to other and wider opportunities.

In conclusion, a few scaling "donts" are submitted for the benefit of new scalers just starting out. These precautions apply particularly to the system of contract logging peculiar to the Inland Empire.

In the first place, never predict the scale unless requested to do so by competent authority. It saves an embarrassing explanation of why the actual scale was lower than the predicted figures if your advance judgment proves too optimistic. The safer plan is to let the scale stick tell the story.

In the second place, never place yourself under obligation to the person whose logs you are scaling. Instances have occurred in which favors were intentionally offered with

the express idea of securing a higher scale.

Another precaution is to avoid telling contractors what other contractors are "scaling out." The scaler often becomes the unintentional source of trouble in so doing.

Seize every opportunity to check figures during the day and lighten night work.

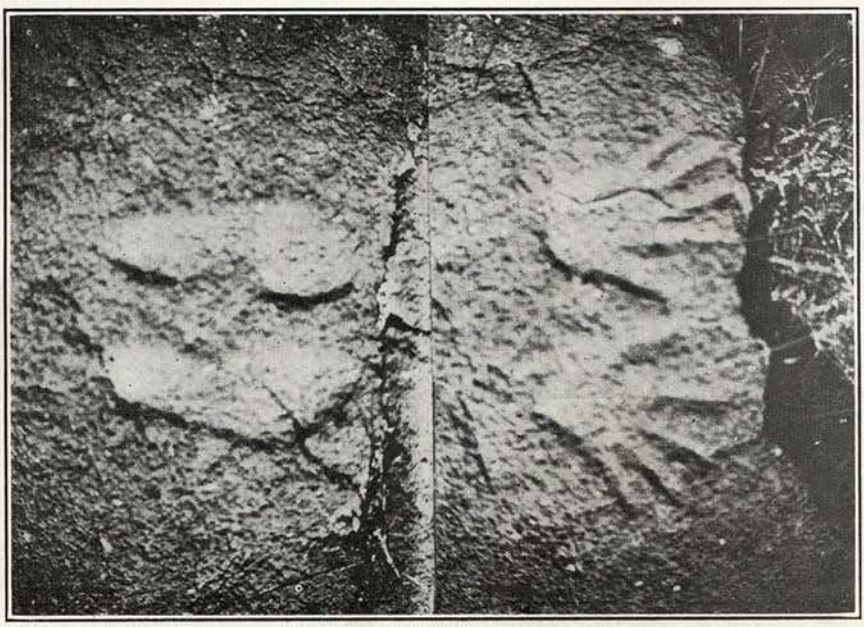
Never repeat rumors about members of your organization or other contractors. The scaler working out from a central camp has a splendid opportunity to become a local gossip, unless he watches himself. He can do something more worth while by carrying mail to outlying camps than by scattering unsubstantiated news.

A FOREST MYSTERY

By H. I. NETTLETON

Eighteen miles west of Guler, Washington, the Forest Service trail to Racetrack Ranger Station passes over a strip of ancient lava. In its twisting efforts to reenter the heavy timber beyond, it passes close to the edge of Goose Lake, the shallow waters of which all but hide the mysterious clews to an ancient tragedy.

On a thick slab of flintlike lava, sloping down to the water's edge, and uncovered only in years of extreme drought, may be seen, plainly indented, the hand and foot prints of an Indian woman.



The position of the prints would indicate that the maker had jumped from a higher position.

The position of the prints would indicate that the maker had jumped from a higher position; alighting on "all fours," so to speak. It takes but little imagination to picture the condition of the now flinty lava when it was plastic enough to receive those tell-tale imprints, made, perhaps, centuries ago.

One could pass many times within a dozen feet of the spot and never notice anything unusual and yet, every Indian tribe whose ancestors roamed this region knows of the prints and has a legend concerning them.

According to one tribe, there was once an Indian princess, blessed with exceeding beauty but cursed with a diabolical temper. One day, in a fit of mad rage, she leaped from the summit of Red Mountain, four miles distant from Goose Lake, fell into the onrushing lava stream, and was instantly consumed.

Be that as it may, the mystery of Goose Lake remains today as it has perhaps remained for untold years, unsolved, yet alluring, visible but mysterious—one of God's many secrets.

THE FOREST FIRE SEASON AT DIFFERENT ELEVATIONS IN IDAHO

By J. A. LARSEN
Priest River Forest Experiment Station, U. S. Forest Service

In any fire-ridden forest region, such as north Idaho, there is great need for a tangible basis by which to judge the length and the intensity of the fire season in different forest types and at different elevations. The major and natural forest types, such as the western yellow pine forests, the western white pine forests, and the sub-alpine forests, occur in altitudinal zonations one above the other and are the result of differences in air temperature and precipitation which affect not only life, growth, and distribution, but the fire hazard as well. It follows, therefore, that in addition to the local and physical basis of classifying fire hazard, as determined by the quantity and quality of inflammable material in each forest type, we should be in a position to begin laying a climatic basis which will set forth and define the length and possibly the intensity of the fire season in various forest types.

With this in view, the writer has examined variations in temperature and precipitation at different elevations in north Idaho, using data collected by the U. S. Forest Service and the U. S. Weather Bureau. These data have been correlated with the major forest types, as shown in the following tables:

TABLE 1

Zonation	Station	Mean Air Temperatures (°F) Elevation	Jan.	Feb.	Mar.	Apr.	May
Prairies of Eastern Wash.	(1)	1000-2000	27.7	32.6	41.6	49.9	57.1
W. Y. Pine Forest	(2)	2000-2500	27.2	31.0	37.7	46.1	53.1
W. W. Pine Forest	Murray	2700	25.2	28.5	34.4	43.2	50.4
W. W. Pine Forest	Burke	4080	22.0	26.4	32.3	38.6	44.8
Sub-alpine Forest	Roosevelt	7500	19.2	21.4	25.0	32.7	38.3

Mean Air Temperatures (°F) June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual	Length of Fire Season Beg.	End.	Days
63.7	72.5	70.9	61.6	50.6	39.0	29.9	49.7	4/15	10/16	184
60.3	66.8	66.7	57.4	44.5	36.7	30.3	46.4	5/4	10/2	150
56.4	62.9	61.7	52.2	44.0	33.4	27.4	43.3	5/14	9/23	132
51.4	59.9	58.2	53.2	43.2	33.0	22.4	40.4	6/8	9/23	107
47.6	56.6	56.6	48.9	41.0	27.8	22.0	36.4	6/25	9/9	76

Zonation	Station	Elevation	Precipitation (inches) Jan.	Feb.	Mar.	Apr.	May
Prairies of Eastern Wash.	(1)	1000-2000	1.30	1.25	0.76	0.55	1.04
W. Y. Pine Forest	(2)	2000-2500	3.01	2.18	2.22	1.82	1.96
W. W. Pine Forest	Murray	2700	4.72	3.62	3.34	2.13	3.27
W. W. Pine Forest	Burke	4080	6.17	5.30	4.78	2.50	3.09
Sub-alpine Forest	Roosevelt	7500	2.81	3.01	3.92	1.40	2.03

Precipitation (inches) June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual	July-Aug.	June-Sept.
0.76	0.31	0.45	0.48	0.83	1 54	1.42	10.69	0.76	2.00
1.36	0.73	0.57	1.18	1.49	2.77	2.97	22.39	1.30	3.84
2.72	1.38	1.37	2.31	2.75	5.71	4.40	37.72	2.75	7.78
2.84	1.68	1.03	2.62	3.27	5.48	5.48	44.24	2.71	8.17
2.33	1.48	0.82	0.94	1.12	2.46	3.80	26.02	2.30	5.57

(1) Ritzville, Hatton, and Lind, Wash.
(2) Spokane, Coeur d'Alene, and Potlatch, Idaho.

TABLE 2
Averages and Extremes of Weather Conditions in August

Forest Zone or Type	Place and Elevation	Air Temperature °F			Relative Humidity Per Cent			Wind Movement mi. per hr.	
		Absolute Max.	Mean Max.	Mean Min.	Mean A. M.	Mean P. M.	Lowest Monthly	Mean for month	Max. monthly
Prairies of Eastern Wash.	Hatton 1,100	112	88.8	49.2	—	--	—	—	—
Western Yellow Pine Forest	Spokane 1,943	105	82.3	53.6	64	25	16	5.3	6.5
W. W. Pine Forest Low Station	Priest River 2,380	101	81.6	41.8	65+	39	24	2.7	6.0
Western White Pine Forest Low Station	Murray 2,700	97	80.1	43.3	—	--	—	—	—
Western White Pine Forest High Station	Burke 4,082	92	74.4	42.0	—	—	—	—	—
Sub-alpine Forest	Exp. Sta. Lookout 6,000	—	68.6	51.0	60	46	—	8.9	—
Sub-alpine Forest	Monumental Buttes 6,979	—	72.6	49.1	—	53	30	15.0	—

On the basis of a very exhaustive investigation*, in the course of which over thirteen thousand fires, which occurred from 1909 to 1919 in different parts of northern Idaho and Montana, were classified by months and correlated with temperature, it became quite clear that a mean air temperature between 45° and 50° F, but nearer 50°, could be used to indicate the beginning and the ending of the fire season. Fifty degrees is therefore used to designate the beginning and ending, as well as the duration of the average fire season. It was also shown in the same report that there is practically no fire danger whenever the monthly precipitation averages 2 inches per month and, furthermore, that whenever the rainfall showed less than 2 inches per month the number of fires was directly proportional to this deficit under 2 inches. The danger line in precipitation is therefore fixed at 2 inches per month.

Looking over the air temperature data and curves for indications of the length of the fire season, it is seen that the western yellow pine stations show a possible fire season of 150 days, extending from May 4 to October 2; the western white pine station of Murray, Idaho, 132 days, from May 14 to September 23; and Roosevelt, the station in the sub-alpine region, 76 days, from June 25 to September 9. In the sub-alpine forests the fire season is only half as long on this basis as in the western yellow pine forests. These periods exist in full measure during dry seasons and are somewhat curtailed by rainfall during the normal seasons. Not only does the western yellow pine and the lower white pine forest type show longer fire seasons than the sub-alpine areas, but during this season much higher air temperatures prevail over these, and this fact materially increases the intensity of the fire season in the lower as compared to the upper forest types. The other factors of climate bearing on the intensity are taken up later.

It was stated above that an average rainfall of 2 inches per month during summer holds fires well in check. Since, however, the normal rainfall curves for Idaho go considerably below this point, both in the yellow pine and the white pine forests, there is, therefore, a fire season during every summer of normal, as well as subnormal precipitation, and a safe season occurs only during the years of ab-

*"Climate and Forest Fires in Montana and Northern Idaho" by J. A. Larsen and C. C. Delavan, U. S. Monthly Weather Review, Feb. 1922, 50; 55-68.

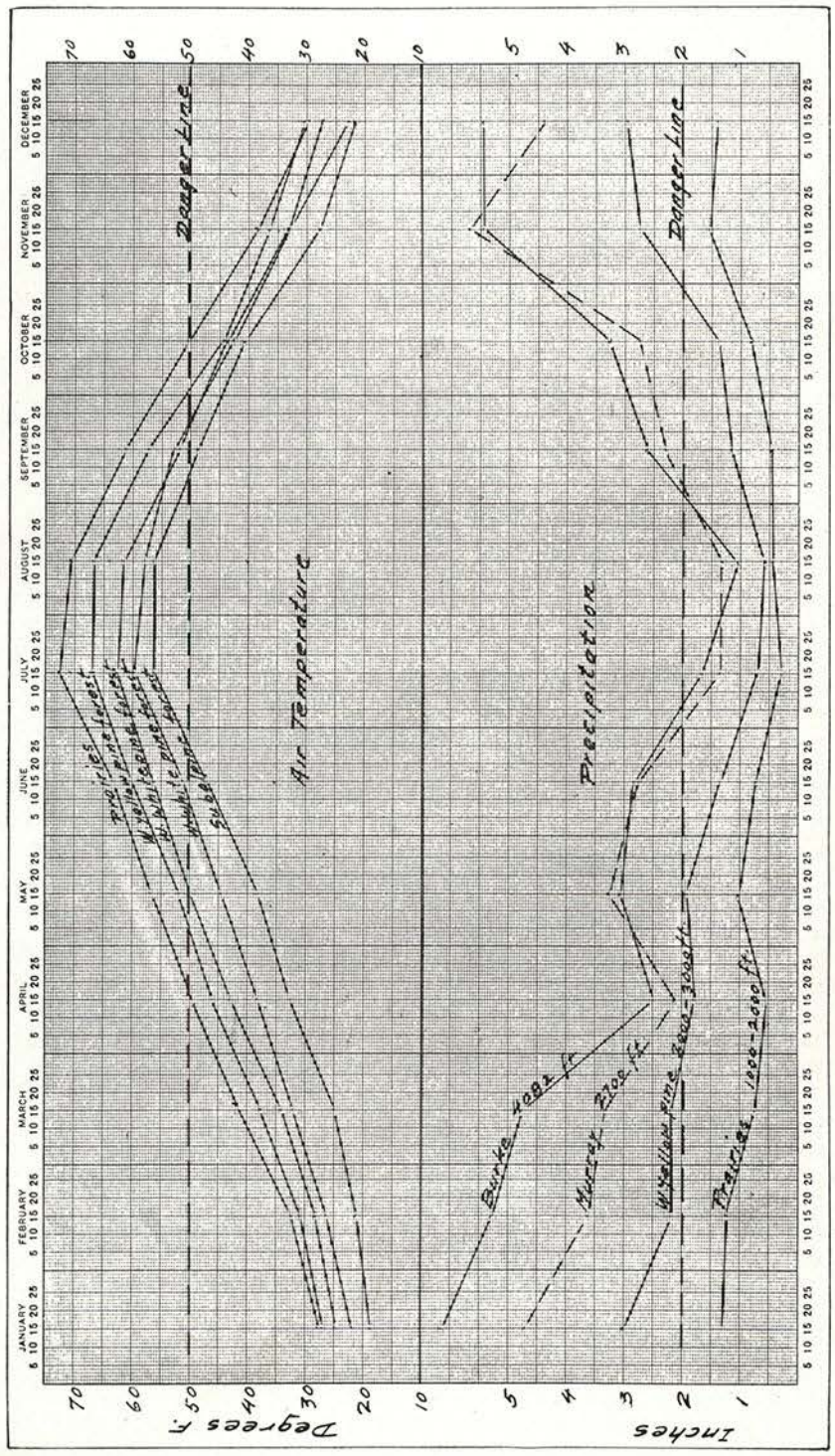

Degrees F.
Inches
Air Temperature
Precipitation
Danger Line
Danger Line
Burke 4081 ft.
Murray 2700 ft.
Yellow pine 2500-3000 ft.
Prairie 1000-2000 ft.
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

Figure 1

normal rainfall. The length of the fire season in the western yellow pine forests, as gauged by the normal rainfall curves,—Figure 1,—extends from May 15 to October 31, seemingly a period of 168 days, but from this we must deduct 29 days in October in which the temperature is so low that there is really no great danger. This leaves a period of 139 days. We may say, therefore, that under conditions of normal precipitation there is, in the western yellow pine forests, a fire season of 139 days, limited by the rainfall in the spring and the temperature in the fall, and in years of deficient rainfall a fire season of 150 days, limited by temperature conditions both in the spring and fall. In the lower station for the western white pine forest, the fire season is similarly limited, during seasons of normal rainfall, to 67 days from July 1 to September 5, and, during summers of subnormal rainfall, from May 14 to September 23,—a period of 132 days.

Unfortunately, there is no available normal rainfall curve for sub-alpine forest stations in northern Idaho. Roosevelt, which lies at 7,500 feet, could be compared for temperature but not for rainfall, because it lies too far to the south on a watershed which shows rainfall conditions different from north Idaho.

It should be remarked that, in judging the length of the fire season for a given locality, the time of beginning is subject to much more variation than its close, because in the spring the drying out begins at the lower elevations and progresses toward the higher elevations, following melting of the snow and advent of warm weather; whereas the fire season in the fall is often terminated by rains or snow simultaneously for high and low regions alike. Furthermore, because of the variations in weather conditions from year to year and the uncertainty in predicting the kind and character of the season, it is difficult to apply this knowledge. It is, therefore, not claimed that the data for the average season, as here presented, will furnish a safe guide and dependable basis indicating when and where to place the guards each year or how to mass or scatter the protective organization. Nevertheless, the chart is fairly indicative of the average opening and closing of the fire season, and in this way they serve the same purpose as frost data in agricultural pursuits. Again, by comparison of the current May, June, and July records with the normal, the data should aid in the recognition of the approach of abnormal or subnormal conditions, so that the cautious administrator would fortify himself for critical conditions.

Going back to a consideration of the relative intensity of the fire season at different elevations, it is necessary to regard the factors of maximum air temperature, atmospheric humidity and wind movement. (See Table 2). These, aside from the forest cover, influence the rate of drying out, the rate of consumption of material by fire, and the fanning and spreading of the flames. Recent investigations, conducted by the Priest River Experiment Station staff and others, have shown beyond a doubt that the dryness of the air in summer greatly influences the rate of spread of forest fires.

Although data on these factors are not as complete as could be wished, certain outstanding and significant figures have been obtained. Thus the mean maximum temperatures in August in the yellow pine forests are about 10 degrees higher than in the western white pine forests, and nearly 20 degrees higher than at the lookout points above 6,000 feet elevation.

Since the critical conditions for forest fires are as much a result of deficient rainfall as high temperature, it is well to consider the amount of rain which falls during the summer, or better yet, during the two months—July and August. For the western yellow pine forests, this is only 1.30 inches and in the western white pine forests 2.71 to 2.75 inches, or 0.65 per month in the yellow pine type and 1.38 inches per month in the western white pine type. During years of unusually bad forest fires, such as 1910 and 1919, the total July and August rainfall has been considerably less than 1 inch for these two months, both in the yellow pine and in the white pine forests.

The relative humidity also shows much more dangerous conditions in the yellow pine forest than elsewhere. But, while the low-lying regions show both a longer and more intense fire season than the higher, the latter are subject to much greater wind movement than low stations and are, for this reason, not as well off as is indicated by the other factors previously considered. Thus, the average wind velocity at Spokane in August is 5.3 miles per hour, at the Experiment Station lookout 8.9 miles, and at Monumental Buttes lookout 15

miles.* The figures on wind velocities at the highest lookout points, such as Monumental Buttes, are indicative rather than representative of actual conditions over the high forest area, in that the instruments are maintained on elevated and outstanding points on the topography. Such figures must, therefore, be somewhat reduced.

Summary

Comparisons of air temperature and precipitation data obtained in the various forest zonations in northern Idaho, made for the purpose of gauging the length and intensity of the fire season in the various altitudinal belts, show a possible fire season of 150 days for the lower western yellow pine forest, 107 to 132 days for the forests of western white pine, and about 76 days for sub-alpine forests at elevations of 7,500 feet. During these days the mean air temperature averages above 50° F. This length of fire season occurs only during summers of subnormal rainfall. When rainfall is normal the season is cut down to 139 days in western yellow pine forests and 67 days in the western white pine forests. Records for the sub-alpine forests are altogether too meagre to permit determination of the length of the normal fire season as limited by rainfall.

The intensity or peak of the fire season, as measured by the mean air temperature, the maximum air temperature, and amount of precipitation during July and August, as well as the relative humidity, appears much more critical in the lower western yellow pine forests than in the forests which appear at high elevations. Wind movement is greatest in the sub-alpine forests and lowest in the western white pine type and, were it not for the low temperature and high humidity occurring at the higher elevations, the fire hazard would be much greater in the sub-alpine type than is actually the case.

*The relation of air temperature, wind movement, and relative humidity on lookout stations in Idaho and the comparison of these with conditions at valley stations is more completely set forth by the author in the Journal of Forestry, Vol. 20, No. 3, March 1922, p. 215-19.

SLASH DISPOSAL IN A PRIVATELY OWNED WHITE PINE STAND

By C. L. BILLINGS

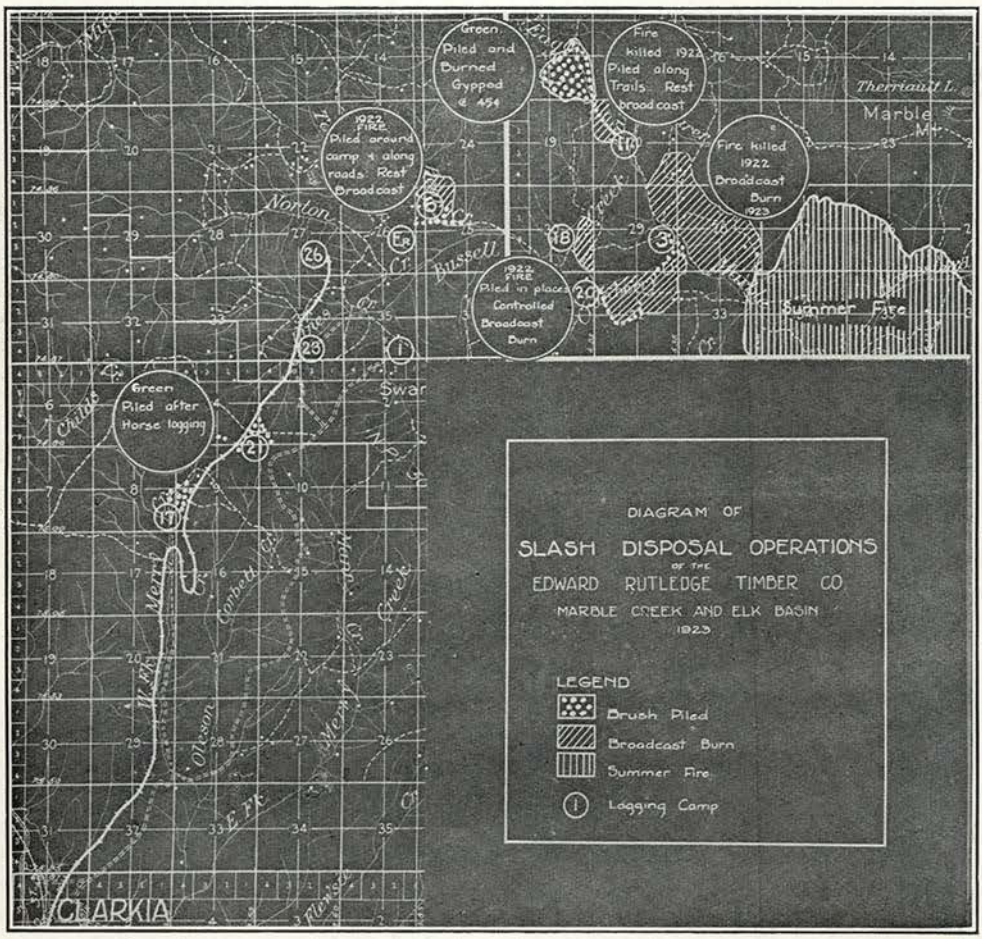
It is the consensus of opinion of those in closest touch with conditions in the timbered areas of north Idaho that slashings constitute the most important factor in the solution of the fire problem. A brief statement, therefore, of the experiment of the Edward Rutledge Timber Company in improved methods of slash disposal in the summer of 1923 may be of general interest. In preparing this paper, liberal use has been made of a very excellent report entitled "Notes on Private Slash Disposal" by R. N. Cunningham of the U. S. Forest Service.

In planning these experiments, the writer in company with Mr. George Hamilton, who was employed to carry them out, made a careful inspection of representative areas of the company holdings on Marble Creek and in Elk Basin and while on the ground devised for each area the kind of treatment it was to receive. The treatment varied from broadcast burning to piling and burning the slash. In general the scheme was to pile and burn in green timber, working on the theory that the important thing to do wherever possible was to preserve the young growth, to conserve the moisture, and provide the shade to prevent the terrific drying out to which the typical broadcast-burned area is subjected. Nevertheless, there were areas where there was absolutely nothing else to do but to broadcast burn. On some areas, it was decided to pile and burn in broad lanes, leaving undisposed brush broken up into isolated patches, while on still other areas controlled broadcast burning seemed most practicable.

From the outset the plan was beset with labor difficulties which made it impossible to carry it out on the scale intended. Men for the job were exceedingly scarce, and most of those secured were not in sympathy with new methods of brush disposal. They were particularly adverse to piling and burning brush, considering the job beneath them. This is doubtless only a prejudice, however, which can be overcome. Another serious disap-

pointment was a fire in 1923, which swept a good part of the tract included in the experimental areas.

A brief description of what was done on a few specific tracts will serve to give a better idea of the general plan. In this connection the accompanying map will help the reader to locate these specific areas, as well as to gain a general idea of the company holdings in question.



Eagle Creek Area

This area, covering about 160 acres, is in Section 18, Township 44 North, Range 3 East, and lies adjacent to a big burn which occurred in 1922. Two and a half million feet of white pine and a few cedar poles were cut from the 160 acres in the winter of 1922-23, leaving a dense stand of cedar and white fir. The slash on this area was piled and burned under contract at 25c per M. feet for piling and 10c for burning. Although the job was taken by two men inexperienced in piling and burning slash, the work was done in a satisfactory manner with only slight damage to the standing timber. Thus not only is the stand remaining on this particular area preserved, but the sixty million feet of white pine left in Eagle Creek is much safer as a result of this reduced fire hazard, gains which will doubtless fully justify this expenditure of $1,125.00.

Cranberry Creek Area

This area is located entirely within the 1922 burn. Between eight and nine million feet of white pine were cut from about 400 acres, including a state sale of 80 acres, handled by the Forest Service. This left little at stake, except to reduce the fire hazard to safeguard the green timber above the cutting, and to protect two camps and a dam on the creek.

To accomplish this a strip one to three chains wide was piled and burned around the upper edge of the cutting area. The remaining area below was then broadcast burned down hill, the operation being conducted in pieces so as to keep the fire from getting out of control. The brush around Camp 3 had previously been piled and burned and later the same treatment was given the areas along the trails, and the creek where more or less travel is expected. The cost, including the piling and burning around Camp 3, was less than 10c per M.

Miscellaneous Areas

At Camp 11 and Camp 6, both within the 1922 burn, the slash was piled and burned around the camps and along the skidways, roads and trails. The rest of the area was broadcast burned.

At Camp 21, a railroad runs around the hillside. Above the railroad, where the timber had been skidded with horses and where all the white fir and part of the cedar has been left, the brush was piled and burned. Below the railroad donkeys were used to drag the timber up. Here characteristic "jack pots" are found, where nearly all the trees have been uprooted and the broken parts piled high. These jack pots will be broadcast burned.

Brush piled ready for burning.

At Camp 17, the slash north of the camp was piled and burned, and this area offers a pleasing contrast to one nearby which was burned broadcast.

On the whole the results are encouraging and, in spite of the many difficulties encountered in the first season's work, our company intends to carry on with these experiments in better slash disposal methods.

Finally, let us remember that the conservation of our natural resources, though the gravest problem of today, is yet but part of another and greater problem to which this Nation is not yet awake, but to which it will awake in time, and with which it must hereafter grapple if it is to live—the problem of national efficiency, the patriotic duty of insuring the safety and continuance of the Nation. When the people of the United States consciously undertake to raise themselves as citizens, and the Nation and the States in their several spheres, to the highest pitch of excellence in private, state and national life, and to do this because it is the first of all duties of true patriotism, then and not till then the future of this Nation, in quality and in time, will be assured.

—Theodore Roosevelt.

RANGE RESOURCES: AN EXCEPTION TO ESTABLISHED FEDERAL POLICY?

By F. S. BAKER, U. S. Forest Service, Ogden, Utah

To talk of an established Federal policy is something of a joke. We do not mean a joke in the sense that Federal policies in regard to range resources or anything else are necessarily the football of politics to be governed only by the exigencies of the occasion, but rather that any Federal policy, when considered over a long period of years is not exempt from the general process of evolution that affects everything in the world that is not dead. A policy has to be judged in view of the trend of the times, both political and economic. Therefore, it becomes necessary, in order to discuss intelligently the question of range resources in relation to established Federal policy, to trace the general treatment of natural resources on public lands of the West through a long period of years, so that we can truthfully say the trend of the policy is clearly shown.

In the early days when our country was young, the importance of what is now the United States seemed to be centered along the Atlantic seaboard. The West was more or less of a wilderness and there was a general belief that it would so remain for a long time. The Louisiana purchase—a wise and farsighted act—was not so regarded by many people at that time. It seemed like adding a tremendous area of wilderness to the small area of the real United States. As a political move it was regarded as perhaps all right but as an economic move it hardly seemed justified. Further western expansion at the time of the Mexican War involved the acquisition of lands which were even less attractive than those which were secured through the Louisiana purchase. The Northwest, too, was a land that seemed only of value to trappers and fur traders. These acquisitions were necessary to our political well being, but not to our economic life according to the current thought of the time. We had to protect ourselves from invasion from the west in order to maintain our political integrity. Webster's famous speech is often quoted in which he declared that not one cent of Federal money should be appropriated to administer the wild and desert country that was acquired through the Mexican treaty. It was generally regarded as worthless. Being so regarded, the National Government had very little care as to who owned the land as long as it maintained political sovereignty. As a natural corollary of this, it appeared that the economic development of the West would, of course, have to be stimulated through something that amounted to a subsidy. The government, therefore, disposed of these low grade lands as gifts to those who would develop the country, or sold them at a purely nominal price. It was under these circumstances that our public land policy in the West was born and it is scarcely to be wondered that large areas were granted to the railroads and states, and that the homestead laws were the most liberal. Mining laws, the Timber and Stone Act, and other statutes were all drawn along similar lines and, while some were not technically as liberal as others, they were interpreted in a most liberal manner. For example, the Timber and Stone Act established a minimum price of $2.50 an acre for timber and stone, yet it was so interpreted that this became merely a nominal fee, as nothing in excess of the minimum was charged, regardless of the character of the land in question for many years.

This subsidized development went on for a long time. Presently, however, the western settlers became aware of the vast values that really existed at their back door. And then began a period of abuse of the laws dealing with natural resources on public lands. The big and famous timber steals under the protection of the homestead laws are part of the history of this period and many other things of the same kind were going on. The land laws were not working out, because they did not take into consideration the facts of the situation. The natural resources were of tremendous value and were no longer needed as a stimulant to build up a backward and naturally unproductive country. The West had come into her own. This forced a second stage in the natural evolution of Federal policy with regard to national resources.

It is interesting to trace the trend of the developing policy in a few specific cases. Coal, for example, is a case in point. Prior to the Coal Land Act of July 1, 1864, the land depart-

ment did not regard coal land as mineral within the meaning of previous acts of Congress. Before that time the enormously valuable areas of coal in the Middle West, from Ohio to Missouri, passed from the Government into private ownership without regard to whether or not they were coal-bearing. In 1873 Congress passed an Act providing that coal lands should be separated from agricultural lands and disposed of as such. The law provided that the price should not be less than $10 per acre when the land was more than 15 miles from a railroad and less than $20 an acre when the land was less than 15 miles from a railroad. From 1873 until 1906 the land office interpreted the law, which required a price of not less than that given above to mean not more than that price and much valuable coal land was acquired at nominal consideration. In 1906 without any change in the law, President Roosevelt put into effect a new scale of prices for coal land, it being administratively decided that the words "not less than" established only a minimum price per acre but that the maximum could be at any higher figure, the commercial value if necessary. A new scale of prices ranging from $76 to $100 was put into effect. Again, in 1909 a scale of prices ranging from $100 to $300 an acre was established by administrative action. These new prices were still far below commercial royalty rates. On February 25, 1920, Congress passed the Coal Leasing Act, which established, by law, the principle of disposing of the Government coal lands to the highest competitive bidder on a royalty basis. The same general developments took place in regard to oil. In 1897 oil was specifically declared to be a mineral within the meaning of the General Mining Laws by Act of Congress. Until 1920 this asset was disposed of at what amounted to a nominal price, although various restrictions were put into effect at various times. In 1920 the Oil Leasing Act authorized the Secretary of the Interior to lease oil lands of the United States to the highest competitive bidder under certain general rules laid down, which specified a minimum royalty rate. The same Act also authorized the leasing of land belonging to the United States, which contained deposits of phosphate or sodium, to the highest competitive bidder again. The Federal Water Power Act was passed by Congress in the same year. This authorized and directed the Federal Power Commission to make investigations and collect data showing the fair value of the power in any given case for use as a basis for charging licenses under the Act, the commercial value again being invoked.

The history of timber has been very similar to these other resources. At first it was disposed of lightly. Legislation in the eighties provided for the sale of public land, chiefly valuable for timber, at not less than $2.50 per acre, which, as in the case of coal lands, was interpreted to mean not more than $2.50 an acre. This interpretation lasted until 1908, a purely nominal price being set upon the timber land during all that period of time. About the time the active administration of National Forests began, came the practice of charging a commercial rate, based upon competitive bids. On the unreserved public domain outside the National Forests, an appraisal system was put into effect in 1908, the timber lands being sold at their commercial value as long as they exceeded the legal minimum of $2.50 an acre. Within the National Forests the timber has been disposed of under regular commercial sale at the highest commercial value ever since the Forests have been established under the Department of Agriculture in 1905.

Special use permits on National Forests which are granted to cover all sorts of uses, as for pastures, sawmills, summer homes, etc., are based upon the estimated commercial value of the rights granted by the permit.

Up until now, however, grazing has been exempt from the same provisions that have governed most of the other resources. The fees in the early days of the Forest Service were low. As far back as 1905 grazing fees were established amounting to from 35c to 50c per head for cattle, yearlong, with the provision that these prices would be gradually advanced when market conditions, transportation facilities, and demand for the range warrant such action. In 1912 a slight increase was authorized by the Secretary, amounting to about 5c a head on cattle. In 1915 the basis was placed at 48c to 75c a year for cattle. In 1916 the minimum was left at 48c but the maximum was placed at $1.25. In 1919 the fees were again advanced by Secretary Houston and at that time the Agricultural Committee of Congress frankly expressed a desire to raise the grazing fees about 300 per cent. The Forest Service at that time recognized that the grazing fees were not on a commercial basis, nevertheless, the Service had no information to show that an increase of 300 per cent could be justified, for certainly it could never rightfully be placed beyond the commercial value of the range. The Forest Service has made a

study of the range conditions the last few years, however, and has determined the commercial value of National Forest ranges, taking into consideration all the factors which make them less valuable or more valuable to the livestock owners than adjoining, privately owned range. This study has indicated in general that grazing fees should be raised approximately 80 per cent to bring them to the National Forest range lands. This proposition is being opposed by the stockmen and is to come before Congress at this session. Perhaps by the time this meets your eye the subject will have been settled by Congressional action. In view of the trend of Federal policy as outlined it seems reasonable to believe the result can be quite definitely prophesied at this time. however. In glancing back over the facts which have been brought out, we see that at first the Federal Government, having only a sovereign political interest in the lands and caring little for the economic side of its ownership, let the lands go at a nominal figure, partly because they believed the lands had but little true value and partly to stimulate the upbuilding of the western country. As the values became greater and the Government lost its sovereign political rights as the states were formed, it began to have more of the interest of the proprietor or landord in its lands. It also found that its system of disposing of the lands was not working out to the best advantage as the West became self-supporting and lands became valuable. The disposal of the land at a nominal price was leading to grave abuses and at the same time the acquisition of these natural resources by private individuals threatened a real public danger, particularly and through the misuse and devastation of forest and mountain lands. Under the circumstances the sanest policy seemed to be to hold control over these lands as a proprietor and to lease them at their commercial value the same as any private or landlord would. Under such a plan many abuses arising from disposal of resources at a nominal price could be done away with and at the same time no impediment is placed in the way of legitimate use and yet the control of the lands still remains vested in the public.

From past history it appears that Congress has refused to increase the fees charged for national resources only when the industry depending upon these resources needed some sort of subsidy in order to get it upon its feet. At the present time the increased grazing fees are being held in abeyance for exactly this reason and authority has been given to the Secretary of Agriculture to continue to hold them in this manner until the livestock industry is entirely recovered from recent reverses. Generally speaking, however, it is certain that the range livestock industry is firmly established here in the West and no longer needs a subsidy. The number of prosperous livestock owners dependent upon privately owned lands, comparable to National Forest lands, is proof enough of this. Many are leasing lands at commercial rates much in excess of the fees charged by the Forest Service and, indeed, considerably in excess of the fees it is proposed to charge, for it is realized that Forest Service grazing regulations actually do make grazing upon the National Forests less attractive financially than upon lands where the owner of the livestock has a free hand. Unless the livestock industry can show itself to be so much a part of the old West, that it can exist only upon subsidy, the natural federal policy will be to include range among the other resources that are paid for on a commercial basis.

FIRE FIGHTING

By C. W. CHENOWETH

Fire is an element whose behavior is difficult of description. I tried for ten minutes to assemble a list of adjectives sufficiently impressive but gave it up. I must rely on the reader's imagination to make the picture as wild, riotous, raucous, and raging as is the reality. If he fails my story is pointless since fire is my theme or rather fire fighters. There is a difference.

Fire fighter is only a name. Its possessor frequently neither has fire nor is a fighter. I made another try for adjectives here with no better success than before. The reader must again take the responsibility. If the individual he envisages is not sufficiently fagged, brain-weary, and rusty it is no fault of mine.

The problem of this paper is to exhibit the relation appropriate to the fighter whether he

looks like, with respect to the fire, whatever it is.

The importance of the undertaking is emphasized by the fact that every year we **use** five times as much timber as we produce, **waste** five times as much as we use, and **burn up** five times as much as we waste. (Black face is mine, the figures are not). There is profit in use, pleasure in waste, but the burn up is clear loss. A way must be found to minimize it. This investigation is devoted to that end.

The problem of fire fighting will be treated under three heads: getting to the fire, getting away from it, and getting on with it.

If this outline seems to lack a certain logic in its arrangement, it makes up for the defect by faithfulness to the actual practice. Often, getting to a fire and getting away are all that there is to fire fighting. And the interval between them is so short that even a past master in the art of coherency would scarcely have time to insert a criticism, much less an entire division. Having pointed out the discrepancy between theory and practice, however, I shall incline to the theoretical treatment, and present the divisions in the following order: getting to, on, and from a fire.

1. Getting to the fire.

Considerable red tape is involved in getting to a fire. Every knot must be taken in due course or the outcome is sure to be disappointing.

1. Get a job with the fire service.

There are several ways of accomplishing this. The most common perhaps is to speak for one at the close of the preceding season, that is if you didn't close the season prematurely. If you have had that misfortune probably your only recourse is to go into an entirely new locality and start all over again.

The next best way is to find somebody else to get the job for you. This is especially recommended to beginners. A letter, unless one is a past master in composition, is usually unconvincing and consequently will get no result, especially in a slack season, while a personal interview is nearly always fatal. But an influential friend can turn the trick. Hold your enthusiasm and keep out of sight until he lands the job. There is need of men to save the forest but don't feel the responsibility too heavily until it has been clearly delegated to you.

2. Get enough in your back pack but not too much.

What is enough? and what is too much? The size of the fire fighter's appetite will determine the answer to the first question, his disposition, the second. If he has a liking for quantities of food out of all proportion to his willingness to sustain a heavy burden on his back for long intervals, the problem is seriously complicated. The pack string may solve it. If it is going in you can leave it all to the commissary man and the packer. A little caution to "Take plenty of grub" jokingly given will often not be amiss.

3. Get the right trail.

The most difficult task of a woodsman is, in view of all of the factors involved, to select the right trail. This is especially true of the woodsman who is in for the first time. A little bungling here will often result in his first being likewise his last. Whether or not it results in this extreme consequence, a bad selection will never fail to involve unfavorable elements.

An old fire fighter will not need to be told that the shortest trail to a fire, even if it is easiest, is not always preferable. A fire must be humored. Any delay in getting to it will be utilized by it in having its own way. In that event it may run into difficulties of its own and go out for want of serious opposition. Prematurely annoyed it never does. The real fire fighter knows that no fire is ever as bad as it might be and he will be slow to risk making it worse by ill-advised opposition. It is easier to trench in the ashes after the fire quits burning. And for the practical purpose of making the reports it amounts to the same thing. The conclusion from these facts is obvious. Instead of selecting the shorter, choose the longer way and thus make sure that no impetus will be given to the blaze by a premature arrival in its locality.

Suppose it doesn't go out? Well, what of it? A fire fighter must above everything else be an optimist. Every year new methods are being perfected whereby two trees are produced where formerly there grew only one. A good healthy fire is the most effective means of getting rid of the "ones." And it is not the fire fighter's business to substitute the "twos." That is the worry of somebody else. Therefore take the longest way around and give the fire a chance. It must, there is no third alternative, burn or go out. In either event the consequence will be good. If it goes out it will mean rest for the fire fighter. If it doesn't it means a double timber supply for future generations. These considerations must have weight.

II. Getting on with the fire.

The greatest caution in going to a fire will often, however, result in getting there. This is a predicament from which even genius may sometimes fail to extricate itself. In such instances the fire fighter's attitudes are of the utmost significance.

1. Attitude toward camp.

The fire-camp is the fire fighter's home. He must come to regard it as such if his stay on the fire is to have any semblance of enjoyment.

Home is preeminetly a place of rest, refreshment, and companionship. A fire-camp has some of these features. It is a place of rest—for the fire boss, a place of refreshment —some times when the cook is in a good humor, a place of companionship of every sort, bugs, birds, reptiles, bears. The unpredictible conduct of these lends enchantment to the association. A fire camp lacks something of the ideal home but an active imagination can supply the deficiency.

2. Attitude toward the boss.

The fire boss is a unique species. Here and there are indications that he belongs to the genus homo. But the evidence is not conclusive. In the early stages he usually has more or less the appearance of a man. But his metamorphosis is rapid. By the end of the second week the human traces are lost. He has reverted to type. But, in spite of the fact that his lowly station is thus clearly shown, he must be treated with tact.

In the first place he is conceited. This usually takes the form of assuming for himself such superior knowledge that he is willing to inflict his decisions on others without at all consulting their preference. No matter how superior is the plan for circumventing the elements, if the boss has made up his mind to try something else it goes into the discard. Your only recourse in such a case, if you happen to be the author of the perfect plan that was not tried, is to loaf on the job if possible, so that the boss' way will be less likely to succeed. This means will often mend, if it does not entirely cure, his conceit. It is a remedy, however, that must be applied cleverly. If one is caught in the act a cure of something is likely to be effected but it is scarcely ever of the boss' conceit.

In the second place he is heartless. Here again the only course is to humor him. To become "hard boiled" with a fire boss is to cast pearls before swine, with the consequent trampling and rending—trampled expectations rended loose from the pay check. The answer is, save the pearls.

When he tells you to get up at five o'clock in the morning, without going to the trouble of ascertaining whether such course meets with your approval or not, get up anyhow. Sacrifice your comfort then. But keep in mind what you have lost. By a little skillful management the opportunity may be found during the day to get it all back with interest.

It is always well to keep in mind that a fire boss is more difficult to control than the fire. And success is more necessary. A fire will, in the course of time, burn itself out and automatically accept control. But a fire boss never wears himself out and is brought under control only by skillful management. Once that control has been achieved the fire problem may be considered solved.

III. Getting away from the fire.

There are several methods of getting away from a fire. The particular one to be selected in any given instances will depend on several factors.

The first of these grows out of the fire fighter's relation to the fire boss. The best planning and the most skillful management will, in some instances, fail with a particularly stubborn subject. One must constantly keep on the outlook for such an eventuality and plan his exit when he sees it coming. It is always better to leave the instant that the boss discovers that you are trying to manage him and before he is completely convinced that you have failed. A boss has no objection to being managed, so long as he does not find it out. His indignation is all the stronger against an attempt that fails. Success means appointment as straw boss. Failure means a little trip. You can tell when it is time to take the one by the fact that you do not get the other. Don't wait too long. A violent headache, a slight cut on the knee, or some other temporary disability will render an exit easy.

Another indication that it is time to leave a fire may be of service to the few who are left to patrol the ashes after the fire has burned out and the trench around it has been cut. To such persons the camp and its equipment are especially important. The comforts of the fire fighter are tied up with the fortunes of the camp.

You can tell that the tides of fortune have set against the camp if, at any time in patroling your beat, you notice in the trench, tracks resembling those of a bare foot human. Don't

be deceived by the resemblance. They are bare feet; but not human. The menace to the camp is proportional to the number and size of such tracks. When it will materialize is the question.

That bears will "pile up" a camp is well known. The time in which they prefer to do it is the barest conjecture. Sometimes it will happen while the occupant is away even for twenty minutes. Again it occurs while he is in bed but not asleep.

In the first instance the problem is easy. For when the fire fighter returns to camp and finds it and everything in it "ripped up" and scattered all over the forest, there is but one thing to do; pronounce the fire safe and move out where bears are not quite so officious.

When it occurs in the night time, it is more or less of an ordeal. Then one knows by the sounds what is being done but he usually feels that it would belittle him to make any move to prevent it. His only alternative is to roll up in his blankets and smother his wrath which is usually so violent as to send shiver after shiver through his frame and bring the cold sweat to his brow. It is this struggle with his wrath that makes the ordeal. The intensity of it multiplies if the bear gets curious about what is in the blankets. When that happens instructions are unnecessary. One's former mode of life and the present state of his conscience will wholly determine his course.

If the bear confines his operations to things outside of the blankets, it is better to stay in them till morning. Even if one gets stiff from lying rigidly in one position, it is preferable to running around in the night, disturbing the harmony of wild life. One may feel that it is beneath him to take any notice of a controversy between a bear, a cougar, and a wolf about which is to have him for breakfast. But if he is a nature lover he will avoid whenever possible raising such ill will among them. Besides, a man who has just had a camp pulled down over his head by a bear will scarcely get sufficient control of his anger to trust himself to stray alone in the woods at night. If the bear will concur in the arrangement, stay where you are until morning. If one is to make speed in the woods, it is much better to attempt it in day light.

Another factor determining the appropriate time to get away from a fire depends on the behavior of the fire itself. The dispositions of different fires vary greatly. One will be playful, another grouchy, a third violent. Unfortunately, the same one may be all three at different times. It is as difficult to gauge the mood of a fire as it is to read the mind of a bear.

Sometimes in the morning you may find one sportive. It will run laughing up to the bounds which you set for it and then back off when you sprinkle a little dirt in its pathway. It seemingly enters into the game with a hearty zest, observing all of the rules. But don't be deceived. Its mood is likely to change at any minute into one of violence. Such changes when they do occur usually take place from ten o'clock in the morning to four in the afternoon.

The first indications that a transformation is imminent may be seen in the tendency of the fire to run up the trees and jump from one to the other. It is a pretty stunt executed with a great deal of skill. One who has drawn most of his knowledge from the habits of children may easily believe that the intention is to "show off." But a fire is childish only sometimes and this is one of them.

Its climbing the trees is a signal to the wind which invariably comes rushing with a speed approximately forty miles an hour. The two, the fire and the wind, go speeding off neck and neck through the tops of the trees. This is called a "crown fire." It gets its name from the circumstance that it has been instrumental in the coronation of more people than all the other kinds of forest fires put together. When its fiery chariots start through the forest harnessed to the billows of a forty mile gale, only the fleet footed will escape a free ride.

The final method, then, of getting away from a fire demands fleetness. It must be employed over a course directly at right angles to the path of the fire and must have as an objective an immense burn or a body of water. If developments are so rapid that this is impossible, one had better bury himself in wet moss, if he can find any, and say his prayers before his vocal cords stiffen. One always leaves a fire somehow but it is often difficult to say whence.

Getting to a fire, getting on with a fire, which is really a problem of managing the boss, and getting away from a fire tell the story of fire fighting. I apprehend that the story is told.

PREDICTION OF YIELDS OF YOUNG WESTERN WHITE PINE TIMBER IN IDAHO

By C. EDWARD BEHRE

Scattered through the western white pine region of North Idaho are found many sections covered with young stands of western white pine and associated species, ranging in age from a few years up to the point where the trees are reaching merchantable size. The origin of these stands can in most cases be traced back to fires which destroyed the original stands years ago and which were followed by even aged reproduction over considerable areas.

With the virgin timber entirely removed from many of the more accessible watersheds and the end of the supply of many large operators already in sight, attention is focused upon these young stands and it is worth while examining them carefully in order to find out what may be expected from them in the future and how important a factor they will be in prolonging the life of existing operations

At the request of the Edward Rutledge Timber Company, an examination of the young timber in the southern portion of section 29, Twp. 43 N., R. 2 E., B. M. near Clarkia, Idaho, was made in September 1923 by the Idaho School of Forestry. The results of this examination are presented in this paper, in the belief that the area examined is typical of many other areas of young timber in the white pine region and, therefore, of general interest to timber land owners and others interested in the future of the lumber industry and the forests of North Idaho.

I. Description and History

The growth on the southern portion of Section 29 can be separated into four more or less distinct varieties of stands as a result of fires which have swept the area in the past. The original forest was typical of the white pine belt in which this section lies. At least 50 years ago, or about 1870, a severe fire swept over the entire area, resulting in the entire destruction of the original forest except along the lower slopes of Oleson Creek, where, because the fire was apparently less intense, much of the original stand remains as a somewhat irregular mixture of White Pine, White Fir, Cedar and Hemlock with many openings in the upper story now being filled by thickets of younger trees. The S.E. ¼, S.E. ¼ is covered with this deteriorated virgin stand. Following this early fire, reproduction came in abundantly over the entire area where the original forest had been destroyed.

This reproduction was very nearly pure white pine in the western portion of the section, but in the central portion other species have taken a high per cent of the area. Larch in particular is found as the dominant tree over considerable areas, usually in the vicinity of veteran seed trees not killed by the fires.

Another fire burned over parts of this section in 1884 or 39 years ago. Along the present railroad this fire killed out the reproduction which had started after the earlier fire but it did not extend eastward as far as Oleson Creek, thus leaving the early reproduction intact over most of the S.E. ¼, S.E. ¼, and some of the S.E. ¼, S.W. ¼.

Reproduction, with a high proportion of white pine, soon took up the areas burned by this second fire, giving rise to the thrifty young white pine about 35 years old, seen along the railroad in the E. ½ S.W. ¼, S.W. ¼ and some of the S.E. ¼, S.W. ¼.

In the W. ½ S.W. ¼, S.W. ¼, the reproduction originating after the first fire was very largely white pine. The fire of 1884 apparently burned through this portion of the area at night, or at a time when it ran slowly without destroying everything in its path. It did, however, thin out the stand very uniformly by killing many of the young trees which then were about ten to fourteen years old and, if we may judge by other portions of the section, extremely dense. The trees which survived are, therefore, well spaced and not overcrowded and, as a result, have been able to make a most remarkable development. That this theory of origin of the fine young timber about 50 years old, found in the western portion of this section, is correct, is attested by the fact that a very large proportion of the trees are badly scarred at the base, not charred, but with a catface—always on the same side of the tree—such as would result from the killing of the cambium on the windward side of the trees, during a ground fire which was

not hot enough to burn them up. It is truly remarkable that a fire should thin out a stand so uniformly, and that trees, many of which were girdled for more than half their circumference, should be able to make such fine growth.

II. Estimate of the Stand

In order to obtain the necessary information for attempting to predict the future growth on this section, a systematic sample was taken across the lower tier of forties. A compass line was run due west, from a point ten chains north of the S.E. corner, through the section, except for an offset of 200 feet north, made to avoid the railroad right of way, in the S.E. ¼, S.W. ¼. This line was tied in to the S.W. corner of the section with a negligible error of closure. Along this compass line a tally was made of all the trees over 2" D. B. H. on a strip one-half chain in width, thus covering one acre in each forty with a mechanical sample. The trees of each species were tallied separately by one inch diameter classes up to 12" D. B. H. and by two inch classes for larger sizes. The white pine was further segregated, according to position of the crown, as dominant, co-dominant, intermediate and suppressed.

At intervals of 300 to 400 feet along the strip, borings were made to determine the ages of the trees and the heights of a few dominant trees were measured as an aid in classifying the sites.

No tally was kept in the S.E. ¼, S.E. ¼, because this forty lies along Oleson Creek in the area over which the virgin stand was not entirely destroyed. In addition to the tally by forties made in this way, a separate tally was made on a strip one-half chain wide and ten chains in length along the western boundary of the section in order to show more clearly the conditions in the 50 year old stand which had been thinned by the fire of 1884 as described above. The results of the tallies are presented in the accompanying tables:

TABLE I.

Present Stand—SW¼ SE¼ Section 29, Twp. 43 N. R. 2 E. Average Age 49 years

Species	Av. D.B.H. Inches	Basal Area per Acre Sq. Ft.	Total No. Trees 2" and up per Acre	Av. Dom Height Feet	No. Trees 7" D.B.H. and up per Acre	Av. D.B.H. 7" Trees and up Inches	Bd. Ft. Vol. per Acre Trees 7" and up	% Vol.	No. Trees 10" D.B.H. and up per acre	Av. D.B.H. 10" Trees and up	Bd. Ft. Vol. per Acre Trees 10" and up	% Vol.
White Pine	5.3	42.3	276	62	63	8.3	1840	31	11	10.0	540	
Larch	6.6	28.6	120		51	8.7	1490	25	12	10.7	580	
Douglas Fir	6.4	1.2	5		1	12.0	60	1	1	12.0	60	
Lodgepole Pine	8.0	6.5	18		12	9.5	570	10	5	10.8	370	
Hemlock	5.0	28.2	204		27	10.4	1400	23	12	13.0	1030	
White Fir	3.6	27.9	392		19	8.6	590	10	3	12.9	290	
Western Red Cedar	2.7	3.7	92		1	9.0						
Engelmann Spruce	2.7	0.3	7									
Total or Average	4.8	138.7	1114	62	174	8.9	5950		44	11.4	2870	

YIELD TABLE—White Pine—Larch Mixtures—Lower Slopes.
(From J. A. Larsen, Silvical Bulletin for District 1, U. S. F. S.) Predictions

Age	W.W.P.											
50	5.5	173	940	63			10,000				8,000	
60	6.8	196	770	75			16,000				12,800	
70	8.0	221	630	86			22,500				18,000	
80	9.3	244	530	96			30,500				24,500	
90	10.6	265	440	105			40,000				32,000	
100	11.8	286	370	114			51,000				41,000	

TABLE II.

Present Stand—SE¼ SW¼ Section 29, Twp. 43 N. R. 2 E. Average Age 42 Yea

White Pine	5.0	37.2	270	61	52	8.0	1510	36	7	10.8	390	
Larch	5.9	31.6	164		48	8.4	1280	31	7	10.8	350	
Douglas Fir	8.2	10.8	30		18	9.9	800	19	10	11.5	600	
Lodgepole Pine	6.1	1.7	8		3	8.5	100	2	—	—	—	
Hemlock	3.1	8.0	150		1	7.0	30	1	—	—	—	
White Fir	3.4	22.8	376		15	7.5	420	10	1	10.0	70	
Western Red Cedar	2.5	4.4	126		—	—	—	—	—	—	—	
Engelmann Spruce	4.9	.7	6		1	7.0	30	1	—	—	—	
Total or Average	4.4	117.1	1130	61	138	8.4	4170	—	25	11.1	1410	

TABLE II—(Continued)

LD TABLE—(White Pine—Douglas Fir—Western Larch Mixtures)
Ridge Site—Rockwell, 1909.

Predictions

	Av. D.B.H. Inches	Basal Area per Acre Sq. Ft.	Total No. Trees 2 in. and over per Acre	Av. Dom. Height Feet	No. Trees 7 in. D.B.H. and over per Acre	Av. D.B.H. Trees 7 in. and up Inches	Bd. Ft. Vol. per Acre Trees 7 in. and up	% Vol.	No. Trees 10 in. D.B.H. and up per Acre	Av. D.B.H. Trees 10 in. and up	Bd. Ft. Vol. per acre Trees 10 in. and up	% Vol.
Age				Merch. W.W.P.		W.W.P.						
42	4.3	173	1580	48	240	7.8	2100				1400	
50	5.3	206	1240	52	357	8.0	4500				3000	
60	6.4	240	1000	57	430	8.4	9500				6400	
70	7.5	271	860	63	468	8.8	19500				13200	
80	8.4	300	760	71	486	9.2	36500				24700	
90	9.3	324	680	79	490	9.6	49200				33400	
100	10.1	346	625	88	485	10.0	56700				38400	

TABLE III

sent Stand—SW¼ SW¼ Section 29, Twp. 43 N. R. 2 E. Average Age 43 yrs.

ite Pine	7.2	81.90	291	62	112	10.3	5290	54	53	12.3	3840	60
ch	7.0	25.7	97		46	9.2	1620	16.5	15	11.5	895	14
glas Fir	10.4	3.5	6		5	11.3	300	3	4	12.1	275	4
gepole Pine	7.5	18.1	59		30	9.6	1410	14.5	11	11.4	1030	16
nlock	3.4	3.9	64		2	7.0	50	0.5	—	—	—	—
ite Fir	5.0	29.2	218		37	8.6	1075	11	8	11.2	375	6
stern Red Cedar	2.9	1.5	33		—	—	—	—	—	—	—	—
elmann Spruce	5.3	.5	3		1	7.0	25	.5	—	—	—	—
al or Average	6.3	164.3	771	62	233	9.7	9770	—	91	12.1	6415	—

ld Table—(Western White Pine). Site one Rockwell 1909.

Predictions

Age												
43		221	1120	67	284	8.8	8200				6100	
50		257	920	76	340	9.5	14400				10700	
60		304	740	87	390	10.6	30000				22300	
70		344	610	96	418	11.7	54000				40200	
80		378	530	104	425	12.8	74000				55000	
90		406	475	110	420	13.7	89000				66200	
100		430	430	116	410	14.5	102000				75900	

TABLE IV.

sent Stand—W½ SW¼ SW¼ Section 29 Twp. 43 N. R. 2 E. Average Age 50 Yrs.

Species	Basal Area per Acre Inches	Total No. Trees per Acre 2 in. and up	Av. Dom. Height Feet	No. Trees per Acre 7 in. D.B.H. and up	Av. D.B.H. Trees 7 in. and up Inches	Bd. Ft. Vol. per Acre Trees 7 in. and up	% Vol.	No. Trees per Acre 10 in. D. B.H. and up	Av. D.B.H. Trees 10 in. and up	Bd. Ft. Vol. per Acre Trees 10 in. and up	% Vol.
ite Pine	122.4	324	78	178	10.6	9800	57	108	11.9	7900	59
ch	52.3	104		86	10.3	4000	24	44	11.9	3000	23
glas Fir	11.1	20		18	10.5	900	5	8	12.7	600	4
gepole Pine	19.8	32		26	11.5	2000	12	22	12.0	1900	14
nlock	0.4	4		—	—	—	—	—	—	—	—
ite Fir	13.9	116		16	8.0	400	2	—	—	—	—
stern Red Cedar	0.5	8		—	—	—	—	—	—	—	—
elmann Spruce	0.2	4		—	—	—	—	—	—	—	—
al or Average	220.6	612	78	324	10.5	17100	—	182	12.0	13400	—

ld Table—(Western White Pine.) Site one Rockwell 1909.

Predictions

Age											
50	257	920	76	340	9.5	14400				12400	
60	304	740	87	390	10.6	30000				25800	
70	344	610	96	418	11.7	54000				46400	
80	378	530	104	425	12.8	74000				63500	
90	406	475	110	420	13.7	89000				76400	
100	430	430	116	410	14.5	102000				87500	

III. Prediction of Growth

The tally of each forty was compared to figures in available yield tables for stands of similar age and character on the basis of height of dominant trees, number of trees per acre, diameter of merchantable trees, average diameter, and yield per acre. For each tally the yield table was selected which seemed to correspond most nearly to the stand in question in character and development. Although a different table was used for each forty, the differences in the stands seemed to make this necessary and the results seem quite consistent. In each case the predictions for the future have been made by reducing the yields shown in the table in the same ratio that the basal area per acre at present bears to the basal area for the same age in the table. In all cases except the S.W. ¼, S.E. ¼, this ratio is approximately the same as the ratio between the present volume in trees ten inches and over and the total stand per acre, given in the tables. In the case of the S.W. ¼, S.E. ¼ the present stand per acre seems low in comparison with the table, although the stand compares fairly well in average diameter, height, and number of trees per acre. This may be accounted for by the fact that the number of trees per acre was larger than that indicated in the tables and as a result the average size somewhat lower. In a stand in which only a small portion of the trees are reaching the merchantable limit, a small difference in average size will make a big difference in the number of trees scaled as merchantable. This discrepancy in volume will gradually disappear as more of the trees in the stand grow into the merchantable stand. Furthermore, the method of computing the board foot volume is quite crude and, by shifting the average heights very slightly, the discrepancy can be eliminated. However, the same heights were used in all cases and, as they seem conservative and give consistent values in the other tallies, no modification was made in this case.

The standard Forest Service volume tables of District 1 for the various species were used in computing the board foot volumes, with the following heights adopted throughout:

D. B. H.	No. Logs
7	1
8	1
9	2
10	2
11	2
12	2
14	3
16	3

The predictions in each case show the estimated total stand of all species. In interpreting these values the per cent of the different species shown by the volumes for trees over seven inches in diameter may be used, reducing the results for the inferior species somewhat if it is desired to consider that they will not be utilized as closely as the pine. The ratio between the present volumes for trees over seven inches and for those over ten inches cannot be taken as an indication of what the volume to the latter limit will be in the future. Indeed, very little if any reduction need be considered on this account, because, as the stand reaches maturity, there will be very few trees less than ten inches D. B. H. present.

From the information accompanying the yield tables, it would appear that the yield table figures should compare with the volumes in trees 7 inches in diameter and up. Yet, in all except the S.W. ¼ S.E. ¼ the comparison is closest between the tables and the trees 10 inches and over, which means, if anything, that the actual stands exceed those given in the table, or that the predictions made are conservative.

IV. Summary

In the summary of growth predictions presented here, it is aimed to show for each forty the total present stand and the stand which may be expected at 10 year intervals in the future. These figures have been interpolated graphically from the values for 10 year age classes derived from the yield tables given previously. The figures for white pine alone have been secured by applying the per cent of present white pine volume in the trees 7 inches and over in size to the figures for total yield.

TABLE V.—Summary

Total Present Stand M. Ft. B.M. Sec. 29, Twp. 43 N. R. 2 E., Trees 10" D.B.H. and Over.

Subdivision	Ave. Age	White Pine	Larch	Douglas Fir	Lodgepole Pine	Hemlock	White Fir	Western Red Cedar	Total
SW¼ SE¼	49	21.6	23.2	2.4	14.8	41.2	11.6	—	114.8
SE¼ SW¼	42	15.6	14.0	24.0	—	—	2.8	—	56.4
SW¼ SW¼	43	153.6	35.8	11.0	41.2	—	15.0	—	256.6
W½ SW¼ SW¼									13.4
(Per Acre)	50	7.9	3.0	0.6	1.9	—	—	—	

Summary—Predicted Total Stand by 10 Year Periods, M. Ft. B. M.

Subdivision	Present Ave. Age	1923		1933		1943		1953		1963		1973	
		White Pine	Total	White Pine	Total	White Pine	Total	White Pine	Total	White Pine	Total	White Pine	Total
SW¼ SE¼	49	21.6	114.0	124	400	212	680	296	960	384	1240	496	1600
SE¼ SW¼	42	15.6	56.4	56	160	116	320	216	600	372	1040	504	1400
SW¼ SW¼	43	153.6	256.6	300	560	604	1120	972	1800	1272	2360	1488	2760
W½ SW¼ SW¼													
(Per Acre)	50	7.9	13.4	14.7	25.8	26.4	46.4	36.2	63.5	43.5	76.4	50.0	87.5

V. Conclusions

It is of course evident that the predictions made are extremely tentative, but the tally of what is present now, when compared with available yield tables, is certainly encouraging. The figures represent a fair average of all conditions prevalent in the vicinity and are not in any sense arbitrary plots in the best of the young white pine. There can be no doubt that sections containing young growth of this character are worth holding and protecting, for certainly there will be enough merchantable material upon them to justify logging before the exhaustion of the present supply of virgin timber.

IDAHO'S FOREST PROBLEM

(Continued from page 5)

It should be said that some private operators are falling in line with the state policy, and are cutting and cleaning up properly on their privately owned lands. There is no question that in time many of them will do so. Upon timber lands which have been sold under state contracts, some very good work has been done in the way of slash disposal, and excellent results have been obtained in most of these sales.

It seems that our great opportunity to serve lies in the fact that we may carry on our reforestation program to a large extent with minimum cost. By reforesting at the time the mature virgin timber is cut, we can make this mature timber bear the burden of caring for the young growth and it will work hardship upon no one.

It is gratifying to note the increasing interest from year to year that the general public is taking in the future of the State's timber supply. The timber industry employs more than one-half the industrial population of the State, making a market for all kinds of farm produce, increasing railroad and industrial activity of all kinds. In some counties it pays 90 per cent of the taxes. The water flow in streams is largely controlled by the stand of timber, thus preventing the premature run-off of snows, and consequential floods, all of which means much to the irrigated areas. In fact, the timbered areas, and the lumber industry are vital forces in all activities in which the State of Idaho may or will be interested. If we would be interested for the future of the State, we must not overlook the 23,000,000 acres of priceless timber lands.

THE STIMULATION IN GROWTH OF WESTERN WHITE PINE REMAINING ON AREAS AFTER LOGGING

By RODGERS G. WHEATON

It is generally known that the majority of the trees left on an area after logging grow faster following release than before. The actual amount of this stimulation, however, is more or less of a question. Its answer has relatively little value at present but, as time passes and the virgin stands of timber become exhausted in the West, the operators will turn back and go over the areas which they had once cast aside and considered valueless. Most people little realize that the few trees left standing after an operation are growing faster individually than those of most of the best and more fully stocked stands. When the day of expensive logging has passed and the portable mill starts cutting here and there, these trees which were "passed up" will be the ones to furnish the lumber. Even now some of the more farsighted land holders are beginning to look at these areas and they can see that they will have, before many years, a definite value. It is folly to let these areas burn over. Not only is the advance reproduction lost, but also a large amount of "potential growth." These trees, which have been left, are now ready to put on accelerated growth and in this way shorten the time required to reach merchantable size.

From data collected in the field on areas cut-over in 1907 by the Potlatch Lumber Company in the vicinity of Harvard, Idaho, the author has determined the amount of stimulation. The material was gathered from five plots and an effort was made to lay out plots which would be representative of the area. The figures were worked up under four headings; by stand classes, release classes, diameter classes and crown classes. The term "stand class" denotes the trees of one plot and these plots are lettered in order to distinguish the trees of each plot. The term "release class" refers to the percentage of release from competition caused by logging and was determined by the number, size, and position of surrounding stumps. The term "diameter class" denotes the diameter in inches at four and one-half feet from the ground. "Crown classes" denote the amount of light received by the crowns of the trees. Dominant trees receive full light from above as well as from the sides, co-dominant trees receive full light from above and a small quantity from the sides, intermediate trees receive partial light from above and none from the sides, and suppressed trees receive no direct light either from above or from the sides.

The per cent stimulation was obtained by comparing the growth for 15 years before with the growth for 15 years after logging.

In computing the volume of various trees, cubic foot volume tables, based on form classes and constructed by C. Edward Behre, were used.

Table I shows the per cent volume stimulation for stands:

Table I

Stand	Per Cent Volume Stimulation
B. C.	293
A.	203
M.	188
B. C. II	148
F.	135

In Table I, plot B. C. shows the greatest stimulation due to the fact that the cutting on this area was heavier than on the others and consequently the average release per cent was higher. The plot was located on a site possessing optimum growth conditions. Plot B. C. II was located in the same general area, but on a poorer site where the cuitting was light. By comparing the stimulation of this plot with that on plot B. C., the effect of the degree of cutting is readily seen.

Table II, showing the per cent volume stimulation by release classes:

Table II

Release Class	Per Cent Volume Stimulation
0	68
10	128
20	145
30	125
40	149
50	192
60	258
70	185
80	223
90	332
100	205

The figures in Table II show a decided increase in the per cent stimulation as the release class increases. Release class 0 shows a stimulation of 68 per cent and this is caused by the general improvement of the growth conditions on the area when a portion of the stand is removed. It would be extremely difficult to give this factor a numerical value but it is a point worth noting.

Table III shows the per cent volume stimulation by diameter classes.

Table III

Diameter Class Inches	Per Cent Volume Stimulation
6	550
7	240
8	180
9	212
10	152
11	152
12	139
13	266
14	277
15	129
16	69
17	151
18	54

In Table III, the lower diameter classes show a greater per cent stimulation, due to the fact that most of these trees have a larger release per cent than those in the larger classes, and that they had been growing but slowly before logging.

Table IV shows the per cent volume stimulation by crown classes.

Table IV

Crown Class	Per Cent Volume Stimulation
Dominant	163
Co-dominant	179
Intermediate	210
Suppressed	135

In the above table the intermediate class shows the largest per cent of stimulation. This may be accounted for in that growth on these trees was retarded before logging as compared with the two dominant classes and yet the ability to recover from partial suppression had not been lost.

The suppressed class shows considerable stimulation because oppressed as well as suppressed trees are included. This class contains but four individuals and therefore the average may be somewhat unreliable.

The next section of this article deals with the periodic annual growth (P. A. G.) in volume and is divided in the same manner as the previous section. The measurements extend over the same periods as before, and the figures are obtained by dividing the average total growth for the period by the number of years in the period.

Table V, showing the average P. A. G. by stand classes:

Table V

Stand	Before Logging P.A.G. in Cu. Ft.	After Logging
B. C.	0.39	0.95
A.	0.49	0.94
M.	0.49	1.07
B. C. II.	0.28	0.56
F.	0.35	0.76

Although stand M. shows the largest P. A. G. since the time of logging, the increase is not equal in proportion to that of stand B. C. The growth in stand B. C. was relatively slow before logging thus making the difference.

Table VI, showing the average P. A. G. by release classes.

Table VI

Release Class	Before Logging P.A.G. in Cu. Ft.	After Logging P.A.G. in Cu. Ft.
0	0.55	0.87
10	0.25	0.56
20	0.45	0.86
30	0.53	1.10
40	0.37	0.63
50	0.43	1.04
60	0.17	0.49
70	0.25	0.70
80	0.48	1.05
90	0.41	0.98
100	0.59	1.68

From the figures in Table VI, it is readily seen that the change in P. A. G. depends directly on the amount that the tree is released.

Table VIII shows the average P. A. G. for the diameter classes.

Table VII

Diameter Class In.	Before Logging P.A.G. in Cu. Ft.	After Logging P.A.G. in Cu. Ft.
6	0.07	0.43
7	0.10	0.26
8	0.17	0.43
9	0.15	0.44
10	0.26	0.65
11	0.37	0.79
12	0.52	1.24
13	0.40	1.46
14	0.51	1.49
15	0.87	1.77
16	1.03	1.73
17	0.99	2.47
18	0.78	1.18

It is evident that the P. A. G. has increased more in the lower classes because of greater release in these classes at the time of logging as well as their slow growth before that time. It should be noticed, however, that there is a substantial increase in annual growth throughout the classes.

Table VIII, showing the average P. A. G. by crown classes as follows:

Table VIII

Crown Class	Before Logging P.A.G. in Cu. Ft.	After Logging P.A.G. in Cu. Ft.
Dominant	0.60	1.28
Co-dominant..	0.29	0.71
Intermediate	0.20	0.48
Suppressed....	0.14	0.33

The individuals in the suppressed class, having lost to a certain extent their ability of rapid recovery, do not show an increase in their P. A. G. which compares with that of the other classes.

From the figures given in this article, it is possible to determine quite accurately the growth which will take place in the trees left on an area after logging, for example: if an area should be cut over and approximately 100 per cent release was given each tree and the trees left should be growing at the rate of one hundred board feet a year, the owner might well expect an annual growth of three hundred and five board feet after logging. The figures also show that material left on areas should not be considered valueless. If enough trees are left per acre to make logging profitable when the trees reach merchantable size, the time elapsing between the first and the second cut will be materially shortened.

The results of the study show what takes place in a stand when it is thinned. The stimulation will vary with the degree of cutting and the method of thinning used but, if enough can be removed and marketed to offset the cost of the operation, the length of the rotation may be shortened and this would result in a reduced cost of growing a timber crop.

THE NEW SCHOOL FOREST

By C. W. WATSON

The State Land Board has granted to the School of Forestry the use of Section 9, T. 40 N. R. 5 E., Boise Meridian, as a school forest. The need has long been felt for a field laboratory where students might learn to apply classroom theories, and the acquisition of this area is the first step in the formation of such a laboratory. This laboratory makes a valuable addition to the School's attractive Arboretum. One shudders to think of what havoc might be wrought in this beautiful, miniature forest by a large class armed with axes. On the School Forest, however, there is plenty of chopping that may be done with only benefit to the timber.

This section is, at all seasons, easily accessible from Moscow, the seat of the University. It lies due north of the town and about seven miles distant by road. One has six miles of hard, surfaced road—part of the North and South Highway—and the last mile is over a country dirt road, which is good for automobile travel from April to November. This road penetrates the south side of the section at the quarter corner, recently a mill site and the main point of drainage to the south. The tract is folded like a blanket over a high ridge, which runs east and west through its middle, descending in long spurs and steep slopes to valleys on the north and south.

The south slope has a many branched system of roads and trails—the logging operation's bequest. Some are very steep but the majority is quite usable, except for the occur-

rence of obstructing windfalls. The north side of the section has a few roads, it is very steep and brushy, and it is more difficult of access than the south side. On the mill site there remain only the foundation timbers and the floor. The dam nearby has a bad breach, so that the log pond—a miniature about 30' x 70' —is little more than a frog pond. However, let us not despise this humble, slimy pool; its bosum may support many a hotly contested log rolling contest when the foresters assemble there for the annual barbecue.

The name "School Forest" would seem to indicate a tract of land covered with mature trees and containing much valuable lumber, but such is not the true condition in this case. Practically all of the mature timber has been cut off, leaving at best only scattered seed trees. The south one-half is good, yellow pine land, and the southwest one-quarter has a dense growth of pine reproduction, about thirty years of age and averaging in the neighborhood of 1,000 trees per acre. The draws and east exposures have small, mixed stands of white fir, Douglas fir, larch and cedar, but the bulk of the growth on this south slope is yellow pine. Aside from the reproduction, there are numerous, mature pines, widely scattered and acting in the capacity of seed trees, and many thrifty firs are also in evidence. In the middle of this south slope an open, brush area of about one hundred acres takes the form of a "V" with its point at the mill and opening to its full width on the top of the ridge. This patch was heavily cut and severely burned, so that very few seed trees were left standing and the only conspicuous reproduction is represented by a five acre plot of three to five year old yellow pines. Otherwise seedlings are very rare. The site would appear to be unusually adverse and it will be well suited to studies of artificial planting.

The greater part of the north side of the ridge is an old burn covered shoulder high with brush. This site, judging by adjacent timber areas of the same character, once bore a good, mixed stand of yellow pine, white fir, Douglas fir and cedar. Many young seedlings of these species are gaining a foothold under the brush, but the struggle is severe, and it is a question whether this reproduction will be successful in overcoming the brush. This area also will be an excellent one for artificial planting, and it may prove to be a good white pine site.

Planting is one of the interesting developments planned for on the School Forest and, during the past spring, an experimental planting of Scotch pine was made on a student field trip. Five of these field laboratory periods were spent on the Forest, each consuming an entire day. The men carried out various problems in silviculture. Early in the spring the slash from the recent logging was burned on several acres, some being piled and burned, while the remainder was burned by throwing it on the fires. Two sample plots of four acres each were laid out and one of smaller size will be made to complete the series. These plots are to serve as indicators of the effect of different methods of brush disposal on future reproduction and to show how fast slash will decay if not burned. On Plot A all slash was burned; on Plot B the tops will be lopped and the brush scattered; on Plot C no disposal of the slash will be made and it will show how the other plots appeared before treatment. Temporary plots were used in studying the density of reproduction, and some time was spent in collecting data on stump ages and diameters, heights of trees felled, and the diameters to which they were cut in the top. This work will be carried forward upon the opening of the School next fall.

During the years to come this School Forest will gradually be developed until it will serve as a demonstration of many phases of forest practice, and as an excellent field laboratory where classroom theories may be tested in the light of actual field conditions. Forestry students will welcome this opportunity to make their work practical, while those for whom woods work is new will receive a mild initiation. The social and recreative side of the forester's nature will be appealed to by the construction of a fine, large log cabin which will be available for camping trips and for an occasional forest club meeting.

We consider that the acquisition of this tract of forest land will prove to be a stroke of fortune for the School of Forestry and we all look forward to the time when the institution will be able to give its men the best of field training in adjacent forest areas, controlled if not actually owned by the School.

FORESTRY AND THE FARMER

By F. G. MILLER

According to the U. S. Forest Service, 98 per cent of the farm homes of the United States is built of wood. This is explained on the ground that America has always had at hand an abundance of high grade timber for building purposes, and that wood is the most readily usable, and as a whole it hitherto has been the cheapest building material to be had. The result is that no rural people anywhere are as well housed as ours.

But it is not only in the matter of supplying the farmer with building material that forestry benefits him, for he is the beneficiary of the forest in many other ways. Of these, only a few as related to the farmer under Idaho conditions are mentioned in this paper.

Woodlot Income

The federal census schedules for 1920 called for the value in detail of woodlot products sold from or used on the farms in 1919. The items included firewood, fencing materials, logs, railroad ties, telegraph and telephone poles, materials for barrels, bark, or other forest products.

In Idaho, a total of 5,041 farms, or 12 per cent of the total number of farms in the state, reported forest products sold from, or used on the farms in Idaho in 1919, as having a value of $2,329,244, an average of $462 per farm. This is income which is largely net to the farmer, since the labor involved in harvesting and marketing is performed mostly in winter when he has the most spare time. It is income too, which with proper management may be greatly increased. In fact, the increase in the decade of 1909 to 1919 was nearly 90 per cent.

The total woodlot area in Idaho in 1920 was 820,876 acres. This acreage includes such parts of the farm lands as are covered with natural or planted forest trees capable of producing firewood or other forest products. For the most part these woodlot areas in Idaho are found in the wooded belts and represent uncleared portions of the farms hewn from the forests. While a certain per cent of these woodlots is agricultural in character and will eventually be cleared for tillage, yet a large portion of them occupies land too steep, too rocky, or otherwise off-color for farming and should be left permanently in forest.

A small, unknown acreage of the woodlot area consists of planted groves. These are found mainly in the irrigated sections. Records accurately made show many of these plantations to be very valuable, and indicate that much more such planting would be profitable.

Thus it is that, with nearly 821,000 acres of forest land in the hands of the farmers, no small part of the responsibility for the proper handling of the forest resources falls directly upon them, a responsibility which farmers are accepting in increasing numbers since woodlot forestry is becoming more and more remunerative.

Relation of Forestry to Irrigation Farming

Nearly 2,500,000 acres or 55 per cent of the state's improved farm land is irrigated. This area is nearly all in south Idaho. Without water, these lands are all but worthless; with water, they have a value running into high figures. Southern Idaho has few streams which are not already of doubtful adequacy. There is plenty more irrigable land, but water rights are scarce and difficult to get. Reservoir storage will help, but the greatest single help will be forested watersheds.

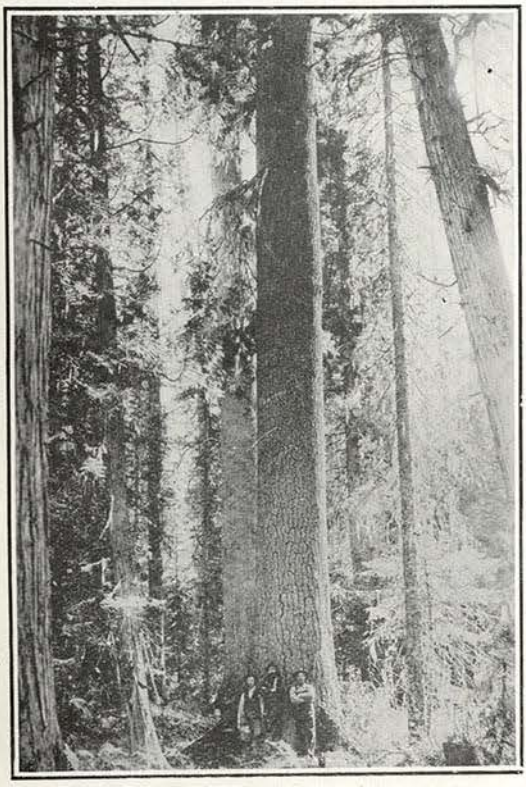
F. S. Baker of the U. S. Forest Service, is authority for the statement that the forested watersheds in Idaho draining into the whole Snake River valley are worth $17 per acre for irrigation purposes alone. When it is considered that the forested watersheds tributary to the Snake River valley in Idaho comprise 12,000,000 acres, their enormous value to agriculture is at once apparent. Mr. Baker also states that devastation of the forest and forage cover on these watersheds by fire, reckless cutting of the timber, or overgrazing would decrease their value to the irrigation farmer by one-half. Any measures, therefore, that may be taken to prevent such disaster are of the utmost importance to the entire state.

That "He who wishes to master the waters must first master the forests" is a truism which doubtless former state tax agent, John D. Robertson had in mind when, in one of his papers on forest taxation, he wrote: "When our forests are destroyed we can look for flooded lowlands in the spring and lack of water in the summer and fall. Nature's great

reservoir will be destroyed, and the taxpayers of Idaho will have to build artificial reservoirs to store for irrigation purposes the spring rush of water."

Home Markets

Another important way in which forestry may be of assistance to the farmer is in helping to supply a home market for his products. This is a factor of special significance to the farmer in a state like Idaho, situated remote from the large consuming centers. The lumber industry in Idaho distributes not less than $24,000,000 annually for labor and supplies, the bulk of which goes either directly



"Idaho White Pine"

or indirectly for products from the farm.

These figures do not include the wages paid out in the maufacture of such materials as poles, posts, hewn ties, round mine timbers, pulpwood, match blocks, etc., nor the wages paid out by the many secondary woodworking industries directly dependent upon the forest, all of which wages in large part go to purchase agricultural products. Such secondary industries will locate in Idaho in increasing numbers, if a permanent supply of raw material is assured. Factories will bring people, and people create markets. Sustained lumbering and other forest industries, therefore, mean a permanent home market of no mean importance for what the farmer grows. Thus forestry and farming go hand in hand.

This is a matter of particular importance to farmers adjacent to forest industries. Examples in numbers may be cited in the older lumber sections where the establishment of saw mills led to local agricultural development, more often in the way of small farms, but the mills did not stay, and these same farm homes were later abandoned. Indeed, one need not go outside of Idaho for such examples, although the lumber industry in this state is young.

Transportation

The farmer is interested in the construction of railroads and highways, as he must have transportation for his products. The forests of Idaho have been directly responsible for securing much that is now afforded in the way of transportation facilities and will play an increasingly important part in this direction in the future. The state has at present a considerable mileage of railroad that was built primarily to tap new belts of timber, and the U. S. Forest Service is cooperating with the state and counties in a very substantial measure in the construction and maintenance of roads, all of which construction is a very direct benefit to the agricultural interests. Up to June 30, 1923, the U. S. Forest Service had expended in Idaho a total of $4,323,086 for the construction, improvement, and maintenance of roads and trails from forest road appropriations and other federal and cooperative funds. A very substantial fund for this purpose is in sight for the fiscal year of 1924. It is, for example, these forest funds that have made the North and South Highway possible.

In this connection mention may be made of the fact that, as the forests are made more accessible by the building of roads and trails, the tourist traffic in Idaho is rapidly increasing, the number of tourists visiting the national forests alone now exceeding 300,000 annually. Records of the number visiting other forested areas are not available. An unknown percentage (doubtless large) of these tourists comes from outside the state, hence brings in new capital. It is reckoned that each tourist spends two and one-half days in the forests, hence it will be seen that our tourist trade now reaches formidable figures, a large part of the money going di-

rectly to the farmer. This tourist trade, if rightly fostered, has large economic possibilities.

Taxes

The lumber industry in Idaho pays a million dollars in taxes annually, and in some of the more active sawmill counties it pays from 30 to 60 per cent of all the taxes raised. In addition the federal government pays what amounts to a yield tax of 35 per cent of the gross receipts from the national forests for the support of schools and the building of roads in the counties in which these forests lie. If the lumber industry declines in a given locality and in consequence pays less taxes, it is the common practice to assess the difference against the other classes of property, thus increasing for the latter a burden already excessive.

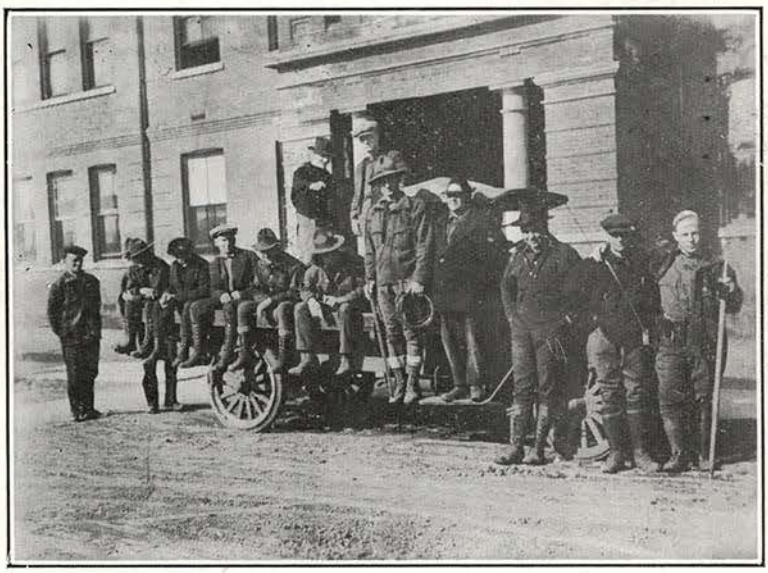
Looked at, therefore, from any angle one may, it is highly to the interest of the farmer that the forest lands be kept continuously productive, to the end that the varied industries dependent upon the forests may be made permanent.

WHAT THE PAST YEAR HAS BROUGHT FORTH IN THE SCHOOL

By C. W. WATSON

New Instructor Arrives

This school year began with a change in the faculty personnel. Professor C. Edward Behre, after serving in the school for four years, left in October to take up his new duties as assistant silviculturist at the Northeastern Forest Experiment Station, Amherst, Mass. He left behind him a record of excellent service for the school and for the profession. Mr. Harry I. Nettleton joined the School as instructor in lumbering in the early fall and he has proved to be a valuable addition to the faculty. Mr. Nettleton is a graduate of the Oregon Agricultural College where he received his degree in forestry. Subsequently he taught one year at his alma mater, then he was employed by the East Oregon Lumber Co., at Enterprise, Oregon, during the year 1922-23. Mr. Nettleton came to the School with strong endorsements.



Off for the Field

We Are Still Growing

This year has seen the largest student body yet in the School of Forestry. The unusually large freshman class was very encouraging.

The following tabulation shows the total registration for the year:

Four year courses	73
Ranger course	21
Non-Resident courses	10
Total majoring in forestry	104
Students from other departments taking one or more forestry courses	32
Total under instruction in forestry	136

It is of interest to note that the 94 men majoring in the resident courses come from 17 different states.

Ranger Courses Shortened

Owing to the rapid growth of the long course enrollment and the increased demand made on forest faculty in consequence, the year long Ranger Course has been reduced to a one term course of twelve weeks. The The School will continue to make this course one of its major activities and it is believed that the needs of the men taking advantage of it can be met best by giving it in January, February and March, which is now the plan.

Interesting Lecturers Heard

During the week of February 25 to 30, Mr. James B. Yule of the District Office, U. S. Forest Service, Missoula, Montana, lectured on maps and surveys. Mr. Yule gave an excellent series of lectures. He talked with a conviction born of intimate contact with his subject and he exhibited many maps to illustrate his lectures. We hope that he may visit us again.

Mr. James C. Evenden, forest entomologist, stationed at Coeur d'Alene, Idaho, favored the School with a visit in early fall. Mr. Evenden exhibited a moving picture reel, showing the work of forest insects and the measures taken for their control. The week beginning March 3, Mr. Evenden gave a series of lectures describing the work of different forest insects, methods of identifying them, etc.

On May 13, Mr. Norman F. Coleman talked to the foresters about what is being done in the lumber business to create a sympathetic understanding between employer and employe.

Some Times a Camp is Established in the Field

Mr. Coleman's position as president of the Four L organization gives his words much weight and his talk was both unusual and interesting. The term Four L fully interpreted means Loyal Legion of Loggers and Lumbermen.

New Equipment Received

The School recently acquired a new, steel herbarium case with space for 2,000 plant specimens. This collection is being added to at the rate of from one hundred to two hundred specimens yearly and this new case was very much needed.

The engineering and mensuration equipment has been added to by the purchase of several new pieces. Also, in the forest pro-

ducts laboratory equipment has been installed for the treatment of fence posts by the open tank method, and experiments in this line are under way.

Portable Fire Pump Demonstrated

Through the courtesy of the Edward Rutledge Timber Co., Coeur d'Alene, Idaho, a Northern Portable Fire Pump was loaned to the School of Forestry during the late winter and early spring season. Mr. J. W. Rodner has handled these pumps in the woods while employed by the Coeur d'Alene Timber Protective Association and he gave several demonstrations of its efficiency.

SHOOTING WILD BEARS

A. M. SOWDER, '24

In my wanderings here and there about the woods I have always been equipped with something that will shoot, not always a rifle or a pistol, but for the most part a thing that will shoot—pictures.

My remarks here are to be confined for the most part to the taking of pictures of animals, and getting it even to a finer point than that, to bears; yea even a bear.

To begin with, bears are a lot like humans, and, knowing a little something about one, you know a little something about the other. With that assumption, in taking pictures of both it is merely necessary to attract their attention to the long used birdie in the camera. Please note how the bear in the accompanying picture was watching the birdie in the camera.

Many people have mentioned to me that this picture was surely taken in an animal park, but such is not the case. It was taken in the woods of northern Idaho, far away from any such park, and the time of year was the latter part of June, just when the bruins are coming out of their long winter sleep and hungrily looking for food. At this particular time I was working in a railroad construction camp, and the swill hole for the camp refuse furnished a good place for the hungry bears to get an easy, ready meal, hence my chance for getting better acquainted with such animals and affording an opportunity for taking pictures of them. The swill hole was about a hundred yards from camp and it was possible to sit in camp and watch the bears visit the place to eat. Obviously a hundred yards is too far to get a good close-up of a bear, so I had to cut that distance down considerably to get the accompanying picture.

We were all somewhat afraid of the bears, and they were apparently afraid of us so the feeling was more or less mutual. However, I was willing to take a chance at the bear being more afraid of me than I was of him, so I posted myself quietly behind a fair sized stump which was just at the edge of the swill hole. I had observed one thing the bears always did when jumping in and out of the swill hole, and that was to sit upon the mound of dirt thrown up and look around to see that things were perfectly okeh. With this in mind, I had the camera placed on the ground with the adjustments all properly made and

close enough to me so that I merely had to reach out and press the bulb.

This particular evening I waited a long time, so long in fact that I had to make readjustments with the camera owing to the lateness in the evening. However, my patience was rewarded. The bear came to the edge of the swill hole, opposite from where I was hiding behind the stump, and, after a little hesitation, he jumped in the hole, and from my position behind the stump I could distinctly hear him munching and slopping around. I doubt very much if I was over five feet from him in a direct line.

While he was still down below me, I reached over for the bulb of the camera and the bear, hearing me, jumped to his position on the mound. There was my chance, and for once in my life I sparked because, as he sat there ready to run in any direction, I began to whistle softly, and he immediately pricked up his ears and looked intently at the camera while I snapped the shutter open. I knew I had to expose it for several seconds and figured it would be just luck if he would sit still long enough. I was as intently watching him as he was the camera, and when he showed the least sign of "hauling freight" I closed the shutter, and you see the results in the accompanying picture.

Although I tried several other times to snap this bear and several others, they all seemed to be camera shy and refused to pose for me. Many people have asked me what I would have done if he had started for me. What would you have done? Doubtless the same thing I would have done. You can use your imagination.

THE ANNUAL BANQUET

By PAUL M. HARLAN, '25

On March 19, almost eighty foresters and guests gathered at Forney Hall for the Eighth Annual Banquet. Here, for four hours, they feasted, listened to forestry tales, and utterly forgot the troubles of a forester. Good food, excellent music, clever decorations and typical forestry speeches filled the evening as no preceding banquet has ever done.

Cant hooks and calipers were checked at the door and everyone entered the banquet hall with a hard collar and a regular appetite. The chef forgot that a forester is used to bacon, boiled rice, and strong coffee and set a dinner which even a parlor forester could enjoy. From fruit cocktail to cigars the smiles kept increasing until at last the crew sank back exhausted but happy.

Mr. H. I. Nettleton, instructor in forestry, acting as toastmaster, kept up a running fire of snappy remarks in introducing the various speakers and never failed to take advantage of his prerogative to get in the last word. On the program were President A. H. Upham, Mayor Melgard, of Moscow, Dean Angell, Ernest Robinson, Rodgers G. Wheaton and Floyd M. Cossitt, who talked on everything from reforestation to ten-thirty. These talks were interspersed by instrumental music furnished by a trio composed of Miss Helen Wood, violin; Frank Mitten, piano; and Robert Reed, cello.

This year the Forest Club, through its social activities and especially through its banquet, has knit together its students and faculty to an unusual degree. Talking and jesting over the coffee cups the foresters united themselves into a friendship such that assures success to any undertaking of the club.

ON LEAVING THE U. S. FOREST SERVICE

I'm a better man with my broken bones
And those shattered dreams, that hurt,
Than I was that day when the Ranger pinned
This badge upon my shirt.

When he burdened me with the rules and tools,
With coffee and "tack" and rice—
When he handed a "45" to me,
With words of his tried advice.

When he dragged me up to a "lookout" peak,
Some two miles in the air
And said, "This country 'round about,
I'm leaving in your care."

No, I'm not the man that I thot I was
When the Ranger grinned at me,
"'Twill either make you or break you, boy."
God knows, I'll never be.

—Stanley Foss Bartlett

PERSONALS OF FORMER STUDENTS

By C. C. OLSEN, '26

Mark Anderson, Ex-'15, is operating two hotels in Provo, Utah. He writes that many Forest Service men make his places their headquarters when in Provo and that he retains a keen interest in forestry work.

Stanley Foss Bartlett, (R.C.) '21-'22, sends from Locke's Mills, Maine, a highly embellished and thoroughly interesting letter of his exploits. He has been dividing his time between forestry and art in many forms. He was, for a while, employed on the White Mountains National Forest, did some surveying and timber estimating for private concerns, was then engaged for a time with the Bureau of Entomology on gypsy moth extinction work, and more recently has been delving into the realms of commercial art and writing poetry. He writes that he has been doing some comic series for a newspaper syndicate, sold numerous poems, and will enter the School of Fine Arts of Yale University the coming fall.

Herman Baumann, '24, is in the employ of the Fruit Growers Supply Co., Susanville, California, as forester.

Paul S. Bieler, (R.C.) '21-'22, is employed as a draftsman and assistant photographer in the engineering department of the Southern Pacific Railroad Co., Ogden, Utah.

Edward W. Chamberlain, Ex-'26, is a student of the United States Military Academy at West Point where he will soon have completed his first year of training.

Fred B. Chamberlain, Ex-'23, writes from Toledo, Oregon, that he is with the Pacific Spruce Corporation where he has been in charge of their sawmill and cargo shipments.

Donald S. Coolbroth, Ex-'26, writes from San Francisco that his experiences have been wide and varied since he left Idaho. He was with the U. S. Forest Service for over six months during last summer and fall after leaving the School of Forestry. He has since been employed by the Bay City Box Co., of San Francisco. Some work at Portland is now claiming his attention, but he insists that he is in forestry work for good.

Albert S. Daniels, '23, on leaving college in June, 1923, accepted a position as chemist to the National Lumber and Creosoting Company at Texarkana, Texas. Recently he has been made Assistant Superintendent of their Houston plant with headquarters at 1114 Union National Bank Building, Houston, Texas. He reports the work very much to his liking and can see a great future to the wood preserving industry.

S. K. Denning, Ex-'13, is now sales manager for the Panhandle Lumber Co. at Spirit Lake, Idaho.

J. Phillip Drissen, '21, is in charge of logging operations on the Mescalero Indian Reservation, Mescalero, New Mexico. He visited the School last December.

Leslie E. Eddy, Ex-'24, is on the ranger force of the Clearwater National Forest, with offices at Orofino, Idaho. He has been on an extensive timber survey, spending the summer in the field and during the winter season compiling the data obtained.

C. E. Favre, '14 (M.S.For.) '15, is supervisor of the Wyoming National Forest, Kemmerer, Wyoming. This forest is doing the largest timber sale business and the second largest grazing business in District 4.

Ray S. Ferguson, (R.C.) '21-'22-'23, is a ranger on the Selway National Forest and is in charge of the Smith Creek cedar sales.

Howard A. Gatley, Ex-'27, received an appointment last fall as assistant scout executive of the Boy Scouts of America and was assigned to the council at Terre Haute, Indiana. He reports the arrival last April of another daughter.

Paul H. Gerrard, '23, is fire assistant on the Clearwater National Forest with headquarters at Orofino, Idaho.

George M. Hammond, Ex-'20, is associated with the Bowerman Lumber Co., Ltd., at Glendale, California. He writes that since leaving school he has served a hitch in the army, been married, has one child, been in the retail lumber business in Pocatello, and now is in glorious, sunny, prosperous California.

Ralph L. Hand, (R.C.) '20-'21, is ranger on the Selway National Forest, being in charge of the Lochsa District.

George J. Madlinger, Ex-'24, is attending Yale University, being a candidate for the Bachelor of Science degree in Sheffield Scientific School. He has been engaged in silvical research at Yale and on the Yale Forest in New Hampshire. He was recently married to Miss Olive Geise of Poughkeepsie, New York. He extends his personal greetings to all the

boys of the school and the faculty.

Harry E. Malmsten, '17, is engaged in range investigations in the U. S. Forest Service. Most of his field work has been at the Great Basin Experiment Station, but he makes his compilations at the District Office at Ogden, Utah. He writes that he is still single and contented and may be communicated with c-o U. S. Forest Service, Ogden, Utah.

Paul J. Martin, Ex-'19, is with the Liverpool and London Globe Insurance Company, Ltd., with offices in Spokane, Wash. He frequently consults the School of Forestry for information concerning fire hazards in timber lands and says that his training here has assisted him in inspection of mill and log risks.

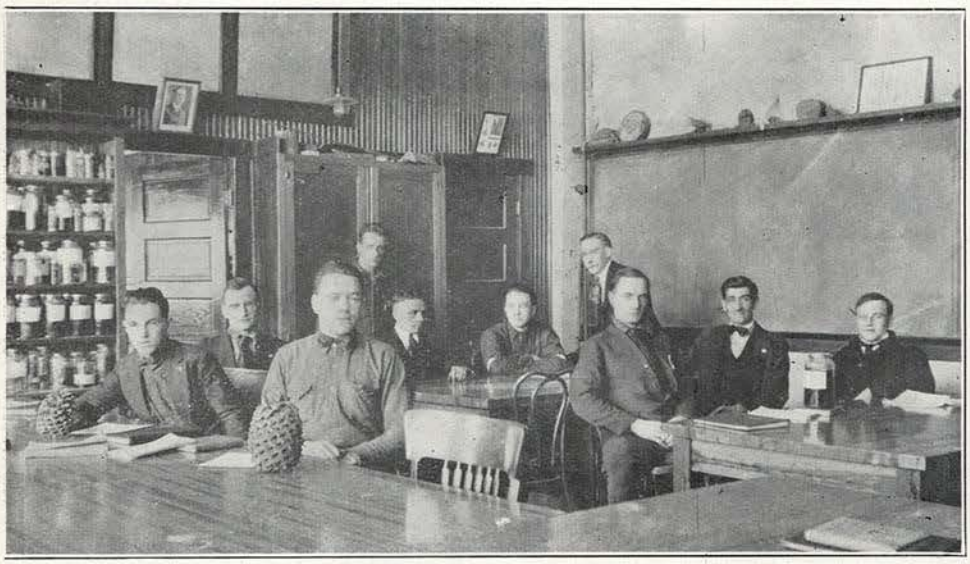
William Byron Miller, '22, writes from Ogden, Utah, that he has been on grazing reconnaissance and has been making a grazing plan for the Fillmore Unit of the Fishlake National Forest. Mr. Miller was a visitor at the School during the Christmas vacation.

E .H. Myrick, Ex-'17, has been with the Forest Service since he left Idaho and is now Supervisor of the Lewis and Clark National Forest, Choteau, Montana. Mrs. Myrick was formerly Clara Hackett of the class of 1914. They have three children who Mr. Myrick says will some day be Idaho students. He says that he has "always been treasuring the thought that some day in some way, I might manage to call, shake hands, swap a few yarns, and may be tell of a few things we are doing in the Service."

Edward T. Nero, '23, is a ranger on the Clearwater National Forest. He spent his Christmas vacation with his folks in Moscow and incidentally visited the School of Forestry several times.

Russell M. Parsons, '24, has accepted a position with the Pacific Lumber Company, Eureka, California, and is already in the field. This company is practicing forestry on its large redwood holdings.

C. R. Patrie, '22, writes that he is with the Western Office of White Pine Blister Rust Control, with headquarters at Spokane, Wash. His time is divided between quarantine inspection and wild Ribes eradication.



A Laboratory in Dendrology

E. C. Rettig, '19, writes, "I am located at Orofino, Idaho, in the employ of the Clearwater Timber Protective Association as Assistant Fire Warden and in the Clearwater Timber Company as head cruiser." Rettig was detailed by his company the past winter to study methods of logging on the Pacific Coast. This study included typical operations from British Columbia to central California. Just as we go to press it is learned that Rettig had his right arm broken in a recent baseball game.

Victor N. Runberg, (R.C.) '22-'23, is grading lumber for the Potlatch Lumber Company, Potlatch, Idaho.

Ralph S. Space, Ex-'25, is employed with a

reconnaissance party working for the U. S. Forest Service on the Selway National Forest for the summer. He plans to return to school next fall and complete his course in Logging Engineering.

Howard W. Staples, '20, is operating assistant with the Yukon Gold Co., Murray, Idaho. He is married and has a daughter. He expects to be at the University again during commencement. Life goes well with him and he writes that he is increasing in girth about the middle.

C. R. Stillinger is pathologist with the Office of White Pine Blister Rust Control of the Department of Agriculture, where he has been for the last four years. His present address is Spokane, Washington.

J. Warren Stoneman, Ex-'24, was married to Juanita Hansen on May 17, 1924. Mr. Stoneman was a Junior in the School of Forestry when he left school and active on the campus. He was a two year letterman in track. The couple will make their home at Mead, Washington, where Mr. Stoneman will be engaged in farming.

Norman E. Taylor, (Voc.) '20-'21-'22, died in Spokane, Washington, February 8, 1924. Mr. Taylor was a valued employe of the U. S. Forest Service at Republic, Washington.

James A. Thornton, Ex-'12, is with the Winton Lumber Co. on their logging operations at Emerald Creek in northern Idaho, where he has been for the past two years.

John H. Zuver, Ex-'25, has been leading a journalistic life in South Bend, Indiana, since his departure from Idaho. The "Indiana Flash" assures us that nothing startling has happened to him since he left the haunts of Morrill Hall, and that he expects to begin another year with us next fall.

FOREST ECONOMICS IN NORTH IDAHO

(Continued from page eight)

writer's opinion the picture usually painted by men in the lumber industry is a too pessimistic one. But foresters must at all times keep in mind some very pertinent facts in approaching the question of future timber production. Some of these are:

1. The stumpage owner has no way of predicting what burdens the taxing authorities may lay on the land and timber during the many years before it can be harvested.

2. The owner is taking very large risk in loss from fire and insects and, as more private land is cut over, the risk from fire may, because of failure of other owners to protect cutover land as they do mature timber, become larger.

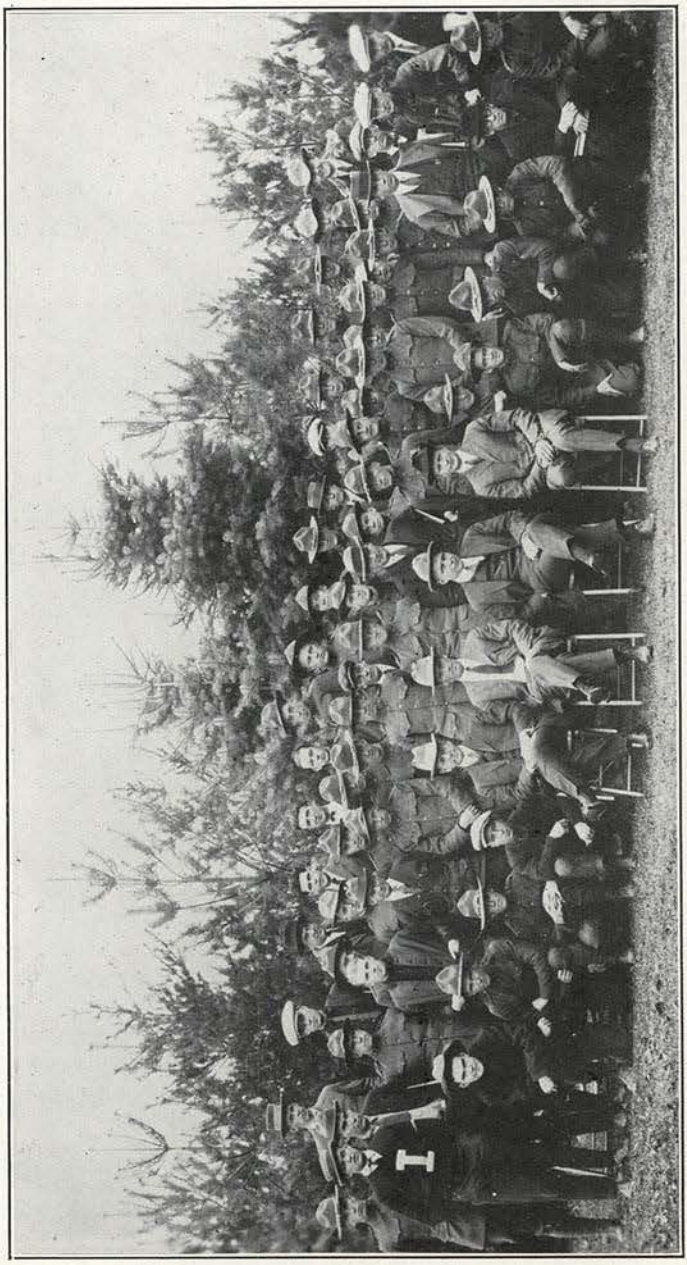
3. The owner cannot predict with any degree of accuracy what his stumpage will be worth when timber is ready for cutting.

4. If the land has any agricultural possibilities, the owner cannot predict with any degree of accuracy what it may be worth for that purpose as against timber production.

5. It is the owner who has to foot the bill, and unless it looks like there is going to be a chance for him to realize a profit on his investment, he isn't going to make it. Capital is properly shy of ventures with too many hazards, even though there is a chance of good profits.

These questions cannot be settled en masse, or at once. One cannot say that all the timber lands in North Idaho represent such and such economic possibilities from the standpoint of the owners any more than it can be said that the farmer or the grocery stores represent certain possibilities of profitable business to their individual proprietors. The question must be brought down to consideration of particular pieces of land, with recognition of the carrying charges, risk, and productivity of the particular parcel.

An effort has been made through the statistics quoted to point out briefly the relative importance of North Idaho forests in the economic development of the region, and in the discussion following to indicate a few of the general problems that must be settled between the public and land owner before the economic possibilities can be realized. They are baffling and many-sided probelms and will be solved wholly or in part only by passage and enforcement of laws and by public assistance designed to fit the needs of particular local situations. It is the job of the forestry profession in the region to help in framing laws that will fit the situation and help to secure their passage and enforcement; to gather data on production possibilities, and to adapt, so far as possible, the forestry practices recommended to the economic needs of the region.



Associated Foresters, 1923-24

THE ASSOCIATED FORESTERS

By J. W. RODNER

The forest club of students and faculty of the Idaho School of Forestry has had a most successful year. Under the leadership of Floyd M. Cossitt we have expanded, not only in numbers, but in the scope of our activities, and in the broadening of our individual visions of a mighty profession.

This year the foresters inaugurated the custom of holding business meetings at the various fraternity houses. The idea has worked out very well, with the forestry students in the house at which the meeting is held in charge of the social part of the program. Our programs have included talks on the activities of the Pacific Logging Congress at Spokane, Washington, by Harold Z. White, Lawrence Pugh, and Rodgers Wheaton; a talk on The White Pine Blister Rust Situation in the Northwest by Dr. Schmitz and an address on the Relation of English to the Profession of Forestry by President A. H. Upham.

The first big event of the year fostered by the Associated Foresters was the Annual Dance, held October 6, 1923, in the university gymnasium. The "gym" was decorated for the occasion in a woodland effect which earned for us the distinction of having the best decorations of any dance this year. The musicians syncopated from a woody retreat, and across the hall punch flowed freely from the recesses of another evergreen bower. The affair was a success from every standpoint.

The following officers were elected for next year: President, W. E. Buckingham; Vice-President, Clarence Olsen; and Secretary-Treasurer, Robert McLaughlin.

XI SIGMA PI

By A. M. SOWDER, '24

Xi Sigma Pi, national honorary forestry fraternity, came into existence in 1908 as a local society at the University of Washington, Seattle. It grew steadily, and in the year 1915 it became a national honorary society. Xi Sigma Pi can now boast seven live, active chapters scattered over the United States from coast to coast.

The Idaho Chapter, known as Epsilon Chapter, was established in 1920. At first its members here numbered but a few; but now, with the recent initiation of seven new men, it claims a place with any of the honor societies on the campus.

The objects of the fraternity are 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 idea of scholarship and leadership in forest activities has always been uppermost in the selection of new members.

In order to secure keener scholastic competition among the students enrolled in the School of Forestry, Xi Sigma Pi purchased a bronze tablet of beautiful and artistic design upon which is engraved each year the names of the students who have attained the highest average in each class for the school year. This tablet is fulfilling the purpose for which it is intended and occupies a very conspicuous place on the wall on the main floor of the Administration Building.

The students whose names are now engraved on the plaque and the years they attained the highest scholastic average of their class are listed as follows:

1922—James W. Farrell, senior; Russell M Parsons, junior; Arthur M. Sowder, sophomore; Paul M. Harlan, freshman.

1923—Albert S. Daniels, senior; Ralph S. Space, junior; Paul M. Harlan, sophomore; Floyd W. Godden, freshman.

To be eligible for membership into Xi Sigma Pi, a student must have completed two and one-half years of standard college work in an approved School of Forestry, three-fourths of his grades shall have been above 80 per cent, and he shall not have received any failures in forestry subjects. He shall also have shown creditable interest and activity in practical forestry work.

Besides scholastic achievement much weight is placed upon an individual's practical ability, such as adaptability to forest

work or lumbering, and capacity for leadership. Based upon these points, we are able to take into membership only men of high caliber and stimulate the desire of the underclassmen for membership to the fraternity, thus fulfilling the objects of the fraternity.

The officers for the year just closing are:

Floyd M. Cossitt, Forester; Rodgers G. Wheaton, Associate Forester; Arthur M. Sowder, Secretary-Fiscal agent and Executive Council Representative.

The faculty members include: Dean F. G. Miller, Dr. Henry Schmitz, Clarence W. Watson, and Harry I. Nettleton.

New members initiated May 15 are Robert P. McLaughlin, '25, Paul M. Harlan, '25, Floyd W. Godden, '26, Harold Z. White, '26, Emera W. Renshaw, '25, Elva A. Snow, '25, and Lewis Cummings, '25.

WHERE THE BOYS WILL BE THIS SUMMER

Floyd M. Cossitt will continue his work as Ranger on the Selway National Forest and his summer address will be Lowell, Idaho.

Arthur M. Sowder expects to be located near Burns, Oregon, with the Fred Herrick Lumber Co.

Rodgers G. Wheaton will be with Mr. Watson and Mr. Nettleton this summer, getting data regarding white pine growth in north Idaho.

Elva A. Snow left school the middle of May to accept work with the Office of White Pine Blister Rust Control as a scout for Ribes and white pine blister rust.

Orlin Dean De'Atley has not definitely decided what to do but expects to work in a sawmill this summer to gain practical experience.

Harold Z. White will be located on the Clearwater National Forest with headquarters at the Mussellshell Ranger Station, Weippe, Idaho.

Norman F. Gillham will spend most of the summer with his folks in Illinois. The last last part of the summer he will be in Arizona getting material for his thesis on grazing.

Robert P. McLaughlin, will be employed as a smoke chaser on the Clearwater National Forest with headquarters at the Mussellshell Ranger Station, Weippe, Idaho.

Paul M. Harlan is traveling south for the summer to work with the California Barrel Co., Arcata, Calif.

Fairly J. Walrath has been employed by the U. S. Forest Service as a smokechaser on the Clearwater National Forest. He will be under Ed. Nero, a School of Forestry graduate with the class of '23.

Clarence C. Olsen will be a foreman in the field work carried on in north Idaho this summer by the Office of White Pine Blister Rust Control.

Ralph B. Ross is to work as smokechaser on the Selway National Forest.

Arlie W. Toole will be working under Ranger W. E. Buckingham as a commissary clerk at the Mussellshell Ranger Station.

Ivan S. Doyle will return to his work in highway surveying with the Washington State Highway Department with headquarters at Yakima, Wash.

Chas. A. Gregory will be employed by the U. S. Forest Service in forest protection work on the Selway National Forest.

Philip M. Gustafson will spend the summer in forest protection work in north Idaho on the Kootenai Forest.

Wilfred F. Beals is going to work as a lookout on the Okanogan National Forest with headquarters at Okanogan, Wash.

Alden B. Hatch will get some practical field work in surveying this summer by working for the Winchester Lumber Co., Craigmont, Idaho.

Gerald S. Horton will also work for the U. S. Forest Service with a trail crew on the Kaniksu National Forest with his summer address as Coolin, Idaho.

Virgil O. Crawford is undecided just what he will do this summer, but it will be either assisting his father in fruit growing or working with the Forest Service.

Lawrence R. Pugh expects to do work in scaling and cruising for the Russell and Pugh Lumber Co., Springston, Idaho, in which firm his father is a partner.

Liter E. Spence has accepted employment as a commissary clerk and smoke chaser with the U. S. Forest Service on the Chamberlain Meadows District at Superior, Montana.

Henry C. Hoffman will spend the summer logging for the Edward Rutledge Timber Co., at Clarkia, Idaho.

Tracy L. Heggie has informed the staff that his summer work will consist of making and repairing trails for the U. S. Forest Service

with headquarters at Coeur d'Alene, Idaho.

I. C. Burroughs will be employed in forest protection work with the U. S. Forest Service with headquarters at the Bear Creek Ranger Station, Lowell, Idaho.

William V. Cranston is going to work with a timber cruising party for the U. S. Forest Service out of Lowell, Idaho.

Carl Gustafson is to be engaged in map making and survey work on the Nez Perce National Forest out of Grangeville, Idaho.

John C. Baird will spend the summer with the Edward Rutledge Timber Co., Clarkia, Idaho, taking care of this company's portable fire pumps and doing other forest protection work.

ROSTER OF STUDENTS

The following is a list of students in actual attendance at the School of Forestry during the year 1923-24. The information after each name is in the following order: 1, name; 2 home address; 3, social fraternity; 4, honorary fraternity; 5, scholastic athletic and campus achievements.

Seniors

Baumann, Herman; Milwaukee, Wisconsin; Sigma Alpha Epsilon, Xi Sigma Pi, Alpha Zeta, President Associated Foresters 21-22, Business Manager "Idaho Forester" 23-24, English Club.

Cossitt, Floyd M.; Weiser, Idaho; Elwetas, Xi Sigma Pi, President Associated Foresters 23-24.

Parsons, Russell M.; Moscow, Idaho; Beta Theta Pi, Xi Sigma Pi, Vice-President Associated Foresters 22-23, Editor "Idaho Forester" 22-23.

Rodner, Jack W.; Moscow, Idaho; Sigma Alpha Epsilon, Editor "Idaho Forester" 23-24, Vice-President Associated Foresters 21-22, Associate Editor "Idaho Forester" 21-22, English Club.

Ryan, Cecil C.; Moscow, Idaho; Kappa Sigma.

Sowder, Arthur M.; Coeur d'Alene, Idaho; Sigma Alpha Epsilon, Xi Sigma Pi, Alpha Zeta, President Associated Foresters 22-23, Secretary-Treasurer 23-24, Silver Lance, English Club, Track "I" 23 and 24, Cross Country "I" 24.

Wheaton, Rodgers G.; Springfield, Mass.; Sigma Nu, Xi Sigma Pi, Sigma Xi, Business Manager "Idaho Forester" 23-24.

Juniors

Cummings, Lewis A.; St. Petersburg, Florida; Xi Sigma Pi.

Gillham, Norman F.; Edwardsville, Illinois; Elwetas.

Harlan, Paul M.; Jackson, Tenn.; Kappa Sigma, Xi Sigma Pi, Alpha Zeta, Associate Editor "Gem of the Mountains" 23-24, Silver Lance.

McLaughlin, Robert P.; Idaho Falls, Idaho; Acacia, Xi Sigma Pi.

Renshaw, Emera W.; Kamiah, Idaho; Phi Gamma Delta, Xi Sigma Pi, Alpha Zeta, Pep Band, Vice-President Associated Foresters 23-24.

Pugh, Lawrence R.; Springston, Idaho.

Snow, Elva A.; Boise, Idaho; Kappa Sigma, Xi Sigma Pi, Alpha Zeta, Baseball "I" 22, 23 and 24 .

Walrath, Fairly J.; Orofino, Idaho; Phi Gamma Delta, Pep Band.

Sophomores

Bolles, Warren H.; Little Valley, New York.

Buckingham, William E.; Gifford, Idaho.

Bucklin, Ted; Idaho Falls, Idaho; Beta Theta Pi, Football "I" 24.

Callender, William C.; Boise, Idaho.

De'Atley, Orlin Dean; Lewiston, Idaho.

Doyle, Ivan S.; Moscow, Idaho.

Field, Walter D.; Huston, Idaho; Phi Delta Theta, Baseball "I" 24.

Fox, Charles E.; Utica, New York; Elwetas.

Godden, Floyd W.; St. Paul, Minnesota; Xi Sigma Pi.

Greene, Edwin G.; Moscow, Idaho.

Guernsey, William G.; Poughkeepsie, N. Y.; Phi Delta Theta, Assistant Business Manager "Idaho Forester" 23-24.

Hall, Charles W.; McMinnville, Oregon.

Hills, Chester W.; Everett, Mass.

Johnson, Richard H.; Poughkeepsie, N. Y.; Phi Delta Theta.

Lansdon, William H.; Boise, Idaho; Phi Delta Theta, Baseball "I" 24.

Olsen, Clarence C.; Seattle, Wash.; Sigma Alpha Epsilon, Associate Editor "Idaho Forester" 23-24, President Sophomore Class 23-24, Cast "Wayfaring Men" and "Every Man" 24. English Club.

Payne, Hanley H.; Idaho Falls, Idaho; Beta Theta Pi.

Ross, Ralph B.; Gary, Indiana; Elwetas, Wrestling.

Sams, Arch M.; Skamania, Wash.

Toole, Arlie W.; Marshfield, Oregon.

White, Harold Z.; Moscow, Idaho; Xi Sigma Pi.

Williams, Guy V.; Boise Idaho; Sigma Nu.

Freshmen

Baird, John C.; Chicago, Ill.; Sigma Alpha Epsilon, Frosh Football and Baseball 24.

Balch, Prentice; Spokane, Wash.

Bark, Wendolin; Park Ridge, Ill.

Beals, Wilfred F.; Okanogan, Wash.

Bennett, Carey H.; Ogden, Utah.

Blackburn, Edmund G.; Pittsburgh, Penna.; Kappa Sigma.

Bloom, Lawrence C.; Wallace, Idaho;

Burroughs, Isaac C.; Poughkeepsie, N. Y.; Kappa Delta, Frosh Wrestling 24.

Clegg, Martello; Heber, Utah.

Coleman, William W.; Cascade, Idaho.

Cranston, William V.; Mt. Vernon, Wash.

Crawford, Virgil O.; Opportunity, Wash.

Drissen, Frank J.; Harrison, Idaho.

Ellis, Francis G.; Idaho Falls, Idaho.

Flock, Kester D.; Spokane, Wash.; Beta Theta Pi.

Fuller, Melvin F.; Orofino, Idaho; Phi Gamma Delta, Frosh Football 24.

Gatley, Howard A.; Washington, D. C.

Godson, William H.; Troy, N. Y.

Gregory, Charles A.; Chicago, Ill.; Sigma Alpha Epsilon, Frosh Baseball 24.

Gustafson, Carl A.; Vancouver, Wash.

Gustafson, Philip M.; Evanston, Ill.

Hansen, Louis W.; Park Ridge, Illinois; Sigma Alpha Epsilon, Frosh Football 24.

Hatch, Alden B.; Bryn Maur, Penna.

Heggie, Tracy; Montpelier, Idaho.

Hoffman, Henry C.; Galesburg, Ill.

Horton, Gerald S.; Clyde, New York.

Hutchins, John E.; Spokane, Wash.; Beta Theta Pi.

Johnston, Royal H.; Poughkeepsie, N. Y.

Kemp, Richard L.; Spirit Lake, Idaho; Sigma Alpha Epsilon.

Moulton, Earl R.; Lynn, Mass.; Elwetas.

Pike, Galen W.; Woodstock, Conn.

Ross, Oral O.; Long Beach, Calif.

Seely, Theodore A.; Belfast, N. Y.

Shaner, Fred; Humboldt, Minn.

Spence, Liter E.; Park Ridge, Ill.

Wilson, LaVerne C.; Jerome, Idaho.

Ranger Course

Baldwin, Wesley; Torrington, Conn.

Biba, Frank J.; Des Plaines, Ill.

Chenoweth, Worth; Progress, West Virginia.

Clark, Benton; Moscow, Idaho.

Dart, Glenn G.; Coeur d'Alene, Idaho.

Irwin, Patrick; Boise, Idaho.

Kane, Thos. Vincent; Niagara Falls, N. Y.

Kayler, Dean C.; Winchester, Idaho.

Kelso, Jean Everett; San Francisco, Calif.

Lefler, Lowell T.; Kamiah, Idaho.

Love, Karl Francis; Los Angeles, Calif.

McMillan, Carleton W.; St. Maries, Idaho.

Morgan, Roy; Heise, Idaho.

Osborne, Ira Dean; Orofino, Idaho.

Page, Milford M.; Union Springs, N. Y.

Potter, Arthur; Ola, Idaho.

Robinson, Ernest G.; Orofino, Idaho.

Schultz, Jerry; Chicago, Ill.

Scribner, Charles H.; Chattaroy, Wash.

Swanson, Rex A.; Chicago, Ill.

Tonseth, Henry R.; Methow, Wash.

Non-Resident

Calkins, Philip R.; Berkeley, Calif.

Cochrane, Clayton, T.; Los Angeles, Calif.

Dawson, Fergus; Cranbrook, B. C., Canada.

Dent, Ronald B.; Seattle, Wash.

Douglas, Robert S.; Potlatch, Idaho.

Labrecque, L. M.; Bridgeport, Conn.

Lehtinan, William; Scotia, Calif.

Morley, David E.; Marion, S. C.

Shadrach, Earl; Cleveland, Ohio.

Stafford, H. L.; Potlatch, Idaho.

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 alumni and former students.

Anderson, Mark, Ex-'15; Provo, Utah; Hotel Manager.

Autrey, Lawrence; (Voc.) '22-'23; Enterprise, Oregon.

Barger, Harlod B.; Ex-'17; Browning, Montana.

Bartlett, Stanley Foss; (R.C.) '21-'22; Locke's Mills, Maine.

Bedwell, Jesse Leonard; '20 B.S. For; Ranger, U. S. Forest Service; Caribou National Forest, Antelope, Idaho.

Berry, Waldo Lee; (R.C.) '15-'16; Post Falls, Idaho.

Bieler, Paul S.; (R.C.) '21-'22; Southern Pacific Railroad Company, Ogden, Utah; Assistant Photographer in the Engineering Department.

Braun, Otto; (R.C.) '22-'23; Burley, Idaho.

Brockmen, Cecil C.; Ex-'23; Bickelton, Wash.

Brown, Frank A.; '22 B.S. For.; 308 State Street, Boise, Idaho.

Burns, Robert Owen; Ex-'15; 625 Hoymount Ave., Fagetteville, N. C.

Cable, Guy Burr; Ex-'22; Roberts, Idaho.

Chamberlain, Edwin Wm.; Ex-'26; U. S. Military Academy, West Point, New York.

Chamberlain, Fred; Ex-23; Pacific Spruce Corporation, Toledo, Oregon.

Chamberlain, Gail B.; Ex-'22; Coeur d'Alene, Idaho.

Clark, George W.; (Voc.) '22-'23; Route 2, Box 25, Touchet, Wash.

Cochrell, Albert N.; (R.C.) '22; Fire Assistant, U. S. Forest Service, Orofino, Idaho.

Connors, John D.; Ex-'26; Prichard, Idaho.

Cook, Jacob Miller; Ex-'20; Oberlin, Kansas.

Coolbrath, Donald S.; Ex-'26; 241 Sixth St., San Francisco, Calif.

Cowan, Talmadge D.; (R.C.) '15-'16; Ranger, U. S. Forest Service, Targhee National Forest, St. Anthony, Idaho.

Cunningham, Russell N.; '17 B.S. For.; U. S. Forest Service, Missoula, Montana.

Daniels, Albert S.; '23 B.S. For.; Assistant Superintendent National Lumber and Creosoting Company, Houston, Texas.

Darnall, Glen McClellan; Ex-'16; Payette, Idaho.

Daugherty, Charles Ira; Ex-'22; Challis, Idaho.

Davis, Roscoe Richard; Ex-'21; Ranger, U. S. Forest Service, Ogden, Utah.

Decker, Arlie Delos; '13 B.S. For.; '17 M.F. (Yale University); Land Agent, Potlatch Lumber Co., Potlatch, Idaho.

Denning, Steward K.; Ex-'13; Spirit Lake, Idaho; Sales Manager, Panhandle Lumber Co.

Dipple, Ralph; Ex-'14; Dentist, Springfield, Oregon.

Dodge, Keith Allen; (R.C.) '15-'16; Challis, Idaho.

Drissen, J. Phillip; '21 B.S. For.; In Charge, Logging Operations, Mescalero Indian Reservation, Mescalero, New Mexico.

Duncan, Robert; (R.C.) '16-'17.

Eby, Lester W.; (Voc.) '22-'23; Walla Walla, Wash.

Eddy, Leslie Eugene; Ex-'24; Ranger, Clearwater National Forest, U. S. Forest Service, Orofino, Idaho.

Edwards, Kenneth D.; Nampa, Idaho.

Eldridge, Ferris Edwin; Ex-'18.

Elhart, Carlton D.; Ex-'22; Caldwell, Idaho.

Evans, Philip Smith; Ex-'20; Preston, Idaho.

Farrell, James W.; '22 B.S. For.; Forest Examiner, U. S. Forest Service, McCall, Idaho.

Favre, Clarence Eugene; '14 B.S. For.; '15 M.S. For.; Supervisor, U. S. Forest Service, Wyoming National Forest, Kemmerer, Wyoming.

Fenn, Lloyd Alfred; '11 B.S. For.; Kooskia, Idaho; Attorney at Law; Manager "Kooskia Mountaineer."

Ferguson, Ray S.; (Voc.) '22-'23; U .S. Forest Service, Kooskia, Idaho.

Flyg, Carl Jacob; (R.C.) '20-'21; Shelley, Idaho; Farmer.

Folsom, Frank B.; (Voc.) '20-'22; Ranger, U. S. Forest Service, Colville National Forest, Republic, Washington.

Fuller, Harry E.; Ex-'25; Emmett, Idaho.

Garner, Lawrence Henry; (R.C.) '22-'23; Midvale, Idaho.

Gavin, C. H.; Ex-'23; Heise, Idaho.

Gerhart, Carl William; Ex-'26; Merrill, Wisconsin.

Gerrard, Paul H.; '23 B.S. For.; Fire Assistant, Clearwater National Forest, Orofino, Idaho.

Gildea, Howard Cecil; Ex-'14; Lawyer, McMinnville, Oregon.

Gilman, John Elmo; Ex-'19; Obsidian, Idaho, via Stanley.

Hallcraft, Vernon Ralph; (R.C.) '20-'22; U. S. Forest Service, Emmett, Idaho.

Hamel, Joseph Henry; (Voc.) '22-'23; U. S. Veterans' Hospital, Walla Walla, Wash.

Hamilton, William Howard; Ex-'22; Santa Paulo, Calif.

Hammond, George M.; Ex-'20; Bowerman Lumber Co., Glendale, Calif.

Hand, Ralph L.; (R.C.) '20-'22; Ranger, Selway National Forest, U. S. Forest Service, Kooskia, Idaho.

Hanzen, Maurice Henry; Ex-'20; Box 904, Kellogg, Idaho.

Hart, Irving Warren; Ex-'22; Boise, Idaho.

Haynes, Ralph M.; (R.C.) '16-'17; Emmett, Idaho.

Headrick, Ralph Alonzo; (R.C.) '16-'17; Moscow, Idaho.

Heard, Herman Claude; Ex-'13; County Agent, Phoenix, Arizona.

Herman, Charles Henry; '13 B.S. For.; Enterprise, Oregon.

Higgins, Howard H.; (Voc.) '22-'23; c-o G. O. Brace, Gibbon, Oregon.

Holbrook, Frank C.; Ex-'25; San Francisco, Calif.

Humm, Howard M.; (R.C.); '20-'22; Colorado Springs, Colo.

Humphrey, Clyde Pearson; Ex-'17; State Highway Department, Coeur d'Alene, Idaho.

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

Jackson, Tom; '19 B.S. For.; Logging Superintendent, Fruit Growers Supply Co., Susanville, Calif.

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

Johanson, Robert; (R.C.) '20-'21; Ranger, U. S. Forest Service, Orofino, Idaho.

Johnston, Herbert William; Ex-'17; U. S. Biological Survey, Unalakleet, Alaska, Range Investigations.

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

Jones, Renaldo Vincent; Ex-'15; Albion, Idaho.

Jones, William McKinley; Ex-'22; Nampa, Idaho.

Kambridge, Antone; Ex-'16; Genesee, Idaho; Farmer.

Kelly, Robert C.; (R.C.) '20-'22; Bradford, Penna.

Kent, Howard A.; Ex-'25; Bonners Ferry, Idaho.

Keyes, George W.; Ex-'22; Challis, Idaho.

King, Leonard Austin; (R.C.) '20-'21; Orofino, Idaho.

Kiser, William L.; (R.C.) '22-'23; Weiser, Idaho.

Knapp, Russell M.; (R.C.) '22-'23; Moscow, Idaho.

Krim, Ben; Ex-'24; Newark, New Jersey.

Lawrence, H. Wayne; Ex-'26; Jerome, Idaho.

Lewis, LeRoy W.; (R.C.) '22-'23; Weippe, Idaho.

Lommason, Thomas; Ex-'17; Grazing Assistant, U .S. Forest Service, Ogden, Utah.

Luby, Lawrence L.; (Voc.) '22-'23; Idaho Falls, Idaho.

Lundburg, Wendell Stanley; Ex-'26; Idaho Falls, Idaho, R. F. D. 3.

Lundstrum, F. J.; '11 B.S. For.; 633 Shatto Place, Los Angeles, Calif.

McKinney, Clark P.; (R.C.) '22-'23; Salmon, Idaho.

McMullin, George Leiby; Ex-'18; 251 Bush St., San Francisco, Calif.; Stationery Specialties.

McNett, Gail, Jr.; Ex-'16; Rathdrum, Idaho.

Madlinger, George J.; Ex-'24; Poughkeepsie, New York.

Malmsten, Harry Elof; '17 B.S. For.; Grazing Examiner, U. S. Forest Service, Ogden, Utah.

Man, Dasaundha Singh; Ex-'25; India; Bevan, B.C., Canada.

Markham, Murl J.; Ex-'24; Grangeville, Idaho.

Martin, Ernest M.; (R.C.) '19-'20; Weiser, Idaho; U. S. Forest Service.

Martin, Paul J.; Ex-'19; Old National Bank Bldg., Spokane, Wash.; Liverpool and London Globe Insurance Co., Ltd.

Maruska, Joseph; (R.C.) '20-'21; Sandpoint, Idaho; Farmer.

Maxwell, Ben C.; (R.C.) '22; U. S. Forest Service, Wenatchee, Wash.

Melchisedeck, L. H.; (Voc.) '22-'23; Sisters, Oregon.

Melick, Harvey Ivan; '23 B.S. For.; Nampa, Idaho.

Melick, Marshall S.; Ex-'25; Bloedel-Donovan Lumber Co., Skykomish, Wash.

Melzian, Wesley; (R.C.) '21-'22; Onamia, Minn.; Teacher; Mille Lacs Indian Reservation.

Miller, Robert Adolph; Ex-'22; Manager, National Park Lumber Co.; Retail Yard, Arco, Idaho.

Miller, William Byron; '22 B.S. For.; Grazing Assistant, U. S. Forest Service, Ogden, Utah.

Montroy, Edward H.; Ex-'26; Bryant, Wash.

Moody, Virgil Carlton; '17 B.S. For.; Ranger, U. S. Forest Service, Ketchum, Idaho.

Moore, Frank B.; Ex-'25, Muscatine, Iowa.

Morris, Leo Francis; Ex-'16; Weiser, Idaho; 408 Savings and Loan Building, Spokane, Wash.

Morrison, Frank Bernard; Ex-'22; Barber, Idaho.

Munson, Oscar C.; '21; B.S. For.; Moscow, Idaho; Southern Telephone Co., 923 S. Union Avenue, Los Angeles, Calif.

Myrick, E. H.; Ex-'17; Supervisor, U. S. Forest Service, Lewis and Clark National Forest, Choteau, Montana.

Nelson, Neal D.; Ex-'26; Heyburn, Idaho.

Nero, Edward T.; '23 B.S. For.; Ranger, Clearwater National Forest, Orofino, Idaho.

Newkirk, Edwin Ely; (R.C.) '16-'17; St. Louis, Mo.; Railway Mail Clerk.

Nonini, Amerigo Louis; (R.C.) '16-'17; Mackay, Idaho.

Olcott, Kenneth Merle; Ex-'26; Allegan, Mich.

Parsons, Ralph Howard; Ex-'14; District Ranger, U. S. Forest Service, Coeur d'Alene, Idaho.

Patrie, Carthon Roy; '22 B.S. For.; Office of White Pine Blister Rust Control, Spokane, Washington.

Pelinka, William; (R.C.) '22-'23; 4104 W. 21st Place, Chicago, Ill.

Pederson, Arthur R.; Ex-'22; Kootenai, Idaho.

Peterson, Raymond E.; Ex-'24; Moravia, Idaho.

Poynor, Neal E.; (R.C.) '21-'22; Council, Idaho.

Rae, Charles Arthur; Ex-'14; Dentist; St. Maries, Idaho.

Redinger, Clyde Arthur; Ex-'21; Adams Basin, N. Y.

Rettig, Edwin Claire; '19 B.S. For.; Clearwater Timber Protective Association, Orofino, Idaho.

Reuterskiold, France; (Voc.) '22-'23; Atkinson, Wisc.

Roeder, Charles; (R.C.) '20-'21; Streator, Ill.

Ruckweed, Fred John; '17 B.S. For.; Gettysburg Public Schools, Gettysburg, S. D.

Rudesill, Ralph M.; (R.C.) '20-'22; Bradford, Penna.

Runberg, Victor; (Voc.) '22-'23; Potlatch Lumber Co., Potlatch, Idaho.

Rutledge, Walter T.; Ex-'16; Nyssa, Oregon.

Salvin, Otis William; Ex-'19; Carmen, Idaho.

Schofield, William Robert; '16 B.S. For.; County Surveyor, Chinook, Montana.

Sharma, Parmeshwri Das; '22 M.S. For.; Rajpura Street, Chaunk, Passian, Amritsar, (Punjab), India.

Shipman, Orville H.; (R.C.) '16-'17; Boise, Idaho.

Sievers, Lawrence; (R.C.) '20-'21; Milwaukee, Wisconsin.

Slavens, Erwin Howard; Ex-'20; Spokane, Wash.

Space, Ralph S.; Ex-'25; Weippe, Idaho.

Staples, Howard W.; '20 B.S. For.; Yukon Gold Co., Murray, Idaho.

Stevens, Arthur W.; '15 B.S. For.; Kearney, Nebr. Editor "The Kearney Democrat."

Stillinger, Charles Roy; Special '19; U. S. Bureau of Plant Industry, Office of White Pine Blister Rust Control, Spokane, Wash.

Stone, Capt. Lawrence Fielding; Ex-'15; Commanding Officer, Arcadia Balloon School, Arcadia, Calif.

Stoneman, J. Warren; Ex-'24; Mead, Wash.

Storms, Willard Sidney; Ex-'23; Rupert, Idaho; Farmer.

Taylor, Norman E.; (Voc.) '20-'22; Deceased.

Teed, Ryle, Ex-'13; Forest Examiner, U. S. Forest Service, Portland, Oregon.

Telford, Milton, McKinley; Ex-'20; Coeur d'Alene, Idaho.

Thometz, Gene Joseph; Ex-'26; Twin Falls, Idaho.

Thornton, James A.; Ex-'12; Logger, Winton Lumber Co., Emerald Creek, Idaho.

Vick, Ernest Raymond; (R.C.) '19-'20; U. S. Forest Service, Luther, Montana.

Wadsworth, Herbert A.; '11 B. S. For.; Major U. S. Infantry, Fort Howard, Maryland.

White, Albert C.; (R.C.) '19-'20; R. F. D. No. 1, Boise, Idaho.

Williamson, Charles Leonard; Ex-'14; N. W. Manager for Powers Regulation Co., Chicago; 318 Alaska Bldg., Seattle, Wash.

Webster, Roy Russell; (R.C.) '15-'16; Post Falls, Idaho; Rubedew Lumber Co.

Wetherbee, Lawrence E.; Ex-'24; Chicago, Illinois.

Willey, Lewis Edwin; (Voc.) '22-'23; c-o J. J. Day, Moscow, Idaho.

Yates, Donald; '17 B.S. For.; Land Department, Potlatch Lumber Co., Potlatch, Idaho.

Youngblood, Frank; (R.C.) '22-'23; Meridian, Idaho.

Zuver, John H., Jr.; Ex-'25; South Bend, Ind.

A MANAGEMENT PLAN
for the
PRIEST RIVER WORKING CIRCLE

(Continued from page eleven)

the annual fire loss of 1 M. M. into consideration the cirlce will cut 25 M. M. each year during the 60 year period.

It is rather interesting to note the uniform distribution of age classes which will result at the end of the 60 year period, if the plan is adhered to.

The now 61-80 class becomes 121-140, 715 acres.

The now 41-60 class becomes 101-120, 37750 acres.

The now 21-40 class becomes 81-100, 36576 acres.

The now 0-20 class becomes 61-89, 47824 acres.

Mature and over mature classes become*, 41-60 36429 acres; 21-40, 38170 acres; 0-20, 42947 acres.

Based on the stocking of the present mature stands, it appears reasonable to assume that, when the now 41-60 year class is reached, the annual cut can be materially increased and that the sustained yield figure will be in the neighborhood of 35 M. M. feet.

Considering the Priest River Valley as a whole, it is believed to be a safe assertion to say that at least 50 M. M. feet can be harvested from that valley indefinitely and that, with the acquisition of private land by the State of Idaho and the Government, an even greater yield ca nbe expected.

*36429 (1-3 of 109299), the mature timber will be distributed over 3-20 year periods, 41-60; 36429 plus 1,741 equals 38170, 21-40; 36429 plus 6,518 equals 42947, 0-20.

THANKFULNESS

I am grateful to the Maker
For the simple soul of me
That is stirred by simple subjects
Like a sunset or a tree.
I am thankful to the Power
That in reverence lifts my eyes
To the beauty of a bird-flock
Hanging high in autumn skies.
God, I thank Thee for my senses
And how gladly would I give
Much more than words of gratefulness
To you, who lets me live.

—Stanley Foss Bartlett.