

For Charles O. Brown

PROCEEDINGS OF FOREST FIRE CONFERENCE

OF THE FOREST PROTECTIVE ORGANIZATIONS OF THE PACIFIC COAST
COMPOSING THE

**Western
Forestry and Conservation
Association**

PORTLAND, OREGON, DECEMBER 4-5
1911

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Organizations Composing the Western Forestry and Conservation Association

(Article IV of Constitution: "Any association formed for the purpose of organized effort in the protection of forests from fire and for the reforestation and conservation of the forest resources of the states represented shall be eligible for membership. Any organization admitted to membership shall be entitled to two votes in the meetings of this Association. The chief forest officer of each of the five states embraced, and of each district of the United States Forest Service embraced, shall be honorary members.")

Northern Montana Forestry Association,
North Idaho Forestry Association,
Coeur d'Alene (Idaho) Timber Protective Association,
Pend d' Oreille (Idaho) Timber Protective Association,
Potlatch (Idaho) Timber Protective Association,
Clearwater (Idaho) Fire Protective Association,
Washington Forest Fire Association,
Washington Conservation Association,
Oregon Forest Fire Association,
Klamath-Lake Counties (Oregon) Forest Fire Association,
Coos County (Oregon) Fire Patrol Association,
Jackson County (Oregon) Fire Patrol Association,
Linn County (Oregon) Fire Patrol Association,
Oregon Conservation Association,
and numerous co-operative patrols without formal organization.

FIVE-STATE CONFERENCE OF FOREST PROTECTIVE AGENCIES

Twelve Private Forest Fire Organizations, Composing the Western Forestry and Conservation Association, Join Government and State Officials in Review of 1911 Experiences and Plan Further Improvement of Patrol, Fire Fighting, Educational Work, Public and Private Co-operation and Fire Laws—Remarkable Contribution to Knowledge of Practical Working Methods.

The fifth semi-annual meeting of the Western Forestry and Conservation Association held in Portland, December 4 and 5, was a Forest Fire Conference of the several forest protective associations which constitute its membership, joined by Forest Service and State forest officers from all over the West.

In point of attendance it surpassed any meeting of the association heretofore held, 142 registering. The topics under discussion were presented by men particularly schooled in the work and were comprehensive and practical. Discussions were unflagging and frequently differences of opinion were tried in the smelter of argument and the dross separated from the fine gold.

Especially notable was the absence of papers or talks devoted to mere generalities or duplication of ideas covered by other speakers. The discussions were intensely practical, bringing out actual and detailed contributions to the science of fire prevention. The greater part were just what would be sought in preparing a working manual for patrolmen, leaders of private and public fire systems, lumbermen, and others interested in every-day working methods of forest protection. This is preserved in these printed proceedings.

MONDAY MORNING SESSION.

President Flewelling delivered his annual address, which was listened to with interest and received with hearty applause.

PRESIDENT FLEWELLING'S ADDRESS.

No institution in the Pacific Northwest has done so much toward insuring the future prosperity of the territory as the Western Forestry and Conservation Association. The greatest natural resource of the States of Montana, California, Idaho, Washington and Oregon is standing timber. This resource represents untold millions, which if preserved from destruction by fire, will for the next hundred years produce for its owners, for the State and Government, for the manufacturers, for the transportation companies, for the farmers, merchants, artisans and for the laborers of the country a constant golden stream of wealth compared to which all the other natural resources of this great empire are insignificant. The forest fires alone can deprive the community of this vast asset. This Association stands for the highest type of co-operation among the parties interested. The private owners co-operate by means of the district and state organizations, which go to form this great association by a system of financing based upon an equal assessment on an acreage basis on all of the timber land owned by its members separately in each district whereby we produce the necessary funds to carry on the work of patrolling and protecting the forest from fire.

Co-Operation of State and Government.

The public through government and state co-operation works in unison with us. The government, through the Forestry Service, taking care of the timber in the National Forests, and the several states, in which state timber is intermingled with private holdings, dividing the territory, the work and expense with the district fire associations, and the public having been quickened and educated to the vast importance of our work by the campaign of education which we have been waging through our publicity bureaus, and co-operating with us, speaking from the rostrum, through the pulpit, the press and the public school, the gospel of preventing forest fires, by the use of ordinary care and intelligence and putting out of small fires before they become a menace to our greatest natural resource. Our work in the past has received the official stamp of approval by both state and government officials, and I think it can be safely said that this Association today stands as exemplification of the highest type of public and private co-operation for the common good in the known world.

We have had some trouble in convincing the old-fashioned logger that it meant dollars in his pocket to pile his brush and dispose of his slash and to equip his donkeys and engines with spark arresters, and that a good method in one district was a bad one in another, and we have also had some trouble in convincing the railroads that it was economy to so arrange their locomotives that they could burn oil for fuel during the dry season, and also that they should remove all combustible material from their rights of way so that in the future they might have

lumber instead of ashes to haul. We have also found some trouble in persuading the rancher that at certain seasons he should not set fires which would menace and destroy our greatest material resource, upon the preservation of which his future prosperity largely depended. We have also been to some trouble and expense to convince the camper that he must not leave fires burning, but by unselfish and persistent hard work, by precept and example, by argument and persuasion, by education and legislation, we have accomplished wonders. Now the logger, the railroad man, the rancher and the public with but few exceptions all unite in a hearty co-operative movement, which means the salvation of the forests, government, state and private, from their ancient enemy, the fire.

Outline of Conference.

You will be told during the progress of this meeting, by the men actually engaged in the work, how



A. L. FLEWELLING
President Western Forestry and
Conservation Association.

we cut and make trails through the mountains; how we build cabins to shelter our men, tools and supplies; how we patrol by men on foot, on horseback, on motorcycles, in motorboats and in automobiles; how we build and operate telephone lines, and what transportation facilities we bring into action to transport men, tools and supplies when fires are reported to headquarters; how we put out ground fires by hand, with shovels and mattocks; how we use hand grenades, fire extinguishers and dynamite. We are prepared to prove to the most skeptical that nowhere in the world has forest preservation reached so high a state of perfection as in the territory covered by the Western Forestry and Conservation Association.

I take this opportunity to publicly express my appreciation of the value of the assistance which this Association has received during the past year from the Government Forestry Service, from state officials and from the press, each in their own sphere has rendered yeoman service. The press having been exceptionally valuable to us in our campaign of educa-

tion, which is one of the most efficient adjuncts to our work. I trust that this meeting, like all our former ones, will be characterized by the broad minded spirit with which all subjects for discussion will be approached and handled and that no spirit of discord will be manifested. (Applause).

Telegrams and Letters of Regret.

Secretary Cornwall read extracts from letters and telegrams received, expressing regrets at inability to be present as follows:

- H. S. Graves, United States Forester, Washington, D. C.
W. S. Rosenberry, Rose Lake Lumber Co., Rose Lake, Idaho
C. I. O'Neil, Kallispell, Mont.
G. W. Millett, Libby Lumber Co., Libby, Mont.
A. H. Huebner, Cascade Lumber Co., North Yakima, Wash.
Grace M. Shepherd, Supt. Public Instruction, Boise, Idaho.
John W. Blodgett, Blodgett Co., Ltd., Grand Rapids, Mich.
A. R. Rogers, Rogers Lumber Co., Minneapolis, Minn.
Frederick F. Sayre, California Sugar & White Pine Co., San Francisco, Cal.
Oswald West, Governor State of Oregon, Salem, Ore.
W. Bradbury, Brookings Lumber & Box Co., Highland, Cal.
J. H. Hawley, Governor State of Idaho, Boise, Idaho.
F. A. Hihn, F. A. Hihn Co., Santa Cruz, Cal.
J. H. Queal, McCloud River Lumber Co., McCloud, Cal.
Thomas Cooper, Assistant to President of Northern Pacific Railroad, St. Paul, Minn.
Theo. Fohl, Orofino, Idaho.
J. N. Teal, Teal, Minor & Winfree, Portland, Ore.
R. M. Hart, Blackwell Lumber Co., Coeur d'Alene, Idaho.
A. C. Dixon, Booth-Kelly Lumber Co., Eugene, Ore.
D. B. Barber, State Lumber Co., Kallispell, Mont.
A. A. Scott, Crown Lumber Co., Mukilteo, Wash.
J. B. O'Brien, Oregon-Washington R. R. & Nav. Co., Portland, Ore.
C. R. Roberts, Kallispell, Mont.
C. R. Johnson, Union Lumber Co., San Francisco, Cal.
Geo. X. Wendling, Weed Lumber Co., San Francisco, Cal.
W. W. Cotton, Portland, Ore.
Edgar Hafer, Crater Lake Lumber Co., Medford, Ore.
R. F. Averill, The Bend Co., Bend, Ore.
Chas. A. Fisher, Clearwater National Forest, Orofino, Idaho.
G. B. Scott, The Scott & Howe Lumber Co., Ironwood, Mich.
John B. White, Kansas City, Mo.
S. O. Johnson, S. O. Johnson Lumber Co., San Francisco, Cal.
A. B. McIntire, Potlatch, Idaho
C. Gerber, Fremont, Mich.
W. L. Gifford, Secretary of State, Boise, Idaho.
D. H. Kenaga, Port Townsend, Wash.
Victor H. Beckman, The Beckman Lumber Co., Seattle, Wash.
Merrill & Ring Logging Co., Seattle, Wash.
W. B. Mack, S. E. Slade Lumber Co., Aberdeen, Wash.
Norman Lind, Nelson-Neal Lumber Co., Montborne, Wash.
F. G. Miller, University of Washington, Seattle, Wash.
Chas. B. March, Enterprise Lumber Co., Kallispell, Mont.
C. H. Richardson, Western Lumber Co., Missoula, Mont.
R. H. McCoy, Bonners Ferry Lumber Co., Bonners Ferry, Wash.
L. S. Hill, Brown Lumber Co., Cottage Grove, Ore.
J. L. Norie, Parker-Bell Lumber Co., Pilchuck, Wash.
August Von Boecklin, Washington Manufacturing Co., Tacoma, Wash.
J. T. Carroll, Coeur d'Alene Lumber Co., Coeur d'Alene, Idaho.
Frank H. Lamb, Hoquiam, Wash.
G. M. Homans, State Forester, Sacramento, Cal.

Report of Forester.

E. T. Allen, forester of the Western Forestry and Conservation Association, submitted a report on the work of the association and a summary of private fire effort, expenditures and losses during the past season. He said:

A year ago today, in Spokane, a gathering like this of government, state, association, and private forest interests met at the call of this association for the purpose of united dealing with two important issues—the results of an unusually bad fire season and the approach of a legislative session in which the fire subject would probably arise. The strength of our association fire work had been proved by the severest of tests, for we had kept the loss of private timber in the hardest-hit states down to less than half of one per cent. But there was all the greater need of making this lesson count promptly in extending protection still further. We had on the one hand to utilize the prevalent fright and excitement to secure the co-operation of all elements, and on the other to allay the results of much injurious exaggeration and possible lack of confidence in the whole effort. It was a task demanding the help of all, but

FORESTER ALLEN'S ADDRESS.

which imposed its chief burdens and responsibilities upon our allied associations.

Report of Results.

Results are what count and we certainly have the results to report today. There were practically no fire losses in 1911. It was not as dangerous a season as 1910, but fully as bad as the average, in which losses have rarely been less than a billion feet, often much more.

Our allied associations patrolled about 16 million acres, a territory as large as a big group of eastern states and containing not less than 400 billion feet of timber. They spent over \$207,575.00 and maintained more than 400 patrolmen besides an army of shifting fire fighters. They built hundreds of miles of trails and telephones. They put out more than 1000 fires considered worthy of report, besides hundreds, if not thousands more extinguished in incipency. And from all these fires, scattered over such a vast territory, the area of merchantable timber burned was held down by them to about 13,000 acres and the destruction of material which cannot be saved to only 26 million feet. Perhaps ten times as much more was damaged so it must be logged soon, but even this is an amount so infinitesimal that it cannot be expressed practically in percentage of the amount guarded.

To the expenditure I have mentioned may be added perhaps \$63,000.00 more by timber owners, many of whom are also members, not spent through association channels but bringing the amount creditable to the northwestern timber industry up to \$270,000.00. And every dollar was of equal service to the community at large.

This is the record the Northwestern lumberman has given the country. Whatever his faults, past or present, I cannot but believe that in any fair balance of his influence upon the forest welfare of America; whether from the point of view of the lumber consumer, the irrigator, the industrial worker, or the rest of the community whose prosperity depends upon all of these, it places him beyond fear of comparison with any. He has proved that he is doing his part to safeguard the resources he holds in trust, and that if Congress, state and public will do as well, there is little to fear. And this without any depreciation of the equally earnest efforts of every state and government official here today. Each has done wonders with the facilities he had. But not one of them but will say gladly that he has found our co-operation as helpful as it was freely given.

Now, as to the specific part played by this association, which after all is the proper subject of my report. After writing about four different approaches to this subject, trying to describe it and still being becomingly modest, I tore them all up and decided to state facts.

Two or three years ago forest protection meant just about as little to the public, the law makers and the newspapers of the Pacific Coast as any term you could have invented. You could fight fire until you were black in the face and nobody cared—not even the adjoining timber owner, unless the wind blew his way. The public set more fires as cheerfully as ever, the legislatures never remembered the subject unless to consider repealing what small law you had, and if the newspapers said anything at all it was to make a sensational story after the damage was done. As for the community interest in forest industry, you would look a long time before finding a man who had ever considered that forests had more than two properties—one to be "bottled up" by the government and the other to enrich the "timber baron." Individually, rarely by small groups, you were carrying on a sort of desperate, discouraged battle against these odds, without even the encouragement of knowing that you weren't doing it alone.

Two years ago today the Western Forestry & Con-

servation Association was organized, with facilities for bringing these scattered agencies together for exchange of experience and suggestions, and, more important still, for getting the ideas thus collected into application every day in the year.

Forest Protection a Living Issue.

And these two years have seen forest protection become a living issue on the Pacific Coast. The laws have been strengthened and state appropriations doubled. The newspapers have taken up the subject in news and editorials. It is preached in churches and schools. It is discussed at Chautauquas, women's clubs and conventions of all kinds. You even hear of convictions following prosecutions in the courts (the Washington Forest Fire Association alone got over thirty this year). And in every speech, every article, every poster in the woods, you see, being driven home on every hand, that not forests but forest industry is what is at stake. And it reaches beyond the Pacific Coast. The Eastern investor hears now that timber is becoming safer. The voter, the Congressman and the magazine writer beyond the Mississippi hears of a new side of the speculative timber baron he has been educated to consider utterly without redeeming features; the side that is safeguarding the nation's resources and earning the nation's thanks.

Now, is this all coincidence? Did it just happen in the two years this movement has been under way? You know things of that kind don't happen so suddenly, that it has taken work to make a greater change in two years than came in ten before. We do not say that this association has done it all, but we do say that it is the co-operative spirit this association stands for and which it has inspired and largely directed, that accomplished every bit of it. None of you could have done it alone and you did not try to do it together until this association showed you how.

Again, it may not be fair to claim all the credit for this year's particular record, but two facts remain beyond dispute. No one but us took the lead in this task or spent half as much money. And it was successful. Washington and Oregon, where we centered our legislative work, revolutionized their forest laws and multiplied their appropriations. In Oregon we even wrote the law. We brought about the organization of the existing Montana and Oregon associations and thus completed facilities by which Government, state and lumbermen worked together as never before to improve their field systems. The record of practically no loss in 1911 is another thing that didn't happen accidentally. It came from better preparation and better work, and these were due almost wholly to education and co-operation fostered by the united effort of our allied associations. We didn't put out all the fires in private timber. Our friends, Elliott and Welty, were on the job just as busily. But if our association hadn't also been busy during the legislature they wouldn't have had much to work with. Ask our friend, Jungberg, how it feels for a State Forester to play a lone hand.

Public Must Realize the Benefit.

In all this talk about fire, I have barely suggested a point which belongs particularly in a discussion of association work because it is something you cannot touch individually. If you are to be fully successful in your local protective work, if you are to utilize your forests economically, if you are to get living prices for your products, if you are to be taxed justly,—in short, if you are to place forest industry on a sound economic basis—the public at large must be made to realize the benefit that lies, not in forests, but in forest industry, maximum and permanent. The community has little to gain from forest preservation unless it encourages the industry that makes forests of use and worth preserving. If this fundamental fact was properly understood, not only there would be little need of discussing most of the topics before

this meeting, but most of your other troubles would disappear also. Whether you look at it from your own standpoint or the public's, the greatest need of the forest situation is for honest, vigorous, unceasing spread of knowledge concerning forest economics.

In this our association has been notably successful. It has become much more than a mere alliance of local agencies for the purpose of improving their local work. It is a live active force, working every day in the year, and possessing great power. It is by all odds the strongest influence in the United States in disseminating the knowledge I have referred to.

Besides irregular articles in magazines, it furnishes 700 western papers with bulletins throughout the fire season, giving reliable news and keeping precautionary necessities before the public.

It issues hundreds of thousands of circulars and stickers, with a highly perfected system for putting them where they will count.

This year, with the aid of state authorities, it put an illustrated folder on forest protection in the hands of practically every school child in the Northwest, an enterprise requiring the printing and distribution of thousands of pounds of material.

It furnishes state officials, local associations and others with most of the mottoes, epigrams and catchy material used in forest publicity work throughout the West. The Summer-time folders of every transcontinental railroad in our territory have half a page of copy furnished by us.

Publication Used as Text Book.

Every public library in the West has a bound book on forest economics prepared and placed there by us. This same book is used as a text book by every forestry school in the United States, which means that the new crops of professional foresters will at least know your problems.

Through public addresses, and the printed accounts thereof, we reach gatherings of all sorts, big and little, almost all over the United States, and not only through those I make myself but by the use of material furnished other speakers who call for it continually.

To itemize the past year's work of our central office in greater detail would be more appropriate at our own business meeting in April than at a general conference of this kind. The same is true of any report from me concerning new projects under consideration including, besides continuance of our old methods, such things as pictures, calendars, placards, purchase of advertising space, moving picture films, and others, of which Mr. Cornwall will speak tomorrow. What I particularly want to emphasize, after giving this outline of its scope and policy, is that it is getting results in two different ways. One is the improvement of sentiment and conditions already measurable. The other is the latent strength we are acquiring to be used as needed hereafter.

We are recognized as an authority on all these matters. When the National Educational Association held in San Francisco last July, one of the biggest conventions of any kind ever held in the United States, a gathering of educators from Washington to Maine and ranging from country teachers to college presidents, to discuss the biggest issues of public education, it selected forest conservation as one topic and selected us as the authority to present it to them. This is just one example, but it will show you what I mean. This influence, its possibilities and its limitations; how we use it and whether we make the most of its opportunity; cannot but be of great importance to every person and interest connected in any way with forest matters. It is not, however, an automatic force that once set in motion will run forever, like a planet in space. Its whole strength lies in its cardinal principle of co-operative effort and its future accomplishment depends upon the measure of your co-operation. (Applause.)

EXPERIENCES IN 1911 OF PRIVATE OWNERS AND LESSONS TAUGHT—BY STATES

The first question for discussion was the experiences of private owners in the different States during 1911.

MONTANA.

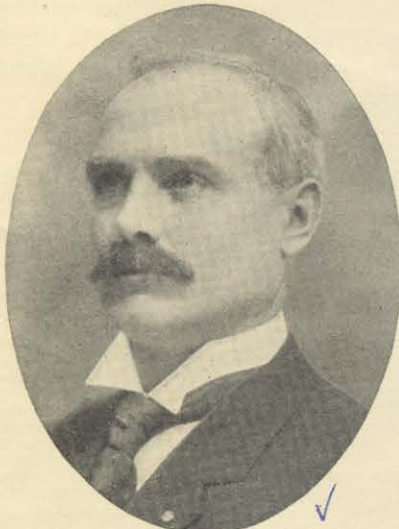
President Flewelling: Mr. G. W. Millett, president Northern Montana Forestry Association, I am sorry to state, is absent. I would like to have

Mr. John R. Toole speak for the State of Montana, if he would, in the absence of Mr. Millett.

MR. TOOLE'S ADDRESS.

I have not prepared myself with any statistics and figures as I did not expect to be called upon to give you any information, but as I recall the situation we suffered little loss by fire. There maybe was some small brush fires, but I do not recall any record of timber destroyed in Montana last year by fire. I

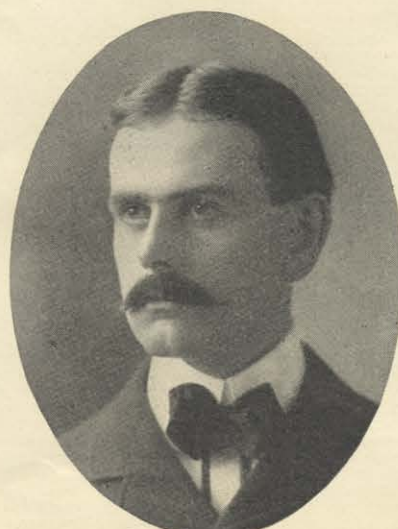
think the situation is somewhat different from what it is further west in Idaho and Washington. The Montana standing timber grows in the open and the commercial yellow pine is largely immune from fire. Notwithstanding that fact we are liable to have fire sometimes that will destroy merchantable timber. I know a few years ago our company lost perhaps 75,000,000 or 100,000,000 feet of timber that was on the Idaho line and is always in danger and always being threatened by fire; that being burned



FRANK J. DAVIES
Vice-President (Idaho)
Coeur d'Alene, Idaho.



A. W. LAIRD
Association Treasurer,
Potlatch, Idaho.



E. T. ALLEN
Association Forester,
Portland, Ore.



C. S. CHAPMAN
Oregon Forest Fire Association,
Portland, Ore.

MR. TOOLE'S ADDRESS.

now we feel that over in Montana we are reasonably safe.

Assistance of Association.

I am always glad to meet with this Association. I am greatly impressed here today with two things. I was impressed last year at the Association meeting with the fact that the Government Forester at that time had a tabulated statement showing the number of fires that originated from the railroad. During a number of years that I have lived in Montana, looking after lumber interests, I have never seen any statistics or figures showing where these fires originated. Last year I was impressed, as I said, that this organization was gathering this data, and coming here we have a specific statement of the facts, showing where the fires originated from the railroad, the fires that originated from camps, the fires that originated from carelessness of the settler, and that itself struck me, I have not forgotten it. These figures alone are well worth what these organizations have cost in the last year.

Now today I have been struck with the information from the State of Washington of the number convicted, about thirty, I believe. I never heard of convicting men over in Montana for setting fire, we have never been able to do it.

I want to agree with Mr. Allen, that this educating the people is going to be of untold value in time to come in preserving the country, in making better citizens; better people in every way.

Commends Foresters' Work.

In the Government Forest Service in Montana we have a lot of young men growing up in the business, when they first came out there we had to deal with them sometimes, in purchasing timber, from the government. A great many people are ignorant of the conditions of the West and we certainly felt that they were incompetent. You know how Western people feel; but there is a class of young men coming out into Montana and all over the West, I take it, that are making a life study of this business, and we feel that we can turn over, largely, our interest in fire protection to these Foresters. Last year we turned over five or six dozen men, whatever they might need, to the Foresters and told them to take these men and use them where they wanted them, to control the fire, and asked them, if they had a serious fire, or were threatened with fire, to call on us for more help. I can see how, over there, these men are growing up and making this a life study, and eventually will create a strong improvement organization and public sentiment that will be worth the while. We have not suffered any serious loss. We co-operate with the United States Government and have turned over a certain number of men to patrol along the railroad and the country generally. (Applause.)

IDAHO.

President Flewelling: A. W. Laird, president of the Northern Idaho Forestry Association, is unavoidably delayed. He has sent his paper by Mr. W. D. Humiston, of the Potlatch Timber Protective Association, who will please read it.

MR. LAIRD'S MR. AMES' ADDRESS.

In Idaho the private timber owners, the state administration and the people at large believe in the protection of their forests from fire, and today there is probably no locality in the world—not even excepting Germany—where this branch of conservation is so efficiently handled as in the timbered section of Northern Idaho, covered by our four local fire associations.

This is not a matter of sentiment with us. We are actuated by purely business motives. That we are justified in spending our money and giving our time to this work is evidenced by the fact that, of approximately thirty billion feet of saw timber in this territory, we lost less than seven ten-thousandths of one per cent this year, and in addition had only about thirty-one ten-thousandths of one per cent damaged or fire-killed.

To state this a little differently, let me say that at an operating cost of \$47,000.00 we protected \$45,000,000.00 worth of property from fire, with an outright loss of \$300.00 worth of timber and damage in fire-killed timber of \$1,400.00. A large proportion of the latter will be saved by cutting within a year or two.

Compared With Cost of Insurance.

Compare these figures with the cost of insurance

in a large, modern city, and the losses of property in a city, and then consider the conditions under which our patrolmen work in the forests of Northern Idaho as compared with conditions under which a well equipped metropolitan fire department works, and I think it will be conceded that in no way can



IDAHO CORK WHITE PINE.

the owner of timber spend his money to better advantage than in the protection of his timber by well organized, co-operative association work along the lines followed in Northern Idaho.

Our operating expenses for the season of 1911 were divided about as follows:

Trail cutting	\$4,450.00
Cleaning out old trails.....	2,185.00
Salaries of chief fire wardens.....	4,745.00
Fire fighting (extra help).....	6,155.00
Patrolling	17,790.00
Miscellaneous	11,515.00

Total\$46,840.00

In addition to the money spent in actual operating expenses, we have, of course, purchased some new camp equipment, tools and other things which are amongst the assets of the several associations. At the close of the season these assets amounted to the very tidy sum of \$13,000.00, covering warehouses, headquarters, camps and offices, lookout stations, telephone lines and instruments, pack and saddle horses, furniture, tools and equipment, and even a motorcycle.

Our expenses are borne by the state of Idaho and about sixty firms and individuals owning 1,514,000 acres of land. The territory embraced within the boundaries of our four associations aggregates 3,220,000 acres; so it will be seen that our members own less than one-half the area patrolled and protected.

We had 300 fires this year, lost 300,000 feet of timber, which was totally destroyed, and had 932,000 feet of timber fire-killed. The only other loss sustained was eight cords of shingle bolts, 100 cedar poles and 2,600 fence posts.

For the benefit of the timber owners here today who have no co-operative associations for protection from forest fires, I wish to say that no matter where your timber is, I feel sure it will pay you to protect it in much the same way that we in Northern Idaho protect our timber, making allowances, of course, for certain differences in local conditions.

Success Can be Duplicated.

I am sure that my associates in the work in Idaho will bear me out in the assertion that, with the same proportionate investment in tools and equipment, by following closely the lines which years of practical experience have demonstrated to us to be the most practical and economical, you can at least duplicate our splendid record, of which we are proud, and on which I wish to take this opportunity to congratulate the association officers, who have given freely of their time and ability to the work, and the men in the field, on whose loyalty and watchfulness depends our success.

I cannot close without saying a word about the Western Forestry and Conservation Association and its relation to the success which has attended our work in Idaho.

I believe the four Idaho associations and the Washington Forest Fire Association formed the nucleus of the Western Forestry and Conservation Association. We felt the need of an association of associations where the responsible heads of the local organizations could get together and exchange ideas and profit by the experience of others, and to President Flewelling and Mr. George S. Long, I believe, is due the credit of perfecting the present organization.

This association has the advantage of being unbiased, unaffected by local conditions and represents no particular interest.

Its forester, Mr. Allen, has gone before the legislatures of several of our Northwestern states and, by reason of his broad knowledge, gained through years of experience in the Government Forest Service and close co-operation with large private owners and state forestry officials, has been able to recommend progressive, practical laws which are now on the statute books.

Much of our success is due directly to the Western Forestry and Conservation Association, and I want to take this opportunity, on behalf of the Idaho local fire associations, to affirm our appreciation of and our loyalty to this organization. (Applause.)

WASHINGTON.

President Flewelling: The next speaker on the program is E. G. Ames, vice-president Western Forestry and Conservation Association, who will tell us the experiences in Washington in 1911.

MR. AMES' ADDRESS.

While the precipitation this past season up to October first has been several inches less than the average, in fact, the driest season on record for twenty-one years, it can still be said that climatic conditions were not altogether unfavorable to fire fighting organizations, for the reason that the rains which did



GEO. S. LONG
Trustee (Washington)
Tacoma, Wash.



T. A. HUMBIRD
Trustee (Idaho)
Sand Point, Idaho.



E. G. AMES
Vice-President (Washington)
Seattle, Wash.



A. P. SPRAGUE
Vice-President (Oregon)
Portland, Ore.

MR. AMES' ADDRESS.

fall came at times when most needed. The scarcity of rain fall in the early Spring put slashings in such a condition that they could be burned with comparative safety and full advantage was taken of this situation.

Timber owners and logging operators were interviewed and the question taken up with them of burning their dangerous slashings. There were many of these menaces in such locations as would render their burning especially dangerous, if they happened to catch fire during the dry part of the season, when their control would be a most difficult matter. The weather conditions for disposing of them were in fact almost ideal, and the plan to destroy them at that time received hearty support with the result that a great many of these fire risks were either eliminated or put in such condition where they could be much more easily handled in case they should burn over later a second time.

Practices of Railroads.

Railroad companies have heretofore been in the habit of cutting brush, weeds, etc., on their right of way early in the spring, allowing it to lie on the ground until summer and become dry, when a spark would set it off. Fires in this material would sometimes lead directly into old logging works and large slashings, creating a most dangerous situation.

In co-operation with Mr. J. R. Welty, State Forester, we took this matter up with the various railroad companies last spring, with the result that much less of this clearing has been carried on this past summer. The question was also taken up with railroad companies of assuming proper care of fires originating on their rights of way, and a decided improvement has been noticed in the attitude of the different companies in connection with this fire risk, and a considerable sum of money has been spent by them directly in taking care of such fires. Two of the transcontinental railroads have installed oil-burning locomotives on those portions of their line penetrating Western Washington, which is undoubtedly a great step toward fire prevention in such localities.

It has been the source of no little satisfaction to the state authorities and the association, to receive such hearty co-operation and effective assistance from logging operators and the public at large. Closer co-operation between the state representatives and our association has been worked out with mutually beneficial results which have been most apparent.

Our fire fighting organization consisted of a chief fire warden, ten inspectors and from 75 to 90 rangers, the number being increased as the fire risk became more apparent. Each of the inspectors was assigned a district with a number of rangers under him with whom he kept in as close touch as possible, and personally assisted in times of particular stress. Each of our rangers has a district to patrol through which he keeps constantly on the move, and in case of fire takes direct charge, engaging what extra help in his judgment is needed to control it.

With one or two exceptions there has been no particular change in the equipment furnished the rangers this year other than that with which they have been heretofore supplied. We have furnished some of our men who were patrolling in the neighborhood of particularly dangerous portions of railroad right of way with collapsible canvas bags, which were easier to carry and which they found could be put to good use in carrying the water to put out small fires originating along such rights of way.

Use of Gasoline Car.

In one particularly dangerous section of Western Washington where a railroad penetrates heavily timbered and mountainous country, we purchased a gasoline motor car to operate on a railroad. On account of the topography of this locality, the fire risk is especially hazardous, and we found that it was most desirable to get men to a fire as early as possible. An hour saved in such a location especially may mean the saving of several hundred dollars in extra labor, if the fire can be stopped before it assumes any large proportions.

Our rangers at odd times have employed their time in clearing out old trails through their districts, making the various portions more accessible. We have contributed to various country telephone systems, thus gaining the friendship of the people living along the line, which we have found to be of great assistance in getting information concerning fires.

Our records show the area burned over in Western Washington during the past season as follows:

	Acres.
Cut-over lands	57,855
Fires in old burns.....	17,700

Green merchantable timber (ground fires, no damage)	2,238
Green merchantable timber (killed or destroyed)	2,281
Young growth, not yet merchantable.....	916

Total

The estimated amount of merchantable timber killed is 83,050,000 feet and timber destroyed or killed in localities where salvage is impossible, 11,090,000 feet. There were 251 fires on which money was expended for extra labor. There were a great many more fires, the number running into the hundreds, which our rangers were able to extinguish themselves, or with such assistance as was voluntarily rendered by people living in the vicinity, and with no expense to the association. The only serious fire of the season was the one at Pe Ell in August, where a fire killed about 75,000,000 feet of timber standing on 2,000 acres of ground. It is estimated that the amount of timber destroyed in this fire will not exceed 10 per cent, or 7,500,000 feet. The balance of the timber killed in this fire is in the immediate vicinity of logging operations and can be taken out before it deteriorates to any extent.

Rangers Commissioned by State.

Our rangers were commissioned forest rangers by the State Forester and were given authority to issue permits to burn. The association issued over 2,500 of such permits during the season.

Approximately 70 arrests and convictions have been secured in Western Washington, largely through the efforts of State Fire Warden J. R. Welty. These prosecutions were instituted on account of the various defendants burning without first securing proper permit, and the wholesome effects of such prosecutions have been most apparent in the districts in which they occurred.

Judging from results obtained from purposeful slash burning during the past season, the association feels well warranted in carrying out this method of fire protection hereafter on a larger scale than heretofore attempted. Our men have learned some valuable lessons in regard to what can be done and what risk can be reasonably assumed in disposing of these fire traps. We have paid closer attention to putting out small, insignificant fires whenever and wherever found, and to this policy can be attributed some of the good results obtained by fire fighting organizations this past season in their efforts toward fire prevention. (Applause.)

OREGON.

President Flewelling: We will now listen to Mr. A. P. Sprague, president Oregon Forest Fire Association, on this same subject.

MR. SPRAGUE'S ADDRESS.

Since the last meeting of this Association we have experienced another fire season—one of the most successful Oregon has known. With climatic conditions in some sections fully as bad as in 1910, not one fire in Oregon did serious damage, and the total fire loss in the state this past season would fall far short of that caused by one of several single fires the previous summer.

Were I to attempt to give a reason for this satisfactory state of affairs, it would be better co-operation of the public generally coupled with active interest on the part of timber owners in fire prevention. Never before in the state has there been such interest taken in picking good patrolmen, in establishing lines of communication and in connecting with neighboring patrols for emergency cases.

Early in the season the Oregon Forest Fire Association started a campaign to secure patrol on lands hitherto without protection. This work was also taken up by the State Forester as soon as he assumed his official duties. Through the combined efforts of the two agencies a considerable number of owners took active interest who, previously, through rare good fortune, had escaped loss, and considered that this would go on indefinitely. The Oregon Forest Fire Association, though not maintained to patrol lands, offered, free of administrative charge, to look after such patrols for owners as they could not well look after for themselves. A number of companies and individuals, whose holdings aggregated some 130,000 acres, took advantage of this offer and in all but one instance the cost was kept down to less than one cent per acre and no losses resulted.

Good Has Been Accomplished.

Through the efforts of our Association I feel that a great deal of good has been accomplished, resulting not only in a saving to the timber owners, but to the State of Oregon, and right here I want to add that in no small measure has the work of the Western For-

estry and Conservation Association made possible the better co-operation, state assistance and improved public sentiment relating to destruction of our forests. To my mind the last fire season has demonstrated several important things, all of which should lead to improvement another year.

First. It has shown that through combined effort we can achieve results which, as individuals, we cannot. As an example, the securing of a good fire law, the operation of which is out of politics and in the hands of practical men desiring to see the state receive a full dollar of benefit for every dollar expended. Another example of this is the securing of county aid in fire prevention. In the few places where this was vigorously solicited, the past season, it was secured. Many owners felt it was riding for a fall to ask county assistance, but I believe another season, nearly, if not quite all of them, will respond to any reasonable request.

Second. The need for closer working co-operation in fire fighting and patrol between the federal, state and private interests. The first step in any movement is to get those concerned alive to the need for the work; after this comes the systematizing, to do away with duplication, lost motion and ineffectual effort.

Co-Operation Needed.

What we want here in Oregon is a thorough patrol of all the timber lands, but we do not need a federal, a state and a private patrolman, or several private patrolmen, in the employ of different companies, going over the same territory. To do away with this condition, which exists in some sections, is one of our tasks, before another fire season arrives. Probably the most simple solution of the matter is the formation of co-operative county or district patrol associations, these under the management of timber owners and co-operating with the state and federal government in such a manner as to prevent overlapping of territory and consequent duplication of effort. Such associations where they have been tried in the state, have shown excellent results; have decreased the cost of patrol while increasing its efficiency; have made far better public sentiment and secured a greater measure of consideration from county and state officials. There are numerous practical reasons why live local organizations are best equipped for the work, first amongst them I should place the stimulation of greater public interest, and a more thorough detail knowledge of local conditions, and the most plausible method of bringing the work to the notice of the greatest number. I feel that Oregon is not well suited to a state-wide patrol such as Washington maintains with such excellent results, but I do believe that county or district associations, under a strong state alliance, will work out to the benefit of every timber owner. Our association is our insurance company—it is a mutual, co-operative company, and to obtain best results must have local branches, and I look forward to the speedy adoption of this plan.

Third. Is the matter of the enforcement of the fire laws. We all look forward to the time when everyone will be so careful with fire that it will be the exception rather than the rule, for a fire to start through carelessness. We have done a great deal along the lines of publicity, advising care with fire, and this has been, and is, eminently necessary, but the time has about arrived when to persuasion and appeals, must be added swift and certain punishment to deliberate violators. In this we can all help. At present, district attorneys, magistrates and grand juries take no great interest in fire cases—unless serious damage is done, they hesitate to convict; in other words, violation of the law itself, unless it results in serious damage, is here in Oregon, considered a very minor offence. By some means, and I feel certain, there are ways, this must be remedied—it will mean less fires and less expense to the state and to the timber owners.

Losses Insignificant Compared With 1910.

In closing, I wish to give a few brief statistics of fire damage as it affects members of the Oregon Forest Fire Association. These figures are not the final compilation, some reports not yet having been received, but the final figures will probably vary but little.

In mentioning acres patrolled, that, actually owned by members is given, whereas if information were in every case available, showing additional lands covered without assistance from their owners, it would increase the acreage by at least fifty per cent.

1. Area patrolled by members Oregon Forest Fire Association, 1,826,009.
2. Number of patrolmen regularly employed, 104, or one man to each 14,000 acres.
3. Total number of fires occurring on lands, 384, of



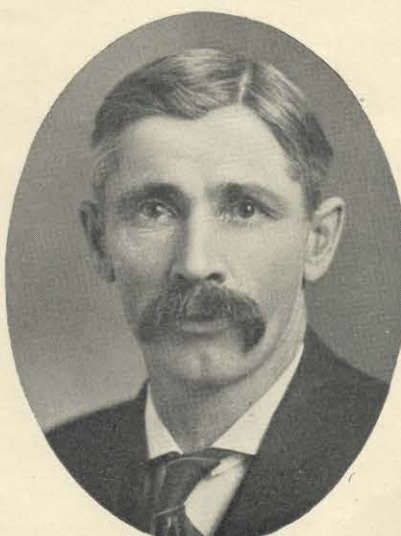
F. A. ELLIOTT
Oregon State Forester,
Salem, Ore.



J. R. WELTY
Washington State Forester,
Olympia, Wash.



G. M. HOMANS
California State Forester,
Sacramento, Cal.



CHAS. W. JUNGBERG
Montana State Forester,
Helena, Mont.

MR. SPRAGUE'S ADDRESS.

which 265 were extinguished by patrolmen without additional help.

4. Total expenditure for patrol, fire fighting and trail and telephone building, \$75,000.00.

5. Green timber damaged or destroyed, sixteen million feet, of which fully one-third can be salvaged.

6. Principal causes of fires in order of occurrence, unknown, slash burning, campers, lightning, incendiary, hunters, railroad engines, smokers, logging engines.

As compared with last season, our losses were insignificant, compared with any season of which we have record of losses, they are small, and this was not due to favorable conditions, one-half so much as to active interest and better co-operation. But far above the lessened fire loss of any one year, we value the better public sentiment, that we are striving to bring about; enlisting the sympathy of the general public to our cause is vital to success.

I find that the most convincing argument for conservation is community interest, for human nature is selfish, and we can always count on the assistance of all classes of people in our cause, if there seems to be a material advantage to them. Though the success of the farmer in Western Oregon is almost absolutely dependent upon the successful operations of the lumber business, I find he has seldom realized the fact until it was carefully explained or illustrated to him by practical example. Any movement can be carried to success if it is sufficiently backed by public sentiment. We have seen, for instance, unwarranted and uncalled for strikes win out because they were able to enlist public sympathy to their side, and we know of any amount of meritorious movements that have utterly failed because of the lack of public interest, so I feel that the best results from the efforts of the Oregon Forest Fire Association this past year is the result of our efforts to get all the people interested in our work, and make them see that they are themselves vitally interested. (Applause.)

CALIFORNIA.

President Flewelling: I would suggest to the gentleman from Oregon, if he would absorb bodily the procedure which the people of Idaho have operated under he would have no trouble. In Idaho we have district organization, each district being complete in itself, and we have found it very successful. We will now listen to Mr. Miles Standish, vice-president of the Western Forestry and Conservation Association, of California.

MR. STANDISH'S ADDRESS.

My report to this Association for California can be made very briefly.

Whilst the name of this organization would probably apply to conservation of our watersheds as well as forests, I take it as only necessary to speak of the latter.

The fire loss in California has been very light. I cannot learn of a serious forest fire during the season just closing.

Legislation.

Whilst several radical bills were introduced last Winter none of them passed, and the only change made is in acts declaring as nuisances lands containing debris and inflammable material which are dangerous to adjoining lands, and compelling the owners to burn and clear this debris or authorizing the State Forester to do so at the owner's expense.

I think no timberman can complain of this act.

Fire Protection.

Upon this most important point I regret to report there is no concerted action either by the timber owners as

a whole, or by those in the two distinct divisions, viz: the sugar and white pine forests of the Sierra Nevada, on the one hand, and the redwood forests along the Coast on the other.

Some of the larger companies in the

first division are piling and burning their logging debris, thus helping reforestation and protecting their own and other holdings. The smaller operators, I am informed, are not doing even this.

Owing largely to the efforts and courtesy of those locally in charge of government forestry matters, there is considerable co-operation between the owners of land adjoining and within National Forests and the forestry employees relating rather to lookouts and fighting fire than protection.

In the redwoods the custom of barking the trees after falling and burning the tops, bark and debris before cross-cutting the logs is necessary as an economical measure.

Now this burning does not usually accompany tie making, and tie making is generally carried on by small independent operators, operating on from forty to one hundred and sixty acres, often in the midst of other holdings.

These tie slashings, until a fire goes through them, are a mass of fallen timber, slabs large and small, shavings and chips from hewing the ties. This is one of the dangers to the timber owner that was sought to be corrected by the law above cited. It takes a very severe fire to go through the redwood bark and kill the redwood tree, and to this immunity much of our carelessness regarding fire protection is due.

However, there is a loss to which we are awakening as we go further back from the Coast and upon the higher lands. This is the destruction of the fir and of tan bark oak, which takes only a light fire to kill.

Much of this back redwood forest land, lying on the hills, contains from 15 to 30 per cent fir, and at least a cord of bark per acre.

With bark stumps worth from \$3.00 to \$6.00 per cord, heavy losses are annually sustained by fires doing little damage to redwood trees. This loss could, of course, be greatly minimized by building fire trails along the ridges where the timber is lightest, wide enough to stop the creeping fires, and in case of more serious ones allowing thereby easy access to fire fighters.

Considerable discussion has been had regarding forming fire districts, using the watersheds of small streams as natural boundaries for the different districts, and owners of lands therein enclosed contributing for mutual protection, and it is along these lines probably fire protection for the redwood districts will be worked out.

Taxation.

Valuations of timber lands by assessors are rapidly rising, without apparent reason, certainly not from manufacturing profits. Much good will undoubtedly be had from a more general public knowledge of the timberman's side of this question.

Invitation for Lunch.

At the close of Mr. Standish's address A. P. Sprague extended those in attendance an invitation to lunch at the Portland Commercial Club as guests of the Oregon Forest Fire Association, of which he is president. On motion of W. D. Humiston the invitation was accepted and a vote of thanks extended Mr. Sprague and his association.

Telephone Equipment.

Forester Allen called attention to a display of telephone equipment furnished by the Western Electric Co., New York, and stated that Carl Bush, manager of the Seattle branch of the company, would explain the various appliances later. Adjourned.



CALIFORNIA REDWOOD.

REVIEWS BY STATE AND GOVERNMENT FORESTERS OF NORTHWEST FIRE PROTECTION

MONDAY AFTERNOON SESSION.

The program was resumed under the head "Similar Reviews of State and Government Experiences."

MONTANA AND IDAHO.

President Flewelling: We will now continue the program, gentlemen. The first speaker is U. S. District Forester F. A. Silcox, of Montana and Idaho.

MR. SILCOX'S ADDRESS.

The climatic conditions during the past season were particularly favorable. Although the precipitation for the season averaged a little below normal, yet its distribution throughout the time of fire danger could not have been better. Just when it was thought that we were in for a dry spell, rains would occur and relieve the tension. Under these conditions the National Forests of Western Montana and Northern Idaho suffered very little from fires during the past season.

Conditions of Slashing.

The fearful conflagration of 1910 and the loss of

life emphasized the absolute necessity to every one living in timbered regions to exercise greater care in the disposal of their slash from logging operations and the debris in clearing up land. There are still a great many bad slashes on cut-over lands and inexcusable carelessness on the part of a great many of the settlers clearing up their land. One of the larger fires of the season in Northern Idaho occurred this year from settlers disposing of brush and slash on their claims. Although the lesson learned in 1910 has had its effect, yet to accomplish effective results in eliminating this prolific source of fire danger, aggressive educational work must be continued and in some cases liability under a strict compulsory brush burning law invoked.

The reports from the men all over the district show that the railroads profited by the experiences of last Summer and have done mighty effective work in clearing up their rights of way. In a great many places strips have been burned off, rendering the right of way practically safe, while in other cases only the heavier material in the form of rotten ties, punk logs, etc., have been removed, leaving the inflammable debris still on the ground to be removed later. If the railroads will continue during the next two or three seasons to go at the work as efficiently as they have during the present Summer, I

believe that we can feel that the rights of way are reasonably safe.

Greater care has been exercised by the loggers in the woods in seeing that their engines are properly equipped with spark arresters and that these spark arresters are kept in working order. Some of them have even gone so far as to consider the advisability of the use of oil for their donkey engines in the woods to minimize the fire danger.

Campers have shown greater protection in building their camp fires. The fearful loss of life in Western Montana and Northern Idaho last Summer has vividly impressed those using the woods for recreation of the danger that lurks in leaving a camp fire unextinguished. Fishermen and hunters have also learned the lesson and were more careful this season with fires than has ever been known before.

Attitude of Public.

From the terrible experiences of 1910 has sprung a remarkably strong and healthy public sentiment in favor of better fire protection. Although the cost of this was high, yet perhaps in the long run it will prove a great benefit and will go a long way in compensation for the loss. It has stirred up the newspapers to greater activity and has prompted the promotion of organizations to assist in minimiz-

MR. SILCOX'S ADDRESS.

ing the danger from fire. All of the railroads operating in Montana and Idaho have rendered valuable assistance. A new fire protective association was formed in the Flathead Valley, and it is doing effective work. All over the district men are interested in the forest fire problem and are assisting in the work of prevention.

Men Employed—Special emphasis was put on the establishment of permanent location for lookout points fitted up with telephone communication to headquarters, and a system of trails radiating from central points. The lookouts are chosen to give primary control and co-ordinating so as to locate fires by intersection and triangulation. Where the areas are covered by accurate maps it has been possible to locate fires by this method at distances as far as 90 miles. In one case, a fire near Athol, Idaho, was located from a lookout near Bear Mountain, near Wallace. The fire was located within a quarter of a mile, and was over 50 miles from the lookout point. Cases are too numerous to cite showing the effectiveness of properly co-ordinated lookout points connected with telephone lines. Although the lookout points were practically rendered valueless last year on account of the heavy smoke, yet it is shown conclusively this year that they are the most valuable agency in quickly locating fires. In lieu of the construction of permanent telephone lines on account of the lack of funds, a great many of these lookout points have been connected up with light insulated wires. The idea will be, however, to connect all of the permanent lookout points with permanent lines as fast as means will permit. In addition to the lookouts patrol men were distributed throughout the forest along the mostly traveled trails, camping grounds, and in such places where there was great fire hazard. Well defined geographic districts were placed in charge of experienced men, who were given the maximum temporary force the funds allowed. This gave approximately 40,000 to the man west of the continental divide and 125,000 east of the divide. Speeder patrol was maintained along practically all of the railroads traversing National Forest land within the district, in some instances, e. g., Spokane International or Northern Pacific, speeder patrol was maintained both by the Forest Service and railroad.

The feature of the organization this year was the employment of per diem guards. Responsible local men are appointed as Forest Guards and paid only when actually employed in the fighting of fire. The effectiveness of this plan depends largely on the ability of the Supervisor to secure the co-operation of the local residents. Under this plan, on one forest alone there was built up a reserve force of over 670 men who were ready and willing to respond to an emergency fire call. This force was made up of ranchers, miners and stockmen. Usually only the foreman or superintendent was appointed Forest Guard. Having authority as a forest officer under this appointment it was possible for him to mobilize his crew when the necessity arose, on his own initiative. On this forest three out of the ten fires were reported by the per diem guards, and in one case a per diem guard arrested campers for leaving their fires unextinguished. Unquestionably this plan offers great possibilities and the way it has worked out on some of the forests is the best proof that the local resident if properly approached is distinctly interested in fire protection.

During the past season a protective force of about 600 temporary men and 200 regularly appointed men were employed on the forests. In addition to this force, there was employed a total of 600 temporary laborers on all of the fires for the entire season. In striking contrast to this a force of 5000 fire fighters and ten companies of soldiers were employed during the season of 1910.

Trail and Telephone Work.

At the present time there is in the district approximately 832 miles of trail, 2200 miles of telephone lines, an appreciable proportion of which were built during the past season. Every Supervisor emphasizes that the main drawback at the present time in properly handling his fire problem is a lack of trails and telephone lines. There are still large areas within the district where fires can be seen from lookout points but can not be reached because of lack of trails. It is estimated that to give adequate fire protection will mean over 11,000 miles of trail and approximately 5000 miles of telephone lines.

With the exception of a combination shovel, mat-

tock and axe which have been devised for patrol work, there have been no new developments in the character of equipment. In the rough mountainous and heavily timbered districts, it is not believed that portable fire extinguishers are practicable. The most effective tools have been found to be the mat-tocks, shovel, axe and saw.

One of the most badly needed items of equipment is pack horses. It has been found wholly impracticable in the heavily timbered districts to figure on hiring pack horses promptly in an emergency situation. Valuable time is lost and in many cases the work badly crippled or handicapped. Quick mobilization of men and supplies is an absolute necessity in dealing with fires and it is just as reasonable to believe that effective work can be done rustling horses each time a forest fire occurs and it is necessary to transport men and supplies, as it is to expect a city fire department to do the same thing.

Pack trains on well defined trail routes make it possible to supply the patrol force and keep them on the job all the time. Without such equipment and service the patrol man in a great many instances must spend as much as 30 per cent of his time going after supplies. The horses are used not only for this work, but for packing supplies to crews, building trails, telephone lines, etc. The main point, however, is that they are always available to transport supplies in case of fire. Without horses as a part of the equipment in the heavily forested mountain areas it is ridiculous to talk of fighting fires effectively.

Fires.

Approximately 500 fires were reported this year, only 50 of which required outside help. These fires burned over approximately 35,000 acres and damaged about 2,500,000 feet of timber. Practically no timber at all was lost outright. The cost of fighting fires amounted to approximately \$15,000. In contrast to these fires, there was spent in 1910 over \$750,000, with a burned over area of 2,600,000 acres and with an actual loss of about 6,000,000,000 feet of timber. Of the 35,000 burned over this year, 30,000 acres was in Michigan and Minnesota, and only 5000 in Northern Idaho and Montana.

Prosecutions.

There were four arrests made in the district during the past season, three settlers and one camper. One settler plead guilty and was fined \$25; one was brought before the grand jury but a true bill was not returned; the other was dismissed by the judge with a reprimand only. The campers were tried before the United States Commissioner, and upon the testimony were bound over for the Fall term of the grand jury. That case has not yet been presented to the grand jury.

Although some of the cases were not carried to successful conclusion, there is no question but what the arrests have a beneficial effect in enforcing greater care by other settlers and campers.

Most Important Lesson Learned.

With the clearing up of the railroad rights of way the continuance of efficient patrol or the adoption of the use of oil or electricity, the railroads, which have been one of the chief sources of fire danger, will have been made reasonably safe. Unquestionably, the source of fire danger which ranks next is from settlers clearing land. Owing to the fact that these claims are usually scattered, it presents a very much more difficult problem than that of the control of the railroad fires. The rancher must clear either in the Spring or in the Fall, and at either season there is a certain degree of fire danger. The closed season, compulsory brush burning, and permit provisions of the fire law in Idaho, have given a very much closer control of this problem.

The state last year appointed each Supervisor a State Fire Warden, who in turn appointed such members of his force as he deems advisable and necessary. This has extended the application of this law to large areas which would not otherwise have been covered. With an aggressive educational propaganda together with strict enforcement of the restrictive measures of compulsory clearing up of debris and of setting no fires without permit during the dangerous season, the fire danger from this source should be materially reduced. Until the pioneering work on clearing up raw land is completed it will be impossible to entirely eliminate this source of danger.

A complete fire plan has been outlined for each forest within the district, showing in detail the telephone lines, trail systems, ranger headquarters,

co-operative districts, tool caches, location of per diem guards, areas of large, valuable bodies of timber zones of greatest fire hazard, points of labor and subsistence supplies, etc. The perfection of this system calls for a complete study of the whole question. The general principle of holding only a well-trained skeleton force throughout the Winter and doubling up during the Summer will be the essential basis of the plan.

There are at present five associations in the district, as follows:

- Northern Montana Forestry Association.
- Pend d'Oreille Timber Protective Association.
- Clearwater Fire Protective Association.
- Coeur d'Alene Timber Protective Association.
- Potlatch Timber Protective Association.

In addition to these associations co-operative agreements are in force with the Northern Pacific Railroad as a land owner, and the lumber department of the Amalgamated Copper Co. The total area covered by the co-operative agreements is 3,363,784 acres, approximately 35 per cent of which is association holdings and 65 per cent National forest land. Altogether the work is on a very satisfactory basis. It avoids duplication and insures the most efficient economical way of securing effective fire protection on large areas where a number of different owners are involved. One particularly desirable feature of the association work is that it provides the very best means of securing the co-operation of owners who otherwise would not and could not take any steps to protect their holdings. This is shown in the case of small owners who can not afford to put into effect any system of fire protection but who are more than glad to contribute their share to the maintenance of a well organized and well directed fire organization. In Northwestern Montana quite an appreciable number of small ranchers joined the association. I think this is equally true of all associations in Idaho. Co-operative agreements with the associations have provided a definite business understanding of what will be done in case of fires before they occur, and insures a quick and ready settlement of the expenses of fighting such fires. In this way they have removed a tendency to hold back when fires occur on the other man's land. Meetings have provided for an interchange of the experiences of different men in meeting the fire problem and in this way has assisted materially in the development of more efficient organizations.

The publicity work of the Western Conservation Association has assisted materially in helping to form a favorable public sentiment. It has stimulated the railroads to exert greater efforts to reduce fires along their rights of way by showing vividly the results of forest fires by the broadcast circulation of telling pamphlets to arouse the ordinary man to take something more than simply a general interest in the question of fire protection. The centralization in one organization of the general work of fire protection in the Northwest has made it possible to get a broad comparison of the methods used in the different states, and has provided a medium of discussion for the general advancement of fire protective work.

OREGON AND WASHINGTON.

President Flewelling: The next speaker is Geo. A. Cecil, U. S. District Forester for Oregon and Washington.

MR. CECIL'S ADDRESS.

When I recall that it is but a little more than ten years since the Federal Government put on the first patrolman of the first organized force for the prevention and suppression of forest fires and then turn to this meeting with its representatives from the forest departments and from the numerous forest fire associations of five great states; and then look over the program filled with topics unheard of at that time, I cannot help but feel that the people of these states are entitled to a large pride in the energy, progressiveness and resourcefulness of their citizens. Nowhere else in the United States has progress in practical conservation been so rapid nor so universally supported. In consequence I am confident that today the efficiency of the state and private protective forces is so great that complete success in protecting the forest wealth of the West is the promise of the near future.

Power of Public Opinion.

Awakened by the efforts of the timber owners to protect their property from destruction the people have come to see that they have even a greater inter-



GOVERNOR WEST
Ex-Officio Member Board of Forestry,
Salem, Ore.



L. S. HILL
Oregon State Board of Forestry,
Cottage Grove, Ore.



GEO. W. PEAVY
Oregon State Board of Forestry,
Corvallis, Ore.



DAN SMYTHE
Oregon State Board of Forestry,
Pendleton, Ore.

FORESTER CECIL'S ADDRESS.

est in the protection of this great resource, and have taken over and made the problem their own.

It is a remarkable instance of the power of intelligent public opinion and as the representative of the Forest Service of Washington and Oregon I wish to thank the Western Forestry and Conservation Association for the opportunity it has furnished all the parties interested to come together here and crystallize the experiences of the past season into better plans, and if that is possible, better co-operation, for the next fire season.

The fire season just past, while not as bad as 1910, was above the average in point of danger and damage in Washington and Oregon.

The months of July and August, except in Northern Washington, were very dry, the rainfall being nearly an inch and a half less than the normal, and for the greater part of these two months the woods were in prime condition for damaging fires. Further, the season furnished an extraordinary number of electric storms, which set an unbelievable number of fires, most of them in the most inaccessible portions of the forests. As a matter of fact, excluding the fires set by lightning, we had only a very few fires which were not extinguished in their infancy and before any damage resulted. Out of a total of 846 fires, 268 were set by lightning as compared with 116 out of a total of 1009 in 1910.

Altogether we had a total of 201 serious fires on which extra labor was necessary, and these cost about \$91,000, exclusive of the salaries of the regular force. The point for particular congratulation here is, that by the expenditure of this sum all but a scant dozen of these fires were actually put out without the help of rain and before any serious damage to commercial timber had been done.

Summary of Cost.

Approximately \$91,000 was expended, about as follows:

In Washington for extra labor \$9401, for the employment of 472 men for a period varying from a few hours to a couple of weeks; for supplies and equipment \$4949, making a total of \$14,350 spent in the State of Washington.

In Oregon, \$44,133 for the employment of 1192 men, and \$33,281 for supplies and equipment, or a total of \$77,414. The total of \$91,000 for the two states represents an expenditure of a little over three-tenths of a cent per acre. The cost of the summer patrol amounted to \$125,000, or a little over four-tenths of a cent per acre, or a total cost, exclusive of supervision, for preventing and suppressing fires, of a little less than eight-tenths of a cent per acre.

In connection with these cost figures it should be remembered that probably 25 per cent of the forest area consists of worthless mountain tops, and another 25 per cent of poorly timbered and inaccessible areas which are given a very light patrol. As a matter of fact, our patrol force is concentrated on the valuable timber areas, and taking only such areas into consideration, the expense for patrol and fire fighting would amount to about 11-10 cents per acre.

Most of the severe fires were in old burns and the amount of timber killed was small in comparison with the acreage burned. Damage may be summarized as follows: Total acreage burned, 55,829; timber killed, 76,929,000 feet; value, \$74,125; damage to reproduction, \$54,262. Practically all of the timber

killed will be a total loss, since it is all comparatively inaccessible.

The season of 1911 found us in a better position in regard to trails and telephone lines than ever before, and in numerous instances these added facilities saved their cost several times over, getting men and supplies to the scene quickly. We have continued the work this season, having constructed 431 miles of trail and 379 miles of telephone line. We have planned the construction of an additional 275 miles of line, which will be available by the beginning of next fire season. This will give a total of over 2000 miles of trails and almost 1500 miles of telephone line constructed and owned by the Service.

A very great advance was made over the season of 1910 in the intensiveness of the summer patrol. In 1910 we employed only 445 patrolmen as against 643 during the season just past, an increase of 44 per cent. We feel certain that this material increase in the fire protection force is responsible largely for the success of the past season.

The Year's Experiences.

The principal points brought out or emphasized by the experiences of the year:

First—The surprising number of fires set by lightning has placed timber in the inaccessible mountain portions of the National Forests in the class of heavy fire risk, whereas heretofore we have considered them in the class of lightest risk. As a result the need for roads, trails and telephone lines into such regions is of paramount importance.

Second—The National Forest timber bodies are generally so far from the source of supplies for labor and provisions and equipment that the necessity for more rapid means of transportation is at once apparent. This will be plain to you when I tell you the greater part of the fires set by lightning last summer were fully 40 miles from a base of supplies, and that from the time the fires were discovered to the time when the fire fighting crew arrived averaged between three and four days.

Third—In the past the utility of lookout stations has been questionable owing to their apparent failure during the most dangerous part of the season on account of the dense smoke. The experience of the past season has shown that almost without exception, even during the smokiest days, there is a short period some time during the day when the smoke lifts sufficiently to permit of a good view of the surrounding country. We are therefore planning to make a more thorough study of the lookout system with a view to establishing a number of permanent stations by which the whole forest area can be covered.

Fourth—Ordinarily the cost of extinguishing a fire can be approximately estimated from the length of the fire front, the cost ranging from \$25 to \$500 per mile, depending on the type of the ground cover, topography and accessibility. The length of the fire front increases with the distance traveled by the fire. Therefore to extinguish a fire at a minimum of expense, to say nothing of damage, efforts at extinguishment should be concentrated on the fire at the earliest moment. In other words, it will always pay to mass all the fire fighters you can get hold of on the fire at the beginning.

Fifth—In fighting a fire the firebreaks should always be located, if practicable, where they will be of permanent value for that purpose. In the past summer we have carried out this policy to some extent, and the results show that with a little care firebreaks can be so located and constructed that they

will afford very valuable protection to adjacent timber bodies for a number of years to come. Such firebreaks are of particularly great value on the borders of commercial timber, on ridges and along streams.

Lastly—The season's experience has emphasized the necessity for the careful preparation of detailed fire protective plans for each unit of management or patrol. Such plans will call for the careful mapping of the topography, types of forest, class of risk, best locations for firebreaks, camps, trails, etc. This work will cost about 10 or 15 cents per acre, and, therefore, it can only be extended over the more valuable timber lands.

In concluding I want to express the deep appreciation which the Forest Service in this district feels for the cordial assistance and co-operation extended to it by the State Foresters, the various forest fire associations, the private timber owners and by a large number of the railroad companies.

I believe that the activity of these officers, individuals and associations and the improved attitude of the public in the matter of forest fire protection points to a final mastery of this source of danger to our greatest resource, and the Western Forestry and Conservation Association must be given the largest share of the credit for this promising state of affairs.

WASHINGTON.

President Flewelling: The next speaker is Mr. J. R. Welty, State Forester of Washington.

MR. WELTY'S ADDRESS.

The State of Washington has been in the business of protecting the forests for almost seven years. The present law was enacted in 1905, and we have the pleasure of having with us today two of the members of the Washington Forest Fire Association and members of the Washington State Board of Foresters, Mr. W. R. Condon, of the Puget Mill Co., Port Gamble, and Mr. Joseph Irving, of the Standard Railway & Timber Co., Seattle. I want to say that these gentlemen were members of the legislature at the time of the enactment of this law and were instrumental in its introduction and passage.

We have been successful this year, our loss has been light. We have an organization and we employ a fire warden in each county during the first part of the season. Later in the season we augmented that force by additional fire wardens in the counties where such protection is needed. This year we expended about \$33,000 in fire protection, that is, the State of Washington, and the Washington Fire Association perhaps more than that.

Loss in 1911.

It has been stated that we lost about 11,000,000 feet, that is, about 11,000,000 feet destroyed, and about 70,000,000 feet killed. The 70,000,000 feet that were killed were in the line of logging operations and will be logged without very much loss. In fact, these fires would not have occurred if it had not been for the logging operations. The fire started in logged-off lands, and being the latter part of the season at a time when we always have our high winds, just before the first rains in the Fall, and the fire ran into the green timber and about 55,000,000 feet was killed or destroyed in about one hour.

Experiences of State Forester.

We have learned that although we are engaged in a warm business we have to deal with a cold world.



RED CEDAR.

FORESTER WELTY'S ADDRESS.

Not so cold as it used to be, because the people are warming up to us. At least the better class of citizens are and are showing a disposition to co-operate with us and to assist us in our work.

It is of first importance that we treat every person fairly. We can accomplish most in suppressing timber fires by gaining the good will of the people. They are ready then to give us needed information and assistance. The setting of timber fires is so easily accomplished and so difficult of apprehension that to make the law effective and to be successful in our work, we should have the sentiment of the people with us. The good will of the people can generally be secured by fair and impartial treatment. Their co-operation and assistance can be secured by showing them that they are interested in the timber and are benefited by its protection; that they are interested in protecting the timber from fire may be shown in many ways—among them the following:

Loss to Community.

On every thousand feet of timber burned, the stumpage owner may lose \$2.00, but the community loses \$8.00 in wages and market for supplies. And this: Timber pays taxes to your county. If it burns your property has to pay the difference. And again: In suppressing timber fires we should have the co-operation and assistance of every one who is interested in saving timber from loss by fire. Every intelligent person who considers the matter will see that he is interested in the protection of timber, whether or not he is the owner of timber lands. Timber is one of the great natural resources of the State and every person is interested in its preservation. A large percentage of its value is expended in wages paid for logging and manufacturing the timber into lumber, and that money cannot be taken away. It remains and enters into the channels of trade. It swells the volume of money. It makes better times. It creates a better demand for the products of the farm, the shop and the factory, and it benefits every man who labors with his hands or with his brain.

Assistance of Railroads.

Through persistent efforts we have induced the railroads to come to our assistance—in talking about railroads, we have had a good deal of correspondence with railroad companies but there has never been any bad feeling between us, it has always been of the most amicable nature because we understand the railroad company is a great carrier of traffic and they have a thousand things to look after, maintenance and many things of like nature besides fire, and that is something, usually that they have not considered in their budget; but the question was put up to the railroad companies something like this last winter,—we did not ask the railroad companies to assist us in forest protection generally but we did ask to be relieved of the burden of putting out the fires set by the railroads, and I asked for a reply as to whether that was a fair proposition. Now the railroad companies have gracefully come to the rescue this summer and have taken care of the fires set by their own traffic. I want to say that it is very commendable and I want to commend them here for it. I saw Mr. Albee here today and I have a good word for him because he worked with us this Summer very efficiently and he is a good man.

Sometimes it is necessary to be firm as well as to be just and fair and when a man violates the law he should be punished. We have made about 60 arrests of persons violating the law and I think it is having a good effect. I know some men who refused to listen to reason, after they were arrested and paid a fine of \$50 came around and said, "What do you want us to do?"

Effective Patrol.

Another thing I desire to speak of now is patrol. The question is, what we consider effective fire or timber patrol. Under ordinary circumstances we calculate that with proper means of traveling and communication one man can patrol about 50,000 acres of timber. If we could have such a force of men as can cover the entire area of a county or territory frequently and quickly and catch any fire there may be and put it out while it is small and before it reaches the proportions of a conflagration, that is about the kind of a patrol that is necessary. Now there are a great many ways in which that patrol can be made effective. For instance, we find a man upon a motorcycle is worth about two or three men on horseback or on bicycles and about six men on foot, so you

can see that if we can get men to use motorcycles that it is very beneficial. The laws of our state have just decided that we cannot allow a man to use his own conveyance, which works, perhaps, a hardship upon the forest fire force, but of course that will have to be arranged in some way.

Another thing that will make this more forceful would be if we can employ men enough as a patrol so when we have a dangerous fire we can concentrate a portion of these men from different sections or different localities and mass them upon the fire, then we would have interested men. One man who is interested in putting out a fire is worth more than twenty-five who are not interested. Fire wardens should be able to recruit their ranks or enlarge their number by getting men who live in the community, who are often very efficient men in fighting timber fires. It has been my experience, and I have had experience on quite a number of occasions, to go to the city employment offices for men, and bring them to a fire, and we have found that these men are of very little use, the men usually are not interested and are a class of men who are bums and are no good for that work. What we want is men who are interested, who are efficient, who have had some experience in fighting fires, and in this way we can have a strong fire control. (Applause.)

MONTANA.

State Forester C. W. Jungberg of Montana was unable to attend the Conference. His paper follows:

MR. JUNGBERG'S ADDRESS.

The season of 1911 opened with fair prospects for an amendment to the state forestry laws, an amendment which was so important at the time for fire protection and for care of forest land. Since the state had just emerged from the losses and horrors of the disastrous fires of last year, it was naturally to be supposed that no difficulty would be encountered in passing measures whereby these appalling losses should be checked to some extent. However, pressure was brought to bear by interests that hold the main part of the timber outside of the National Forest, to defeat all forest legislation.

What have the people of Montana done through their legislative body to prevent the losses by fires? State losses alone amount to \$200,000.00 on 15,350 acres of merchantable timber, to say nothing of the loss of the young stand, which it will cost on an average of \$12.00 per acre to restore. Nor does the loss end here. Large, valuable watersheds have been destroyed by fire. At the last session of the legislature, about \$3,750,000 were appropriated to defray the expenses of the various departments of the State of Montana for the years 1911 and 1912, but not one dollar was appropriated for emergencies in the forest department. I concede the necessity of this large appropriation to carry out the work of the state, but urge awakening interest in the need of an adequate appropriation for forest protection and the extension of the lumber industry which at this time amounts to \$3,410,000.00 annually to the state. Reviewing the situation, I realize the important duty resting on my fellow-citizens and me to care for and safeguard every possible forest resource of this state.

Timber in Montana.

Montana has about 17,000,000 acres of timber land, of which the greater share is owned by a few companies and the Federal Government. There is but little knowledge as to the estimated stand of the timber on this land, but according to a conservative estimate there are fifty billion feet of merchantable timber west of the Continental Divide. East of the Continental Divide there is a large acreage of timber land which contains but a small percentage of merchantable timber, which will not be marketed for some time. This timber, also, is of great commercial value to the state, as it will be utilized sooner or later for fuel and other purposes as the demand increases and the shortage from other districts appear.

Taking up individual ownership against Federal ownership of timber land, we find a marked contrast in the care and protection of timber resources. Within a timbered district the state and the individual reap great profit when the timber of that district can be manufactured into lumber or other commodities, thereby bringing revenue to the state and wages to the individual. In turn, the profit from the timber is distributed into other channels of business, but through sheer neglect and blindness to good business methods,

this thing is lost sight of and our forests are destroyed for the want of care and protection against fire and waste. On the other hand, the Federal Government, through its forest department, has worked out methods by set rules and regulations to perpetuate and conserve forest resources. This is demonstrated by the fact that available funds are appropriated to carry on the work in the various departments, not to mention money available at all times to defray the expenses of fire fighting.

There has always been a feeling of hostility towards the Federal Forest Department, throughout this state, for reasons I shall not give here, but when we take into consideration the amount of protection given to the forest land within the borders of this state by this federal department, I think that you will agree with me that it was done more to save the forest than the average person is aware of. A lesson can be learned from its methods, worthy of being copied by state or individuals owning timber. Yet this lesson is lost sight of because of selfish ends. Public forest lands and those belonging to private individuals bear an important relation one to the other as far as protection is concerned, since no community in any way can do without timber and the protection of that timber. Disastrous fires in one district affect another district adjacent thereto by exhausting its resources, and as a result causing higher prices for timber material and less wages and revenue.

Need of Stringent Laws.

Unless pressure is brought to bear on the next legislature to pass stringent forest laws there is but little hope for the State of Montana or its timber holders to feel safe concerning forest protection.

Under present conditions, relief can be secured by following only one course, that of association work, which has proved rather satisfactory wherever tried.

Our first experience here, along the line of association work, occurred this year on 964,160 acres of timber land owned by the Federal Government, the state, and private individuals, who co-operated in their work. While the state and individual holdings amounted to only 194,428 acres, yet a levy of one-half cent per acre carried us through the necessary expenses of patrol work and other incidentals. Since the timber lands of the government are mixed with state and private holdings, it was necessary to co-operate with the Forest Department in order to simplify the work of the three districts formed. Under the agreement the Forestry Department paid 65 per cent of the cost of fighting fires and the association 35 per cent. The Government paid for no patrol service of the association men, but the Forestry Department furnished 27 men as patrols, while the association had four salaried men and four unsalaried men who made reports. Through the efforts of the association the Northern Pacific Railway Company was induced to place one man in this area for patrol duty. This made a total of 36 men on patrol duty in the three districts.

Conditions were unfavorable this season for forest fires, since precipitation was above normal. Yet a great many fires were caused by lightning. In the districts referred to, heretofore, six fires originated, which were extinguished, since most of them were caught in the incipient stage. Their origin was due to the carelessness of campers, the clearing of land, sparks from railroads, and the burning of old ties along railroad rights of way. The area of land covered by these fires was 199 acres, damage being done to 25,000 feet of timber. The loss amounted to \$35. The cost of fighting these fires was only \$66.50.

Effective Fire Patrol Pays.

The above facts fully demonstrate that an effective fire patrol, such as was maintained by our association this season, will fully repay us and is cheap insurance on timber. Speaking for the state of Montana, of state and school lands, I fully realize the good that has been accomplished by this association. Our assessment was only \$343.61 on 67,721 acres of land, representing a value of \$1,340,000. Rather cheap insurance, is it not?

While this association is only in its infancy, yet it is bound to grow if proper interest is taken by those who have most at stake.

While the conditions this season have been unfavorable for fires, yet we find as we close the year's work for the different forest districts within this state, that a great many fires have occurred that have not been reported until late in the Fall. Of these fires I have no full data.

Forest fires for the state of Montana, including the National Forest:

	Feet.
Timber damaged by fire.....	225,000
Private timber fire killed.....	105,000



GEO. H. CECIL
U. S. District Forester,
Portland, Ore.



COERT DU BOIS
U. S. District Forester,
San Francisco, Cal.



DORR SKEELS
Forest Supervisor,
Libby, Mont.



S. C. BARTRUM
Forest Supervisor,
Roseburg, Ore.

FORESTER JUNGBERG'S ADDRESS.

	Acres
No. of acres burned.....	1,190
Acres of young stand killed.....	973
Untimbered land burned over.....	131
State school land burned over.....	5
Private lands burned over.....	620
Number	
Fires	148
Men employed to fight fires.....	202
Regular fire patrol men	243
Men employed as a whole in field service.....	349
Arrests for violation forestry laws.....	2
State Fire Wardens appointed.....	206
Conviction	1
Acquittal	1
Two districts not reporting.	

MONTANA.

The following is the summarized report of A. E. Boorman, Chief Fire Warden of the Northern Montana Forestry Association for the year 1911, showing excellent results obtained by the co-operative methods in Montana.

MR. BOORMAN'S ADDRESS.

Believing that the preservation of the timber supply in Northwestern Montana—one of its chief natural resources—was a matter of interest to the public in general, the timber owners in Flathead and Lincoln counties held a meeting at Kalispell, Montana, on May 11th, 1911, and organized under the name of "Northern Montana Forestry Association," and later enlisted the aid of the United States and state government for the purpose of formulating and putting into effect the best possible methods for the protection of forests from fires.

Co-Operation.

Steps were taken to enlist the aid of the state and Federal Government, asking their co-operation in protecting the forest from fires during the year 1911, by having their patrolmen placed so as to cover the largest possible area to the best advantage, and to pay their proportion of all expenses in connection with the fire fighting, whether it was on state, Government or Association lands, on an acreage basis. The co-operation of the state and Government was secured with but little difficulty. The state of Montana agreed to co-operate by becoming a member of the Association and paying their proportion of all the expenses on an acreage basis. The co-operation of the Government was secured on the basis that they be allowed to furnish their own patrolmen, separate and distinct from any joint agreement, but would pay their share of all expenses of fighting fire within the co-operative district during the fire season of 1911 on an acreage basis.

The total area included within the co-operative fire districts aggregate 964,160 acres. The proportion of expense to be pro-rated between the Government and Association lands for the year 1911 was based on the above acreage, viz.: 65 per cent being the Government portion, and 35 per cent being the Association portion. Since the above figures were compiled 4,428 acres have been added to the Association acreage.

The total number of patrolmen employed by the Government and Association in the co-operative district during the fire season of 1911 was thirty-two, eight being furnished by the Association. In addition to the patrolmen employed by the Association and Government the state of Montana appointed several prominent citizens located at suitable points as volunteer fire guards. Experienced woodsmen were selected for patrolmen who were capable of handling men and with the ability to deal with the public in general on matters pertaining to the prevention of fires without making enemies. Such patrolmen should, and in all probabilities did, create a public sentiment favoring the purpose for which the Association was organized. All patrolmen were so stationed in their respective districts so as to command from suitable lookouts a general view of the surrounding country which enabled them to locate a fire shortly after its origin, and to take the necessary steps to place it under control before it reached proportions of a damaging character.

The completion this year of trails, bridges and telephone lines in the most remote sections of the co-operative districts will add materially to the efficiency of the patrol service in the way of reporting and handling fires next season.

Fires.

Six fires occurred within the co-operative district this year, five of which were handled and placed under control by the association and one by the government.

Membership.

The membership of the Association now numbers eighty-five representing 194,428 acres, a showing that almost assures the success of the organization. There are approximately 432,000 acres within the co-operative district whose owners are not co-operating. These parties should be interviewed and their membership solicited, for without question the success of the organization depends upon the co-operation of all acreage owners.

Expense.

The total expense in connection with the association work for the year after allowing all bills and making settlement with the Government in accordance with the co-operative agreement, aggregates \$878.94 or approximately one-half cent per acre.

Recommendations.

Under the co-operative plan entered into between the association and the State and Federal Government, for the better protection of the forests from fires, satisfactory results have been obtained. In matters pertaining to the association work the local officers of the State and Federal Government have worked in perfect harmony with the officers of the association so as to obtain the best possible results. With their co-operation next year, and the putting into effect of plans now being formulated for a more systematic and efficient patrol service it is believed that all fires originating within the co-operative districts can be placed under control while in their incipency.

I therefore recommend that the agreements entered into between the Northern Montana Forestry Association and the State and Federal Governments that were in force this year be continued during the year

1912; also that an agreement be executed between the District Foresters of District No. 1 and the association so as to include the acreage of the Flathead National Forests within the co-operative districts next year.

I recommend that an agreement be executed between the Northern Montana Forestry Association and the Great Northern Railway Company for their co-operations in protecting the forests from fires along the main line between Olney and Coram, Montana, also between Fortine and Rexford, Montana, similar to the one now in force between them and the Black-foot National Forest between Olney and Fortine, Montana.

I also recommend that the Northern Montana Forestry Association as a body use their utmost influence towards securing better legislation for the protection of forests from fires within the state; especially one that will make it necessary for parties clearing land during the fire season to secure a permit from the proper authorities. In my judgment the issuance of such permit would help keep the situation under complete control.

CALIFORNIA.

President Flewelling: We will now listen to Mr. Coert DuBois, U. S. District Forester for California.

COERT DU BOIS' ADDRESS.

In reporting the results of fire protection work on the National Forests in California last Summer I am going back to the season of 1910 for purposes of comparison.

In 1910 we got our last rain in the Spring, about May 10. In 1911 the dry season began about May 23. On September 15, 1910, came the first general rain in the Fall, while this year the forests were not considered safe till October 27. So this fire season was three weeks longer than last. The winds were much worse in 1910 but this year was an exceptionally good feed year, especially in the foothills which made more inflammable material on the ground. Take it all in all from the point of view of fire danger, the two seasons were just about equally bad.

In all, on both private and Government lands in the National Forests, 553 fires started in 1910. This year 603 were reported. Please note: 50 fires more this year than last.

Total Acreage Burned.

The total acreage burned over by the 553 fires in 1910 was 367,300 acres; by the 603 fires this year, 68,600 acres or 298,700 acres less. The average 1910 fire covered 654.2 acres, while the average this year was 113.8 acres.

In our classification a Class "A" fire is one that is discovered, jumped onto and squelched right at the start by the regular forest force. The proportion of Class A's to the total number of fires is a valuable measure of the efficiency of the protection system. In 1910, 126 out of the total of 553 fires, or 23 per cent, were Class A's. This year 241 of our 603 fires were Class A's, or 40 per cent. I will consider our system practically perfect only when the proportion of Class A's is 80 per cent or better and the maximum fire does not get over 640 acres in size.

Timber burned this year totaled 12,493,000 board feet, worth at an average stumpage value of \$1.75 per M, \$21,900; 75 per cent of this loss was in Government timber, 25 per cent of it in private. This is against a total money loss of \$407,570 in 1910.

I am willing to attribute part of this good record to a slightly less dangerous season and part of it to luck. But I insist on crediting some of it to a distinct tightening up in the Forest Service protective organization.

When the season of 1910 closed we were thoroughly waked up to the imperative need of doing something decisive about the fire question. I believe we did it.

Study of Typical Conditions.

The first move made was the detail of a man

from the District Office in San Francisco to study the problem on the ground with the local officers on a typical forest. It was found that even a single forest was too big a unit to use for working out protection plans. So each ranger district on the forest was taken up in turn and studied individually. On each, the danger zones were examined and mapped, and for each particular danger area the logical protective measure was adopted—fire lines and cleaning up for logged-off areas; special investigators for incendiary communities; safe camp grounds prepared in advance in sections frequented by tourists; lookout points selected and equipped; patrol divisions laid off and regular patrol routes established; communication provided between the lookouts, patrolmen and district ranger. This we called the control system.

When it was done we set about making advance arrangements for fighting the fires that would occur. Still within the ranger district, the need for tools, equipment and supplies was studied and the location of caches decided. Then each ranger listed the available volunteer in his district, made arrangements with operators employing crews in the woods, notifying them under just what circumstances the men would be called out, made known the rates and terms of pay for fire fighting so there would be no misunderstanding later. Then every available means of transportation in the district that it would be possible to hire, buy or beg in case of fire was looked up and listed—saddle and pack horses, pack outfits, teams, wagons, automobiles and (in one case) a motor truck.

All this was put on paper in detail and a map made of the ranger districts showing all these points. When the district plans were all done they were combined into a forest plan.

The sample plan for the typical forest was sent around to each Supervisor who immediately set to work on a similar plan for his own forest.

When the annual allotment of funds was made to the forests last Spring, just as much money as possible was made available for protective work—for the purpose of putting these plans into effect. The forests were rated according to comparative fire danger and allotments made largely on this basis. On the opening of the fire season a publicity campaign was launched to notify the public that the danger season had arrived.

In conclusion it may be said that careful study beforehand of each individual administrative unit plus a 100 per cent increase in the cost of the protective system, resulted in a decrease of 18 times the damage from fire over the preceding year.

OREGON.

President Flewelling: We have overlapped our time ten minutes, but inasmuch as our luncheon hour is 12:30 I think we will have time to listen to F. A. Elliott, State Forester of Oregon.

MR. ELLIOTT'S ADDRESS.

Considering the season as a whole, the climatic conditions in Oregon have been only fairly good. The rainfall for June, July and August was .14 of an inch less than the average for the last four years, and July was unusually windy. The one light rain on the 19th of August did not materially reduce the fire hazard, and in fact was the cause of a great many small fires escaping from the burning of slashings without permits. During the latter part of August small fires in great number were reported from all sections of the state, except the west slope of the Coast Range. These incipient fires needed only a stiff breeze to break beyond all control and duplicate the record of last year. The heavy and general rains of the first week of September fortunately came before serious loss occurred.

The public generally has shown not only a willingness to comply with the laws, but a desire to learn in what manner they could be of service in reducing the fire danger. But in many localities we had an in-



STAND OF MONTANA LARCH.

FORESTER ELLIOTT'S ADDRESS.

sufficient number of fire wardens to be able to accommodate the people with burning permits, and there was a tendency in a few of these places to take advantage of this situation and burn without permits. We hope to have these localities better covered another year. The same might be said of the loggers. While generally they have given us all the assistance and co-operation within their power, there were a few instances where they seemed to resent any suggestions from wardens relative to spark arresters, cleaning up around their donkeys and in a general way for better fire protection. I am frank to say that, in a measure at least, this is due to the manner in which a warden goes about his work, and no doubt will be entirely overcome when all wardens are selected for their especial fitness for the position.

Co-Operation of Railroad.

The railroad companies operating and constructing lines in the state have also shown a desire to cooperate in the enforcement of the forestry law, but there are still places where rights-of-way need more clearing up, spark arresters either need to be changed entirely or inspected and kept in better condition, and more patrolmen kept on the line during the dry season.

There seems to be no spark arrester, as yet, that entirely prevents fires from starting along railroads where wood or coal is used, and if such an arrester is not found soon it would appear that the only solution of the question is a law prohibiting the use of these fuels through the forested areas of the state during the dry season.

The fire warden service was made up of (1) county supervising wardens, (2) men employed by the counties, (3) federal patrolmen, (4) patrolmen in the service of private timber owners, (5) officials of the United States Forest Service, (6) public spirited citizens who accepted appointment without remuneration. The county supervising wardens were appointed upon the recommendation of the timber owners of the counties that contained timber in sufficient quantity to warrant such appointment. Twenty-three wardens of this grade were employed. They were charged with carrying out the provisions of the law, seeing that forest fires were promptly fought, prosecuting violators and directing the work of the county men and the federal patrolmen assigned to their county.

The timber owners, together with the Oregon Forest Fire Association and this office, requested the county officials of a number of heavily timbered counties to provide for the employment of an assist-

ant to the county supervising warden appointed by this office. As a result of this request three counties, Lane, Columbia and Clatsop, recommended and paid the salary of such an official.

The sum of \$5,000 was allotted to this state by the Secretary of Agriculture under the Weeks Law, for use in fire protection work. This fund was available August 10, and made it possible to put 32 additional paid wardens in the field for the remainder of the season. They were paid a salary of \$75 a month.

Timber land owners requested appointments as state fire warden for 198 patrolmen. This number, however, does not represent the total number of patrolmen employed by the timber owners of the state, as a considerable number of timber owners did not request appointment for patrolmen in their employ.

Under the provisions of Section 3 of the Forest Fire Law, 178 resident officers of the national forests in Oregon were appointed as ex-officio fire wardens upon the recommendation of the district forester and the forest supervisors. In general, these officers were not expected to issue burning permits, but were given appointment so that they would have powers of a peace officer in case violation of the forest law on private land came to their attention.

The 177 voluntary wardens were appointed upon the recommendation of the county supervising wardens and the forest supervisors. In all, 605 citizens held commissions as state fire wardens.

The state has not, as yet, expended money in trail and telephone work, but we are now collecting information concerning needed telephone lines, and our office will probably co-operate in this work next year.

Causes of Fire.

As shown by our records, fires to the number of 367 occurred in Oregon, outside of the national forests during the past season. The origin of these fires is classified as follows:

Cause	Number
Unknown	156
Escaped from slash burnings	68
Campers	45
Lightning	24
Incendiary	25
Hunters	20
Old slashings not extinguished	20
Railroad locomotives	15
Smokers	14
Logging engines	15
Escaped from saw mills	4
Sheep herders	2

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None of the fires resulted in the loss of a great amount of stumpage, in fact, over two-thirds of them were confined to slashings or old burns. A total of 60,000 acres was burned over, representing a loss of 21,351,000 feet B. M. of standing timber, the estimated value of which is \$20,500.00.

Prosecutions for violation of the Forest Law have, in the main, not been successful, due principally to the attitude of prosecuting officials that the intent of the law is not to prevent forest fires but only to punish offenders in case great damage results. It is of the utmost importance that this erroneous conception of the law be changed, and our efforts towards this end will probably be the most important work during the next year.

We have also collected data on about 450 old slashings, ranging in area from a few acres up to two or three thousand acres in extent, and have had quite a number of these burned. We are making plans for assisting the owners in clearing up these fire traps as fast as possible, where there is not a young growth of timber started to make burning impracticable.

In addition, the standard of our field men will be raised and the law will be enforced more strictly than last year, and the organization of local fire patrol associations will be encouraged by rendering financial assistance wherever possible.

Associated Effort Best.

The fire patrol associations have proven their worth beyond a doubt. A compilation of data concerning expenses connected with fire patrol and fire fighting during the past season shows that the cost per acre for this service on an area of 954,000 acres included within the boundaries of patrol associations did not exceed 11-3 cents per acre, while 32 timber owners not members of associations and representing 874,000 acres, paid on an average of 4 cents per acre. That the service on the individually patrolled areas was less effective is clearly indicated by the fact that the associations reported a loss of only 685,000 feet stumpage, while timber to the extent of 3,110,000 feet board measure was destroyed on the lands of the 32 owners not members of associations.

President Flewelling: Gentlemen, we will now adjourn until after luncheon, and will reconvene at 2 P. M.

BURNING OF SLASHINGS PRESENTS DIFFICULTIES PECULIAR TO EACH DISTRICT

MONDAY AFTERNOON SESSION.

The afternoon session of the conference convened at 2 o'clock. J. L. Bridge of the Washington Forest Fire Association, who was to present the subject "Slashing Menace" was absent and Secretary Cornwall read his paper.

MR. BRIDGE'S ADDRESS.

Experience during recent years with forest fires shows clearly that the increasing slashing area is one of the most serious problems and one on which there are many opposing views. There is controversy as to whether purposeful firing is always desirable, some contending that in view of the difficulty of control at any time when a clean burn can be had, an accidental firing that may not occur is no bigger risk than the fire set. This is true only in a few isolated cases, where topography of the country is such and fire control so difficult that the danger of fire to adjoining property does not warrant the risk incurred by burning. Even in such instances, if a time for burning is selected wisely in the early fall this danger of resulting damage can be much reduced.

The majority of logging operators and timber owners of Western Washington, realizing that this increasing slashing area means a corresponding increase of the fire hazard, are now advocating elimination of this risk by annual burning.—the greatest difference of opinion being over the question as to whether spring burning, with its attending possibilities of hanging fires, is desirable.

Proper Time for Fall Burning.

Fall burning is undoubtedly the safest, but not every fall offers opportunity for doing this work, as evidenced by the season just past. The proper time for fall burning is after the first rains have fallen, when fires do not burn so fiercely, and when they can be controlled with proper handling and a reasonable amount of precaution. If weather conditions are favorable, a good burn can be had with comparatively no danger. Weather conditions this fall, however, offered little opportunity for slash burning. The association kept some of its men on duty through the month of September—the State Forester, Mr. J. R. Welty, also kept his county wardens and together we had our men interview the owners of all dangerous slashings and arrange for their burning. The numerous rains and cloudy days during the month of September, however, made it impossible to burn forest material in the open and we were unable to carry out our plans, except in a few cases where conditions were especially favorable. The area of these slashings which could not be burned this year is, in many localities, increasing so that next spring will see a greater danger existing.

There is usually a time in the early spring when fire will run in a slashing and a fairly good burn results. These spring fires will consume the small branches and other finer material which make the fierce fires, and while this same slashing my burn over the following summer, the intensity of the heat and attending risk is very materially lessened. It is, of course, impossible to get as clean or hard a burn at this time of the year as when set under favorable conditions in the fall, but this spring burning disposes of the finer combustible material, the dead tree tops, brush, ferns, etc., the source of the intense heat of slash fires which makes them so difficult for the fire fighter to handle. Slashings occasionally burn over several times, two or three times possibly in one season, but the first fire is the hot one and each succeeding fire easier to control. The rancher with his

five or ten acre tract always wants to set fire to his slashing about the middle of August, when he can get the hardest burn, but I am speaking more especially of dealing with the big slashings left by the logging operator. In handling the small fires of the settler all of our rangers, approximately 100 in number, were authorized by the State Fire Warden to issue burning permits. They were under instructions to examine every slashing which the owner desired to burn before issuing a permit. In the course of the last season the State and Association issued about 6000 and incidentally made a great many friends among the settlers, by making it easier for them to burn according to law. No loss resulted from any of these burnings.

Dangers of Spring Burning.

The greatest objection to spring burning and really the greatest danger is that some smouldering fires may be left unquenched by the rains which invariably occur before July 1st, and later be fanned into a blaze by the wind on some hot day, resulting in a second burning. If the slashing lies in a dangerous location where a second fire might threaten loss, the wisest plan is to spend a little money and put out these small fires which were left. The greatest trouble in this business is that too many people do not realize, or do not stop to think of the trouble which may result from the small fire left to burn.

Last spring the Washington Forest Fire Association, in co-operation with the State Fire Warden, inaugurated a slash burning campaign and the results were most satisfactory. A great number of these slashings were safely disposed of. In not one single case did any succeeding loss result and the risk was eliminated of the first burning occurring in the hottest part of the season, when control would be impossible of at least most difficult.

In our organization we have ten men, known as inspectors, each of whom has direct charge of a district with a number of rangers under his supervision. Experience in fighting forest fires enters largely into the selection of our inspectors and we depend largely on them in this slash burning work. We put these men in the field early last spring, with instructions to examine every dangerous slashing in their district and arrange if possible for their disposal. It was necessary to obtain the consent of owners and, of course, advisable to obtain their assistance. It is a source of no little satisfaction to be able to say that we received the most cordial assistance and co-operation from operators and owners in our efforts along this line. I wish to take advantage of this opportunity to thank them on behalf of the Washington Forest Fire Association for the valuable and material assistance rendered on numerous occasions during the past season, and in numerous ways.

How to Burn.

The actual operation in burning one of these slashings usually consists of first cutting down dead trees and snags in the clearing for a distance of from 300 to 1000 feet back from the edge of adjoining timber, and on the side opposite to that from which the prevailing wind blows. As a rule we always cut down any snags standing in the green timber two or three hundred feet back from the slashing, and in especially dangerous localities cut a fire trail in the green timber about 50 feet from the edge of the clearing. The extent of this preliminary preparation is governed by the risk to be incurred by burning. Fires are then started usually in the late afternoon or evening along what might be called the "lee" side of the slashing near the line of green timber and allowed to burn back toward the center of the clearing against the wind. In the meantime men are sta-

tioned in the edge of the green timber to prevent these fires from running in that direction. After these first fires have burned for say, three or four hours, they have consumed the fine inflammable material for a distance of possibly four or five thousand feet back from the edge of the timber. If the slashing is an unusually large one, we may then set a second line of fire through the center and let this burn toward the first fire set and later go back to the extreme windward side and burn the balance. If the slashing lays on a steep side hill as is often the case, with timber standing above it, we start the first fire at the top of the slashing on the side hill at the edge of the green timber, letting them burn down the hill for a considerable distance before setting others. The object of this first burn along the edge of green timber is to keep the fierce heat of a big fire away from the green trees and thus prevent its getting into the tops. Conditions to be faced are different in practically every slashing—the suggestions given will not apply to all cases by any means, but I think I have sufficiently illustrated the methods generally employed. In summing up the work of the past season in connection with the question of slash burning, our experience has made us strong advocates of this method of fire protection. Not every spring or every fall offers favorable opportunity for this work, but when the chance to burn is presented advantage should certainly be taken of it, and fire risks thus reduced. Some say it is not advisable to burn slashings at all and maintain that fire can be kept out of them, but our observation has been that most of them burn sooner or later and it usually happens in the hottest part of the season. Annual burning has rapidly gained in favor during the last two or three years and I feel sure it will continue to win advocates in the next few years of heavy logging operations.

President Flewelling: Gentlemen, in order that we may have a clearer understanding of the method, I will state that this meeting is not devoted to set addresses, but, as its name implies, is a conference of those actively engaged or interested in the actual work of forest protection, for the purpose of exchanging experience and suggestions for improvement. The topics were selected by a canvass to ascertain the problems generally considered most urgent. Each will be presented in a brief review by one or more acknowledged authorities, after which all interested will be expected to contribute from the view points of their interests and localities. We will now listen to W. D. Humiston of the Potlatch Timber Protective Association on the same subject.

MR. HUMISTON'S ADDRESS.

How best to dispose of the slashings and debris on a tract of land after logging operations are completed is a question which must be determined by several conditions.

This subject must, of necessity, be discussed in generalities before a body representing holdings in the widely differing conditions which obtain as between the redwood forests of California and the spruce, cedar and fir forests of Western Washington, or as between the latter and the yellow pine localities of Northeastern Washington or the white pine belt of the Panhandle of Idaho.

Generally speaking, all cut-over land falls into one of two classes: that which will repay clearing for

MR. HUMISTON'S ADDRESS.

agricultural or other purposes, and that the highest economic use of which lies in raising trees, or in re-foresting.

Thus the lay of the land, climatic conditions, quality of the soil, transportation facilities and proximity to towns all bear on the question.

Cut-over land of an agricultural character justifies more careful burning over, and consequently a somewhat greater expenditure for the work than land the chief utility of which lies in growing more trees.

Marketing Cut-Over Lands.

Several of the operators in the Panhandle of Idaho have put their cut-over lands which are suitable for agriculture on the market within the past year or two, and this action has thrown some light on the matter of disposing of slashings.

One of the first things they learned was that if they could show a prospective customer cut-over land on which there was practically nothing but grass, and perhaps a few top logs between the stumps, they could sell the land more readily and at an advance of not less than \$5.00 an acre over land covered with a mass of charred brush and tops from which only the needles had been burned.

Now, while the first cost of doing a good job of burning on such land is enough higher than the cost of burning slashings as it is usually done to absorb the additional price received for the land when sold, one must not lose sight of the ultimate benefits which will accrue through doing this work well, even at an additional expense.

In Northern Idaho, at least, brush will not come up rapidly, if at all, on land where the slashings has been well burned, while one frequently sees poorly burned off tracts on which the brush has grown so luxuriantly in five or ten years that it will not only cost from \$5.00 to \$15.00 an acre to slash it—thereby reducing its ultimate sale value by that much—but during all the time it is allowed to lie neglected it forms a grave fire menace to adjacent saw timber and other property.

It is safe to say that only on a very small percentage of the land in Eastern Washington and Northern Idaho which has been logged off up to this time is it good business for the owner or in the best interests of the community to practice re-forestation, as the demand for cut-over land in this locality, when offered at a reasonable price and on easy terms, is so great as to be a certain factor in the development and settlement of this section, and offers a solution to the problem of securing homes for the industrious, who are willing to work hard for a few years for farms they would never be able to procure otherwise.

Methods of Burning.

Three methods of burning slashings are resorted to:

- (1.) Piling and burning as logging proceeds.
- (2.) Piling and burning in separate operations.
- (3.) Broadcast burning.

Four factors have to be considered:

- (1.) The protection of adjacent property,
- (2.) Conserving the humus in the soil,
- (3.) Making a clean burn, and
- (4.) Doing it as cheaply as possible.

Probably the most efficient, safest and most economical way to burn under these conditions is at the time logging operations are going forward. This is possible at almost any season of the year throughout the territory represented by the members of this association.

The work is done by the logging crew with comparatively little additional help. Convenient locations for the fires are selected where they will interfere least with the other work, and as the branches are cut off the trimmers throw them on the nearest fire.

In Northern Idaho nearly all the large operators suspend operations during the summer season, so that with us, at least, the danger of fires getting beyond control would be small. One of the chief merits of this system lies in the fact that the slashings are cleaned up as the logging proceeds, and woods operations are made easier through having open ground to work over. Another advantage is gained by reason of the fact that comparatively large limbs can be burned and the work can go forward in rainy weather, or even on snow.

The second method is to pile the debris wherever most convenient after the logging crews move off the land, deferring the burning until favorable weather conditions prevail. In this case it is absolutely essential that a strip at least two rods wide be well cleared around the outside of the cuttings, and that all inflammable material be thrown back from the line of green timber, down logs be pulled back into the slashing and all snags felled away from the timber.

Then, if the burning is kept well in hand and ad-

vantage is taken of skidding trails, roads and the ruts formed by logging with donkeys as fire lines to prevent the fires running on the ground, the burning may be carried on with reasonable safety.

In broadcast burning it is the usual practice to merely leave the debris where it falls and then burn it at the least expense, regardless of results.

This method has nothing to recommend it on any class of cut-over land for, when employing it, there is no possibility of protecting the reproduction, the humus is destroyed over the entire tract, the danger is tremendous, and, when you are through, you find that in most cases only the needles and smaller twigs have been consumed, and the ground is covered with a mat of charred and tangled poles and limbs. Then, if you did your broadcast burning in the spring, you have a smoldering fire menace all summer in every rotten log or stump which, with the first high wind, is apt to break out, entailing enormous expense and incalculable loss of property.

The money which is spent every summer in watching broadcast burnings and fighting the fires which are caused by them would, if spent in doing a first-class job in the first place, insure well cleared land and absence of future fire menace.

There is little room for difference of opinion as to what should be done with choppings or slashings on land which is to be re-forested. Where local conditions warrant burning of slashings it is undoubtedly necessary to so handle the debris that, when burned, no damage will be done to the young timber. At the same time the shade to the forest floor, afforded by the under growth, should be protected in order to conserve the moisture and maintain the cool temperature which is so requisite to the young conifers.

How to Handle Slashings.

One of the best ways to handle slashings on land which is to be re-forested is to pile the brush carefully and compactly twelve or fifteen feet away from any trees apt to be injured. Generally speaking, the piles should not be large—perhaps ten or twelve feet across and six to eight feet high. Begin by putting the twigs and small stuff on the bottom and pile on the larger material towards the top, keeping the tops of the branches towards the center. Success in burning piled brush depends largely on having the piles compact—the more so the better.

Brush piles should not be allowed to stand through the winter, especially when there is snow, for they dry out slowly and ice forms under them, which remains until late in the spring, preventing burning until it is extremely dangerous to have fire out.

Whether to burn in the fall or in the spring is a question on which timber owners differ. In either case the debris is piled and burned after the tract is logged or the broadcast method is employed.

The operator contends that burning the winter's accumulation of debris in the spring is expensive and inefficient, on account of the fact that the debris is too green and wet to burn readily, and, where he has been in the habit of burning broadcast, he points out the danger from long-smoldering fires in rotten stumps and logs.

The non-operating owner of timber in the vicinity of slashings contends that it is not good business for the operator to risk his own property by leaving his debris on the ground during the hot summer season, in order that he may burn it more readily in the fall, and maintains that the operator is laying adjacent timber land under a fire menace which is unwarranted and unnecessary.

To my mind the only way in which these differences can be reconciled lies in piling and burning debris as logging proceeds, when practicable. When this is not practicable the additional expense must be incurred for careful piling in small piles at safe distances from snags, rotten stumps and logs. Then, by taking advantage of the little fire breaks which run throughout all new slashings, an efficient crew of men can make a good burn in the spring without danger of future fires, without loss of the humus in the soil and without injury to the young timber.

These methods are especially well adapted to clearing cut-over land of debris when it is planned to put the land on the market eventually.

Standing snags, especially where they are near green timber, are one of the greatest menaces to our forests. Fire runs up them and the sparks are carried into the canopy of the trees, and what was originally a surface fire, which, but for the standing snags could have been readily handled by a few men and stopped easily with a fire line, becomes a crown fire with which a thousand men would be powerless to cope successfully.

One of the first steps which should be taken towards fire protection and one of the best investments that can be made lies in falling all snags into the old

works and away from your fire lines and the green timber.

While conditions differ so widely in the various sections of the timbered empire represented here to-day that few rules can be set down, yet I am sure every one here who is interested in timber or cut-over lands or the welfare of the community will agree that as an investment as well as a protection the careful and thorough disposition of slashings will well repay better methods than have generally obtained heretofore.

Discussion.

F. A. Elliott, State Forester, Salem, Oregon.—Burning depends altogether on the locality you are working in. In one place you may be able to make a wholesale burning and in other places you have got to pile the brush. As a general thing slash should be burned in the Fall. There was no time after the first rains this Fall to make a good burning. On the open ridges and the burned patches that run around through a good many of your holdings you can get a great deal better burn in the Spring. It is up to the timber owner in the different localities.

Donald McKay, Christian-Mueller Lumber Co., Bend, Oregon: In Minnesota when we first commenced to operate on the Government Reserve we were compelled to pile the brush. It threw a scare into the operators there at the time. We were compelled to put our brush in heaps and at certain seasons of the year burn it. We burned our brush in Minnesota in the Spring. The Standard Lumber Company of Dubuque, Iowa, burned their brush during the Winter at less cost than we did in the Spring. Our burning in Minnesota cost us 42 cents a thousand on something like 15,000,000 feet. In Central Oregon, up on the Deschutes, we are using the same method. We cut the timber claim close along the section line where the green timber is, and where such a thing is possible we haul that timber in toward the slashing and pile it up. It is costing us to-day probably about one man to every ten thousand feet to pile the brush.

J. R. Welty, State Forester, Olympia, Wash.: We have to deal with the stubs of dead trees, which become enveloped in flame with a shower of sparks falling, perhaps, 100 feet, endangering the life of any person endeavoring to cut them. We require the cutting down of all of these dead stubs when we issue a permit to burn in Washington. I look upon the stubs as one of the most dangerous propositions we have to deal with in fires. Loggers have found that by cutting dead snags they get enough good logs to pay them. Perhaps it will work a hardship to require a logger cutting a large area of country to cut down the stubs on the entire area of his logging land, but it seems to me it will be a good idea to require that a strip on the border should have the stubs cut down to a distance beyond which would carry fire.

Chairman Flewelling: Do you think, Mr. Welty, the cutting of stubs should be a subject for legislation or a subject for rules laid down by the Forestry Association? We must be careful not to legislate too much, people are very jealous of their rights. I believe you are right on this stub proposition, how do you think it should be approached?

Mr. Welty: I think it should be left principally as a suggestion, something that should be agitated among the loggers. I do not know but it might work a hardship if we had a hard and fast rule or law to compel the cutting of these snags.

F. H. Cowles, National Fire Protective Associa-



E. O. SIEKE,
Deputy State Forester,
Salem, Ore.



W. D. HUMISTON,
Potlatch Timber Protective Assn.,
Potlatch, Idaho.



J. L. BRIDGE,
Chief Fire Warden Washington For-
est Fire Assn., Seattle, Wash.



T. T. MUNGER,
United States Forest Service,
Portland, Ore.

PROPER METHOD OF BURNING SLASHINGS.

tion, Medford, Oregon: A great many of the rules applying to the administration of the forests are very much in line with the rules that apply to municipalities. We do not go to a man in the city and say it is permissible for you to construct a theater or a tenement house or an apartment house, or hotel, as you will, you know it is necessary to make it mandatory in the building laws. I think as far as possible the thing should be mandatory, where not unjust. (Applause.)

Joseph Irving, Standard Railway & Timber Co., Seattle: Mandatory laws are all right if we could be absolutely sure what is the proper method. Where we are not settled as to the best way to do I do not think we should enact any laws until we know. I have been on the Fire Commission for six years and I do not know yet whether to say you should burn or not burn, whether to burn in the Spring or Fall. I have tried it all, and I don't know what to do except for God's sake try and keep the fire under control. I cannot tell you what to do to keep out the fire, it is up to you to keep it out, if you don't keep it out you lose your job. A donkey is going to be moved next week and the ashes will probably come out—look after the ash pit, put a man on to clear up the ground through this dry weather, it is up to you to look after it, and if a fire occurs you are going to lose your job. If we could have a man come and say, "Now is the time to burn" I would give that man lots of money to come to me whenever I telegraphed him and tell me whether to burn. I think we should go very slow regarding a law as to when a man shall burn.

Chairman Flewelling: The gentlemen do not seem to be very far apart in their theories, just different methods and different experiences. I think I agree with both of them.

E. E. Ellsworth, Bridal Veil Lumbering Co., Bridal Veil, Oregon: In our part of the Coast we have west winds before the first of July, and then we have east winds. If we burn with these west winds we make back fire when the east winds come. A fire after August will not get rain in time to put it out. After rain comes I cannot burn, so I must do it in the Spring, and take the west wind to make a back fire for the east wind fire.

Wells Gilbert, Drew Timber Co., Portland:

Cutting snags should be in the hands of the timber owners, the logging contractor can arrange to have the brush burned and certainly ought to cut the snags. Snags are the greatest menace we have on the Wilson River. Timber owners there have decided that in case the railroad company does not they will cut the snags along the banks of the river, and we have further decided we want to widen the railroad right of way, it is not wide enough, and we will go in ourselves and widen it still further and keep that strip outside of the right of way burned.

President Flewelling: Gentlemen, I am more than ever convinced that the burning of slashings, like the tariff, is a purely local issue, and what is good medicine in one country is not good in another. The theory in Montana would not be good in Grays Harbor country, the districts, the timber and the climate, are so dissimilar. What would work in one place would not work in another, and that is why I asked Mr. Welty whether or not it would be more of a matter of suggestion and persuasion rather than legislation.

Forester Allen: Mr. Bridge's paper, the first on the subject, made a particular point that they had established and thought it feasible as well as necessary to burn, perhaps he did not establish details, but the real point before the lawmakers of the Association is whether or not the slashing and burning should be compulsory sometime during the year, or whether to take the risk of letting it go over a year, or until a good time to burn. As I understand Mr. Bridge's paper, he recommends that sometime during the year the slashings must be gotten rid of. Mr. Long, the President of that Association, can probably speak for that Association. Is it compulsory to have an annual burning and is the time of burning compulsory?

Geo. S. Long, Weyerhaeuser Timber Co., Tacoma, Wash.: I do not like the word compulsory; I never enjoyed it very much since I was a small boy. Through the area of country west of the Cascade Mountains, when a logger gets through with his operations, there is a quantity of debris that in time probably surpasses the total timber that has been taken out. I am not entirely satisfied that compulsory burning should be written into law. The law we have in Washington today gives the Warden the right to inspect the slashings and if he looks upon it as a menace, as a public nuisance, he has a right to denounce it as

such and to enter upon it and burn it. Of course that puts the burden of the question as to whether it is dangerous or not upon the State official or fire warden instead of the owner, but in the bottom of my heart I think every slashing should be burned, practically every slashing ought to be burned, because during the Summer months any little accident will start a fire that you cannot control. Ninety per cent of the loggers in Puget Sound realize the advisability and advantage of burning the slashings because, if they do not, it catches fire, and some day, in the twinkling of an eye, the whole works will burn up. In the last five years loggers in Western Washington have lost equipment, logs, camps and time fighting accidental fires that will almost equal all the timber loss. We have no figures on that subject, but I am of the opinion that there is not a logging camp in Western Washington of four or five years' experience, but what has lost thousands and thousands of dollars by fires in slashings, which have occurred accidentally. Every good logger is anxious to burn off the slashings to save his equipment, logs and camps and to save his timber. We can do much more by education. You get the good will of a man a good deal better by education, by talking to him, convincing him, than you do by reading law to him, and a law that is a dead letter is worse than no law. The average logger of the State of Washington tries to burn his slashings. This question of snags has been one of recent discussion, there was some talk of trying to get it into the law last year in Washington but we thought we were not quite ready, it was not opportune to spring it, but instead we discussed it, and I believe that Mr. Welty has just suggested one of the most practical things,—to clear around every slashing a strip for fighting, a chance to work between the slashings,—in Western Washington you cannot go through the timber with anything like speed, as a matter of fact fire will travel through slashings so fast a man cannot get ahead of it, you have to dodge it—so when you come to fighting fire one of the most essential things is a fighting line where you can get around the point of danger. That as a suggestion, but not as a law, I think will bring about results. I think the slashing should be burned and the snags should be cut, and if we appeal to the broad business sentiment of the loggers they will do it. (Applause.)

USE OF ELECTRIC POWER IN LOGGING OPERATIONS MEANS OF FIRE PREVENTION

Chairman Flewelling: The next on the program is "Logging Hazard: methods of safeguarding operations, fixing employers' responsibility; spark arresters; oil and electric engines, etc." The first speaker on this topic is Mr. A. E. Adelsperger, Coos County Fire Patrol Association.

A. E. ADELSPERGER'S ADDRESS.

While we cuss the campers and petition the Governor of the state for a closed hunting season during the dry months, expecting to eliminate the fire danger by so doing, we must admit that the lumberman himself is the direct cause of a good share of fires. The cause is partly with dangerous machinery or inadequate spark arresters, partly carelessness, indifference of employes, and partly bad organization by the proprietor. The basis in each case is the failure to realize that increasing hazard, higher stumpage values, larger equipment investment endangered, and the growing sentiment against the careless operator, all make it extravagance nowadays instead of economy to omit any possible precaution. The situation grows worse and more dangerous as the number of operations and size of slashings increase, and we should improve our ways both to prevent fires, and to prevent any impractical restrictive legislation.

Improve by Better Organization.

Now it seems to me one method of improvement can be had by better organization—not only by associated effort, but individually. The proprietor's attitude itself around the logging camps should always be made clear to every employe. The responsibility for the occurrence of any fires around the logging works should be clearly fixed and the responsibility for extinguishing them should be systematized so that no time would be lost or expense increased.

The position of Logging Superintendent or Forester, or whoever is responsible for safeguarding standing timber should be made clear to all employes and cooperation between him and the camp foreman should be insisted upon, and the availability of the foremen's men should be strictly understood. Printed rules should be conspicuously posted around the camps and on the framework covering every donkey engine.

Dismissal should be the penalty for carelessness on the part of any employe in starting a fire or for failure to attack a small fire when first discovered. In extra dangerous seasons it might be advisable to close the camps except for repair and improvement work, but in most localities this danger can be overcome by putting on an extra man or so to watch out for fires, clear ground around engines, etc., and always keep watchmen during nights. The whole organization should be dominated by fire prevention aim, even more so than in a mill or manufacturing

plant. For a mill can be rebuilt—you can even collect the insurance on it, but one generation cannot rebuild a forest nor can they insure it further than the money they spend in safeguarding it.

Another thing needing mention is that generally and so long as the logging foreman is held for the greatest possible log output, he is hardly blamable for failure to handle his work and the men with the fullest view to fire work in the danger season, consequently the proprietor should make the foreman's first aim fire prevention, or charge the burned logs or standing timber against the cost of logging, which would soon make them "take notice."

Safety Device.

Now as to safety devices, it never pays to risk a thousand or more dollars in timber and equipment to save \$100 in safeguarding an engine. In the long run it will pay in money to adopt every possible precaution. Spark arresters are necessary where wood is used and I believe that with our laws governing this device and with the number of wardens actively watching most engines, that spark arresters are used in all timbered localities. They are now made fairly efficient and so as not to choke the draft on the engines. While the average logger believes \$75.00 or such a matter an enormous expense in equipping an absolutely spark proof arrester, he should take into consideration the probable loss of timber by fire started through inadequate machinery and the expense of fighting such fires. A fire started in logging camp during operations always re-acts on the logger, even though he is not the owner of the timber. He invariably loses hundreds of dollars in loss of time and in fighting the fires to save his lines and rigging, etc., so that it behooves every operator to take advantage of every precaution in safeguarding his works.

Donkey engines should also have a constant water tank supply equipped with pump and hose, and the ground around engines should be wet down occasionally. When wood is used in locomotives there should be a track patrol and the cost of all these precautions can only be considered as insurance, which is little enough in view of the large investment.

Tests of Oil, Wood and Coal.

We have had no practical experience with oil fuel other than to test the amount of steam power produced from the use of oil, wood and coal, which is as follows:

Quantity	Water from and at 212 degrees F. Pounds	Theoretical Caloric Value B. T. U.
Coal—Ton (2000 lbs.)	15,000.00	
Lb.	7.68	10,645.
Oil—Barrel (340 lbs.)	4,420.00	
Lb.	12.99	18,000.
Slabs—Cord (128 cu. ft.)	9,500.00	

Lb.	1.93	2,675.
Ground Fuel—Unit (200 cu. feet.)	10,000.00	
Lb.	2.03	2,813.
Note:—One cu. ft. ground fuel weighs 24.62 lbs.		

Electric Logging.

On the other hand there are great possibilities in electrical uses for power which will practically eliminate the fire danger around the logging camp and the best way for me to give you an idea of our electrical experiments is to read a report from John Merein, of the C. A. Smith Lumber & Manufacturing Co., the electrical engineer in charge of these experiments, which is as follows:

Report.

Mr. A. E. Adelsperger,
C. A. Smith Timber Co.,
Marshfield, Oregon.

Dear Sir:

Concerning our electrical logging experiments and plans for future development along these lines, I beg to submit the following report:

For the last two months we have had in daily operation a Willamette Iron & Steel Works 11x13 Humboldt yarder equipped with a 165 h. p. Westinghouse variable speed induction motor. This machine has been yarding up to a distance of 1,000 feet and over that character of ground which in Coos County would be called an "average chance." The size of the logs has been a little over two to the thousand. The amount of power consumed per thousand feet averaged 14 kw. hrs. The operation of this machine has been entirely successful and comparable in every way to that of the steam donkey.

Will Electrically Equip Camp.

As a result of these experiments we are confident that electricity can more than compete with steam in the woods, and next Summer intend to completely equip electrically our Coos City camp. This camp will contain five or six yarders and loaders, four loaders and one unloader at the log dump. The loaders and yarders will be equipped with 200 h. p. motors and the loaders and unloader with 100 h. p. motors. These motors will all be of the three phase variable speed type and will consume altogether an average of 5,000 kw. hours per day, or in other words their total power will be equal to 500 kilowatts working through a ten-hour day. However, to take care of peak loads when several of the machines are working at their maximum capacity at the same time, it will be necessary to install a power line and auxiliary apparatus of such capacity that a maximum load of 1,500 kilowatts can be taken care of.

The present intentions are to install a 2,000 kilowatt mixed pressure turbine generator at the mill at Marshfield, and to run same with exhaust steam

SPARK ARRESTERS AND FUEL OIL.

from the present Corliss engines. The power transmission line from the mill to Coos City will be five miles in length and built to carry 1,500 kilowatts, 60 cycle, 3 phase, alternating current at eleven thousand volts. This voltage will be carried into the camp where it will be stepped down to 440 volts at each one of the donkeys by means of individual transformers. Of course it will be impractical to handle as high voltage as 11,000 at the donkeys themselves, and the problem of handling this voltage in the woods while moving the donkeys promises to be a rather serious one. I believe that we shall use a system somewhat as follows:

Each donkey will have its individual transformer mounted on a shed of its own. The power line of 11,000 volts will be connected to one side of this transformer; on the other side will be taken the current for the donkey, at 440 volts, by means of 100 feet lengths of steel armoured, lead incased cables, which would be water proof and which could lay on the ground without injury to man, or to themselves. By putting in additional lengths of cable, it would be an easy matter to move a donkey some distance from its transformer without disturbing the high tension connections. By means of two such transformers used alternately, it would be a very easy matter to move an electrical donkey an indefinite distance in the woods under its own power, it at no time being necessary for the linemen to handle the wires carrying 11,000 volts while they were "hot."

The above equipment is what will be installed first, but it is hoped that it will ultimately prove practical to operate an electric traction engine instead of the present geared locomotive, thus eliminating all danger of fires from sparks. At the present time we are working on a portable electrically operated saw for bucking and if a practical machine can be developed out of it, it is hoped that a great deal of the hand bucking can be done away with, thus effecting an additional saving in labor.

Cost of Installation.

The cost of installing an electrically operated logging camp is somewhat greater than that of installing a steam camp. The following, however, are some of the factors which should reduce the operating cost, and make it possible to log at from fifty cents to one dollar per M. cheaper by electricity than by steam.

Labor—One fireman and two wood-cutters at each of the roaders and yarders could be done away with, one man who at the present time operates the pumping engine, which supplies the other donkeys with water, and one man at the unloading engine, making a total of seventeen men. The electric camp would require one electrician, which would reduce this to a total saving of sixteen men.

Timber—All the merchantable timber which at the present time is cut up into firewood with the different machines would be saved in an electrically operated camp. This, as every logger knows, runs into a great deal of money during the course of a year.

Water—The water problem connected with every logging camp, and especially those located in dry localities, would be done away with and in this electric camp the expense of installing and maintaining an elaborate water system would be obviated.

Repairs—the electric donkey is a much simpler and a more mechanically perfect machine than the steam rig. Owing to the lack of reciprocating parts there would be much less wear and tear and the repairs usually required by the boiler would be entirely eliminated.

Fire—With the elimination of the steam donkey will come the almost total elimination of camp fires due to sparks from same and the accompanying shut downs and destruction of timber which always accompany them will be one of the greatest moves toward practical conservation of timber that has yet been established.

Yours very truly,
JOHN MEREEN,
Engineer in charge of Experimental Work.

Information in Trade Journals.

In conclusion I want to say that most of these experiments and tables of information have been printed in trade journals from time to time which were probably more in detail than what is here submitted, so that we can all readily see the wonderful possibilities of either oil or electricity as fuel for power and the almost absolute elimination of fire danger in using the same. Now I want to emphasize one more point, and that is that every user of steam power using coal or wood, take every precaution in protecting the works around engines and every operator take it upon himself to see to it that the state law is fully complied with in the matter of burning slashing and old log works. Keep these old log works burned out and cleaned up and we will have less danger to the balance of standing timber.

President Flewelling: The discussion will be opened by Mr. A. W. Laird, of Potlatch Timber Protective Association, after which there will be general discussion.

A. W. LAIRD'S ADDRESS.

The Logging Hazard—Why is it and why is it so difficult to control? Why do we hear so much about it in these present days?

Lumbering operations as they have been carried on the past century have been practically all conducted in districts where there were no distinct annual wet and dry seasons. Once in a cycle of ten or fifteen

years there would come an unusually dry season and fires would do considerable damage and burn considerable timber.

Lumbering and logging operations were conducted on a smaller scale and the personal losses corresponded and a quick effort would be made to get out the burned timber. This was quite practicable as there were many lakes and drivable streams in the operating districts. Much of the timber then burned belonged to the Government and was remote from any base, and no one was much concerned, as there seemed to be an abundance of timber for all time.

Conditions have changed. The growth of the country has pushed the pioneer into many new districts and there are many who think that the manufacture



WHITE OR PORT ORFORD CEDAR.

of lumber has reached the pinnacle and must now decline.

New Conditions Developed.

The starting of operations along the western coast and in the Northwestern States developed new conditions. Different climatic conditions, a rougher country, the scarcity of streams which could be used by loggers led to the use of the donkey engine and the hauling of logs by rail. These methods with their sparking tendencies, and the long certain dry season of every Summer, brought the logger face to face with a serious hazard. Then came also the conservationist, probably first awakened by the rapid absorption of the public land area due to an enormous growth in population.

The logger found himself by force of circumstances, a conservationist, practical. The other fellow up to this time has been a conservationist, theoretical. Both must soon come to a common working basis.

The supposedly large profit of the lumber manufacturer has grown to be somewhat of a myth in these days and every operation attendant must be accomplished with economy, particularly logging.

There are other serious hazards besides fire which are constant but the fire hazard is our topic today.

Men who have been brought up in the woods or who have learned woods work are by their training reckless and careless of responsibility and inclined to wastefulness, for Nature herself is ever present with him showing him her wanton wastefulness in her own processes.

The logging camp foreman is the man on whom the immediate responsibility rests. He must watch his men and teach them to walk in other ways than Nature leads them. He cannot and will not make them stop smoking, the great solace of the man in the woods. He can try to make them more careful to put out their matches before throwing them on the brushy ground.

The foreman must also watch the spark arrester or screen on his donkey engines. Most engineers or firemen are inclined to allow the screen to get full of holes for the sake of better draft. Persistent vigilance is necessary. On geared or logging locomotives there is even greater need for spark arresters due to the necessity for forced draft on the heavy grades.

The best stack our company has used is the Radley-Hunter Diamond stack. While not absolutely spark proof, it is very safe. Track walkers should also be employed during the very dry season, as an additional precaution. Such men have put out many a dangerous cinder.

Protective Measures Adopted.

We have also adopted as a protective measure against the spread of fire, the practice of clearing of brush a strip from 50 to 100 feet wide between the standing live timber and the tract being cut. The brush picked up is piled and burned and thus little is left to cause a rapid spread of fire.

Main line trains of heavy loads of logs should be pulled by engines equipped for burning oil. While such engines so equipped can also set fires, watchful attention by good firemen will prevent almost all fire dropping.

The past Summer's experience has proven that the oil burning engine sustains its reputation for being by far the safest equipment and as economical as the coal burning type. It is possible that oil burning donkeys might be found safer and at the same time economical in some sections, but the wood fuel from dead trees unfit for saw timber is too cheap to allow any substitute. In addition there is always a working crew around an operating donkey and such men are good and ready volunteer fire fighters.

However, donkey outfits driven by electricity are the latest experiment both in Idaho and on the Coast, and it is now quite believable that wherever electricity can be obtained without too great expense and conditions will permit the safe handling or carrying of wires, the electric or motor driven donkey will displace the steam outfit, both on account of safety and economy.

After all is said and done the best plan is to push the logging a little harder in the Winter and Spring and accumulate enough logs ahead so that all logging operations can cease during the months of June, July and August, other than the loading and hauling of the logs. With the slashings burned pretty clean during the open season and the dangerous operations stopped during the closed season there should be much less fire fighting expense, much less fire hazard and less destruction of timber. (Applause.)

Discussion.

Mr. Griggs: I would like to ask the gentleman from Coos Bay what the weight of that electric donkey engine is, how far he brings his power and whether he knows definitely if he could develop electric power by water power for logging operations, and bring it some distance—to what extent he could carry it—how many breakdowns he has had with the electric engine, and how long it will take to get started, also the first cost of the electric plant. I really feel that this electric proposition is the solution of a good many of our difficulties, because any of us who have been in the logging business for any time will appreciate where we started, with oxen, and are now operating with flying machines and there is a wide development—if it comes to operating with an electrically equipped plant it seems to me that solves a great many of our problems, for those of us who have timber available for water supply to develop electric power. I think it needs considerable investigation.

Mr. Adelsperger: I cannot tell, gentlemen, just exactly what that motor weighs, but I would think that it would weigh considerably less than a donkey, I know we move in with a lighter scow than we use for the donkey engine.

Delegate: Is it self-contained?

Mr. Adelsperger: Yes, it is mounted on a

ELECTRICITY IN LOGGING OPERATIONS.

sled. As far as the cost of installing an electric camp, it is very expensive to start to operate these camps, it will cost about \$450,000 for the motors and to produce the power.

Delegate: Would you advocate a \$450,000 plant?
Mr. Adelsperger: Well, it will have a saving of about \$150,000 a year, and in three years pay for itself. That is what the expert figured that has been working on it. Question: How about opening tributary territory? Answer: Keep moving further and further ahead all of the time. Question: Can such power as oil be operated successfully? Answer: I should think so. Question: Does the saving of \$150,000 a year include deterioration? Answer: I am just stating approximately the saving would be \$150,000 a year. Question: Do you use electric power for your sawmill? Answer: No. Question: What is your annual capacity, Answer: About 150,000,000 feet a year.

President Flewelling: I think one of the best points made by Mr. Adelsperger was the fixing of the responsibility on some one about the camp, I would like to hear from others on this branch of the subject. How will you fix your responsibility around the camp; who will you make responsible?

J. P. McGoldrick, McGoldrick Lumber Co., Spokane: One way to accomplish anything is by co-operation, this meeting exemplifies co-operation very fully. In a meeting of this kind we exchange ideas and opinions on all propositions that are of benefit individually and collectively. The question of co-operation between manufacturers extends to co-operation between manufacturers and employees, if you desire to have the assistance of employees in prevention of fires you must cooperate with them and educate the employees. The question of absolutely fixing the responsibility on that class of men is probably a little bit drastic

but by working with them and explaining these matters I think it is a very easy matter to obtain their co-operation, and assistance. The question of fire hazards has been pretty thoroughly covered. There is no State legislation or rule that will absolutely cover the districts, owing to climatic conditions, the difference in logging operations, etc. The fire law of Idaho pretty well covers a proposition of that kind. The co-operative law embraces the manufacturers, the State and United States Government and the people who are interested in the timber. The law provides for the burning of underbrush, the timber and manner is left to the discretion of the fire warden, whether Spring or Fall.

President Flewelling: In your own works how do you fix the responsibility?

Mr. McGoldrick: By co-operating with the employees.

Delegate: I would like to say just a word about electric equipment that has been mentioned here this afternoon. I do not know how many of the gentlemen present are electric engineers, but there are a great many intricate details to those who are not familiar with electric apparatus. I am wondering why it would not be a good plan for this Association, in connection with some of the large electric manufacturers, to secure an electrical engineer who can, in conjunction with some certain plant associated with this Association, make a thorough test and try out and get detailed figures of the different propositions. In the first place I think there is an erroneous impression about what it costs to carry out a transmission line.

President Flewelling: We are all inclined to let these investigations regarding new methods be done by "George." Of course when it comes to spending \$450,000 to demonstrate whether electric energy is the proper thing to use in logging operations I am very much inclined to "let George do

it," and I think the rest of you are. This matter is bound to come up within the next few years. The present cost of lumber and the high cost of produce will force us to practice economies in the manufacturing of lumber. We have got to reduce our cost of production to get a reduced cost of logging, and electricity opens up an avenue for investigation, but I am inclined to "let George do it." I do not think, as an Association, we can finance this thing. We have got to get hold of some kind millionaire who don't care much for money and ask him to do it, then if it is a success we will always follow.

Mr. Adelsperger: I think an electrical engineer would be the proper man to explain the merits and defects and everything concerning an electric donkey and other electric uses that are being developed.

Mr. Laird: Our company has been fooling away a little money this past Summer in similar experiments to the C. A. Smith Lumber & Manufacturing Company. We have tried an electric donkey, and we believe it is going to be a success, especially where logging can be carried on close to the power plant. We have already contracted for two donkeys to be operated by electricity, and have bought motors and electrical equipment, but from our observation I think the matter is still in an experimental stage and it will be necessary for the companies in the lumbering and logging business to experiment a little.

Endorsing Not Province of Conference.

An animated discussion ensued on the advisability of asking the co-operation of electrical companies to assist in the matter of developing electrical logging machinery and endorsing by the conference of several fire preventive appliances. President Flewelling ruled that such action would be out of order, in which he was sustained unanimously by the Conference.

MINIMIZING RAILROAD FIRES BY USE OF SPARK ARRESTERS AND OIL AS FUEL

President Flewelling: Gentlemen, we are right on time. The next subject for discussion is "Railroad Fires: safeguarding engines; oil fuel; cleaning rights of way; co-operative agreements; attitude of companies, etc." The discussion will be opened by F. A. Silcox, of the Forest Service, who will give a fifteen-minute talk.

F. A. SILCOX'S ADDRESS.

The reason for the destructive forest fire record of the railroads is so obvious that it hardly needs discussion. One inevitable result could be expected when a shower of sparks was either blown through the stack of a locomotive or trailed out from the fire box into highly inflammable material. Practically little or none of the brush and debris occasioned by the original construction of the railroads was removed until a few years ago, and it has been a notorious fact that even the best spark arresters in use have not been a dependable safeguard. Authentic records of forest fires—and their causes, which are available in this country, clearly show these statements to be indisputable. The reports of the different states through their State Foresters or Forestry Commissions show that the railroads are responsible for from 15 to 60 per cent of the fires, the causes of which are definitely known. Reports of the Forest Service show them to be responsible for approximately 40 per cent of the fires started in National Forests.

In striking contrast are conditions existing in the European countries, where railroad fires are of rare occurrence. From the reports of the various directors of the European countries, the following is interesting:

Eleventh annual report of the Forestry Commissioner of Minnesota for the year 1905. Furnished by the respective European Forest Directors.

France.

Page 79: "In the warm region the dangers from fires are greater. As a preventative against them more roads are built, trenches 20 to 50 metres wide and kept free from grass and brush are made around the forest, along railroad lines."

Italy.

Page 86: "Only a very small number of forest fires are caused by railway locomotives."

Prussia.

Page 91: "During the years 1892 to 1896 the annual average number of forest fires caused by railroad locomotives was 2."

Sweden.

Page 102: "The number of acres damaged by fire was 1200, and the amount of damage was about \$10,000. Neglected camp fires and carelessness when burning fields for cultivation are the principal causes. Only three fires were caused by railroad locomotives."

Switzerland.

Page 112: "It is rare that a forest fire is occasioned by locomotives."

Wurttemberg.

Page 116: "The main causes of such forest fires are carelessness while smoking and lighting fires

near forests. Forest fires are very rarely caused by sparks from locomotives."

The question naturally arises, "Why, if the European countries have already effectively solved this problem, we can not do the same thing?" As a matter of fact it is not such a difficult matter to outline methods of control to solve the situation in the timbered regions of this country. The difficulty is in having the railroads go after the problem aggressively enough to see that the methods are practically applied. Such methods of control can be classified under three general headings: (1) safeguarding of engines; (2) cleaning up the rights of way, (3) patrol of the rights of way.

Safeguarding Engines.

In order to keep up the necessary steam pressure for the operation of a locomotive, a forced draft is necessary. In the early type of engines, this forced draft was direct from the fire box through the stack of the engine. This caused not only a loss of fuel but the blowing out of large live cinders, which caused many fires. The modern engines have what is known as a return draft, which forces the cinders back into the fire pit before they are finally ejected from the smokestack. This mechanical arrangement has decidedly reduced the live sparks but it has by no means eliminated them. Many attempts have been made to devise an efficient spark arrester which will not interfere with the forced draft yet will act as an obstruction to such an extent that live cinders blown from the stack will be practically eliminated. Although the designs have been numerous and ingenious, an entirely satisfactory spark arrester has yet to be made. The prospects are that an ideal spark arrester will never be an accomplished fact. It would be possible to eliminate live cinders entirely from being ejected, provided it was not necessary at the same time to keep up a forced draft to maintain steam pressure. By the very nature of the thing a spark arrester must be an obstruction and unfortunately it appears that the more efficient the spark arrester the greater the obstruction. Anything that retards a full draft on an engine does not find favor with either the fireman or engineer. One cannot blame the fireman for knocking out the arrester when the engine is groaning under a long, hard haul and the steam pressure is running low because of a retarded draft. It is common knowledge that this has not infrequently been done. Spark arresters have been of two general designs, either some form of mesh wire in the stack or some form of rim-like obstruction along the interior walls of the smokestack. The principle of the plain wire mesh is simple. The idea was to provide a mesh which would catch the biggest sparks because of their inability to get through. It was thought that the small sparks blown through would die before reaching the ground. The theory of the second class of spark arresters is that under the forced draft the sparks are thrown around violently in the stack and that the centrifugal action holding the larger cinders against the interior walls of the stack, they were caught by placing an inverted cup-like obstruction on the interior walls without materially interfering with the draft. Interference with the "draft", however, has always been raised as an objection to both kinds. In my opinion, the spark arrester now in use should only be counted upon as a factor in minimizing but not eliminating the danger.

The opening of fire boxes and dumping live coals on the right of way is an act of negligence and is in-

excusable. There seems to be no valid reason why the ashes can not be shaken gradually from the fire box and the slag and other material which collects in the bottom of the fire box dumped in a place where there can be no fire danger or where the fire can be watched. The brands from the fire box are a real source of danger. In one specific case in Minnesota, a fire warden reported that he had frequently seen an engine of a fast shore line train trail fire like a comet yet not emit a spark from the stack. It seems that it ought to be possible to eliminate this particular source of danger from fire with ordinary care in the use of the present mechanical devices.

After all the whole problem is largely a matter of fuel. As long as locomotives continue to use coal, particularly on the heavy mountain grades, they are going to continue to set fires. This fact has been recognized by some of the railroads which have in consequence adopted oil as fuel in the forested mountain regions. In my opinion, it is only by the use of oil or electricity as a motive power that an engine can be considered safe. This seems to be the general opinion of those who have been in a position to study the question.

State Forester's Report for California, 1910.

"Prior to use of oil as locomotive fuel many fires were set along the steep grades in Caledon Pass and Canyon Canyon. Small fires are still started, but section men and rangers have prevented them assuming large proportions."

Page 70: "Since oil is used exclusively for fuel by the through lines traversing forest regions, the danger from sparks is minimized. On the heavy grades, however, the adjacent brush is occasionally ignited."

Report of New Hampshire Forestry Commission.

"Railroad locomotives set about 15 per cent of the fires reported, and it is probable that a large number of fires from this cause were not reported. The most satisfactory means of preventing these fires is by the use of oil burning engines. They are used in the Adirondacks and in parts of the West. In some states fire lines are cleared along the right of way. Spark arresters do not seem to have solved the problem."

State Control for Forest Fires.

Laws Controlling Railroads, page 4: "1. The use of coal or wood by railroads is a constant source of danger and is the cause of a large percentage of the forest fires throughout the United States."

Cleaning Rights of Way.

Without the adoption of electricity or oil as a motive power through the forested areas, the most effective substitute method of control known is a proper clearing up of the right of way of inflammable material. The character and width of clearing necessarily varies in different parts of the country, but this method of control has been universally recognized. One reason for the rare occurrence of fires in the European countries is the excellent manner in which the rights of way of the railroads have been cleaned up. In France trenches 20 to 50 metres, or 65-165 ft. wide, kept free from all grass and brush are made along railroad lines. In the Black Forest near the city of Freudenstadt, in the western part of Wurtemberg, Germany, the exterior boundary of the clearing on the railroad right of way was planted with maple and locust trees to guard against setting fire by sparks from locomotives. The clearing on right of way which is 75 to 200 feet

MR. SILCOX' ADDRESS.

wide, is cleared twice a year of combustible material, such as sticks, leaves, etc. This work is excellently done and as a result the rights of way are practically rendered safe. In this country similar efforts are being made.

Report of the State Board of Forestry, Maryland, 1909.

Page 7: "The most effective method of fire control, where the railroad traverses woodlands, is the construction of fire lines and employment of a fire patrol during very dry seasons. The experience in New Jersey where conditions are not unlike ours, shows that fire lines 8 to 10 feet wide on either side of the track, cleared of all inflammable material, and located parallel to the outside track and not less than 100 feet, nor more than 200 feet from it, will check nearly all railroad fires. By burning the strip between the fire line and the track once a year additional protection is secured. The railroads could well afford to do this, as it would reduce the amount of damage now paid on account of fires to a minimum, and the owners of woodlands adjoining the railroads would find it to their advantage to have these fire lines constructed on their lands for the security from fires that it would give them."

Massachusetts Forest Fires, 1904-1906.

Page 11: "The problem of preventing fires from sparks resolves itself, therefore, into careful inspection and prompt repairs of spark arresters and the removal of inflammable material for a distance of fifty feet from the center of the track."

Letter from Cox, Oct. 26, 1911.

"The State law here requires the railroad companies to dispose of combustible material on their rights of way, and this summer the companies, most of them, have started in to comply with the law quite literally. An enormous amount of work has been done, and some of the roads have put their rights of way in excellent condition. Others will need to be urged, even threatened."

Report of New Jersey Forest Park Commission, 1908.

Page 47: "Fire lines of adequate width along railroads are absolutely necessary in order to prevent this class of forest fires. It is not sufficient to clear the railroad right of way of inflammable material. The cleared zone is so narrow that live coals are easily carried beyond its limits. The fire line must be not less than 100, preferably 200, feet in width on each side of the track. Its outer edge must be margined by a strip of plowed ground 8 or 10 feet wide. The space between this clean strip and the track must be kept clear of brush, leaves, etc., but it is not necessary to cut down trees of good size. Such a fire line will afford almost absolute protection against railroad fires. Rarely will live coals be carried beyond the plowed strip. Small fires started within the fire line have nothing to feed upon and speedily burn out, or are extinguished at the plowed strip. (See Figs. 13, 14.) The efficiency of such a fire line has been repeatedly tested. The New Jersey Southern Railroad crosses the Lebanon Reserve for half a mile near Woodmansie, and a fire line of this character has been constructed there. During the past season five or six grass fires were started close to the track, but in every case burned themselves out on or before reaching the plowed strip."

Platform of the American Forestry Association, 1909.

Laws Controlling Railroads, page 4: "4. Railroads should be required to maintain effective fire lines along their right of way. They should be given power, under proper limitations, to enter upon private lands, in order to construct a fire break of effective width."

Methods of clearing the right of way in Montana and Idaho have varied from a strip 50 feet to 250 feet wide and from simply removing the heavy material in the form of punk logs, brush and rotten ties to the removal of all debris and the burning over of the strip at the beginning of the season. The right of way of the Chicago, Milwaukee & Puget Sound Railway, which was cleared under stipulations requiring this as a condition to secure their right of way through the National Forest, has cleared a strip of 100 feet wide on each side of the track with special extensions in many places of 200 feet on the uphill side. In one forest, during the best season, a fire guard at the outer edge of this strip was cleared to mineral soil for a width of approximately ten feet and the area between the rails and the guard burned over. The Northern Pacific and the Great Northern Railroads have in many cases cleared strips approximately 50 to 100 feet wide on each side of the track of all inflammable material by cutting, piling, and burning such material as occurred on the strip, which is immediately within the fire guard. Even the old stumps were grubbed out in doing this work. Although this work has not been completed in Northern Idaho and Montana, the results of the past year are mighty encouraging. Already it is shown conclusively that, in lieu of the use of oil or electricity that a properly cleared right of way is the most effective safeguard in the control of railroad fires. This was strikingly shown on the Minnesota National Forest last season where, out of 64 fires, 36 were started by the railroads, all of them on the Great Northern, which at the present time has no fire line through that forest. No fires occurred on the Soo line, although passing through practically the same kind of timber because it has a clean fire line of 50 feet on each side of track cleared of all inflammable debris and then plowed and burned over. This is one of the best specific examples showing just what can be expected with a proper cleaning up of the rights of way. Where the timber is so heavy, as for example on the coast and the cost of clearing up the right of way is almost prohibitive, there seems to be no alternative for the railroads but to use oil or electricity as a motive power.

Patrol of the Rights of Way.

Until we have reached the point where the railroads have either put their rights of way in first-class shape or have adopted the use of oil or electricity, constant patrol of their rights of way throughout the fire season is absolutely essential. This is best accomplished by special men on speeders assigned to this work and by holding each man employed in the railroad service responsible for reporting fires when discovered. This applies to not only the track gangs but to the regular employees on the freight and passenger trains. For a long

time it has been felt that the railroads should assume this responsibility. In some instances, this is recognized to the extent of requiring it by law. To make the patrol effective caches of tools are located along the right of way and maps furnished to each patrolman showing him the various telephone connections and telephone communications by means of which he can call for additional assistance. He should be authorized to call on any of the gangs of temporary laborers along railroads to fight fire when necessary, it being understood that payment for the use of this force will be made by the owner, provided the railroad is not responsible for the fire. The effectiveness of systematic patrol is recognized wherever the railroad hazard is present.

Report of Canadian Superintendent of Forestry, 1909.

Page 9: "A special patrol was maintained during last season along the line of the Grand Trunk Railway, and as a result no serious fire occurred. As provided for by the Forest Reserve Act one-half of the expenditure within five miles of the line of construction was assessed against the railway company and has been paid by it."

Letter from Cox, Oct. 26, 1911.

"Up here we have required the companies to put on patrolmen during the Summer at their own expense. These patrolmen are mounted on speeders and, during such periods as our rangers decide, patrol the tracks with fire fighting equipment, to catch the fires as soon as started by the trains. During damp or safe periods they are not required to patrol, however, but may devote their time to clearing the right of way. Many of them are equipped with scythes for this purpose, and accomplish a great deal during odd times."

Report of Minnesota Forestry Commissioner, 1908.

Page 35: "Some stringent new provisions have been enacted affecting railroad companies. In a dry season a railroad company must employ at least one patrolman for each mile of its road through lands liable to be overrun by fire; engineers, conductors or trainmen discovering fires adjacent to the track must report the same promptly at the first telegraph or telephone station reached. When the fire occurs near the line of its road the company must have it extinguished. 'Near the line of the road' is defined a distance within which a fire could usually be set by sparks from passing locomotives. Locomotive engineers and master mechanics are held responsible for the good condition of the spark arresters, but without relieving the company from its responsibility. The minimum penalty for violation of any of these provisions is \$50."

Page 40: "In dry seasons every such company shall employ at least one patrolman for each mile of its road through lands liable to be overrun by fire to discover and extinguish fires occurring near the line of the road, by which is meant a distance within which a fire could usually be set by sparks from a passing locomotive."

In the co-operative agreement with the Northern Pacific and Great Northern, the Forest Service has patrolled the road rights of way through the National forests. This has been found to be the most effective way of handling the matter. In two or three instances, however, the railroads have voluntarily maintained their own speeder patrolmen as an additional safeguard. In my opinion, the Forest Service should continue to patrol the rights of way until the pioneering work of getting the railroad rights of way through the National Forests cleared up has been accomplished, at which time the railroads should assume full responsibility for the patrol of their rights of way.

Co-Operative Agreements.

Owing to the seemingly flagrant disregard of the railroads to exercise even ordinary precautions for protecting forest lands along their rights of way from fire, the general tendency was to secure coercive legislation which would force them to take definite action. Legislation of this kind is necessary and it should be clear and specific with sufficient penalties attached to make it some incentive to the railroads to carry out the conditions imposed. It hardly seems reasonable, however, that the railroads should wait until it becomes necessary to take coercive action. The advisability from purely a business standpoint of adopting the most progressive measures of fire protection should at once appeal to the railroads themselves. Considering the costly damage suits against the railroads and the expensive litigation which they entail, it is a reflection, in my opinion, upon the business management of our railroads that they have not recognized, before the matter was forcibly thrust upon them by the various fire organizations throughout the country, their responsibility and taken action to secure better fire protection. The neglect along this line has been notorious. From indications, however, it seems that they are now ready to co-operate in a way which really means something. The co-operative agreements which the Forest Service has with the Great Northern and Northern Pacific Railroads embodies, I believe, the essentials of an effective and satisfactory working basis of co-operation:

1. The railroad agrees:
 1. To clean up its right of way, satisfactorily to a properly authorized forest officer.
 2. To use effective spark arresters.
 3. To furnish such employes as are available to fight fire.
 4. To permit use of speeders for patrol.
 5. To properly instruct their men to notify forest officers in case of fire.
 6. To permit riding on freight trains when necessity arises.
 7. To fight without cost any fires originating within 200 feet of their right of way.

The Forest Service agrees:

1. To maintain an efficient patrol along the right of way.
2. Construct telephone lines connecting forest officers' headquarters.
3. To supervise the clearing of the right of way.
4. To furnish its regular employes to fight fire and to pay for the extra assistance of fighting fire for fires originating outside the 200-foot strip unless it can be shown that the railroads are responsible for the fire.

Under this co-operative agreement very satisfactory results have been accomplished. No co-operative agreement unless followed up aggressively will

mean very much. It has been necessary to keep constantly before the attention of the railroad the terms of the agreement and the necessity for taking action. The local forest officers have through personal touch with the division superintendents been able to go over the rights of way in order to determine just what the railroad could do. This has been followed up by frequent conferences and correspondence, with the result that this year we have something real to show as the result of our co-operation in Northern Idaho and Western Montana. It is much more satisfactory to work the problem out on a co-operative rather than a coercive basis, and I feel that there is a distinct desire on the part of the railroads to take this point of view. Everything points to a more progressive attitude on the part of the railroads, and I believe that they are coming to see the value of proper protective measures not only from the standpoint of self-interest but from that of general public policy.

President Flewelling: The discussion will be opened by E. O. Hawksett, of the Pend d'Oreille Timber Protective Association.

E. O. HAWKSETT'S ADDRESS.

During my connection with the Pend d'Oreille Timber Protective Association, the records show that in the season of 1910 there was a total of 173 fires, 75 of which were caused directly through fires started by the railroads. In 1911, with a total of 146 fires, 57 are chargeable to the railroads.

Considerable work was done by our Association towards bringing the railroads to a realization of the importance of their taking steps to prevent the starting of fires; one of the most effective arguments was the pointing out to them that the destruction of our timber meant a heavy loss in tonnage. Continuous work and argument on our part has had its effect, and every line traversing our territory is doing more each year in the way of co-operation with us.

The Great Northern Railway Co. owns no timber lands in our district, but has donated to our Association for the seasons of 1908 to 1911 inclusive, \$6500.

The Northern Pacific Co., which owns considerable standing timber, has paid us on agreed assessments, as called for, over \$14,000.00 during the same period.

Railroads at Work.

The railroads are now doing more along the lines of fire protection than ever before. This season both the Northern Pacific and the Great Northern employed fire wardens to patrol their right of ways. Both had authority to call on section and extra crews for help to fight fires; they were required to report any carelessness on the part of engineers or firemen cleaning out fire boxes, etc., and to report the working of spark arresters. Tools were cached at different points along the lines for their use only. Both these men kept in close touch with our chief fire warden and arranged such co-operative work as was practicable.

The Spokane International kept a speeder patrol on its line during the dry season, probably being able to maintain it on account of not having as many trains over its line as the other roads referred to. Speeder patrol is considered the most efficient, and our chief warden received very prompt assistance from this patrolman in checking what promised to be a dangerous fire.

The records of our Association do not report a single fire caused by locomotive sparks or otherwise on the line of the Idaho & Washington Northern R. R., this condition being brought about by that road using only oil burning locomotives. This is interesting, and should appeal to those who have been using coal or wood on their logging roads. The cost of oil and coal operation is about the same.

We have found all railroads liberal in their donations and assessments, always willing to furnish passes for our chief warden and assistants, and fully alive to the advantages of co-operation.

President Flewelling: Gentlemen, we would like to hear from E. W. Osborne, of the Northern Pacific Railroad Co., St. Paul, Minn.

MR. OSBORNE'S ADDRESS.

I think the two papers that have just been read show that the railroad companies have been doing good work in protection against fires, and in giving assistance after fires occur. I presume that is entirely in line with the efforts that have been made by Mr. Allen in his work and by different fire associations. Mr. Allen has had some difficulty in convincing the railway companies that it will be a good idea to print notices in the folders. He has been persistent about it and has finally brought them around to his view of the matter. The railway officials have other things to think about, and possibly some of these things might be overlooked unless he keeps this work right up every year. They are willing now, but may forget it next year, so this matter should be kept before them.

Fuel Oil.

The question of fuel oil for locomotives has received a good deal of attention all over the country. I do not know just how much fuel oil is available in the United States, and I do not know just how many engines are operated in any one season through those sections that need protection from engine sparks, but from the best information I can get there is not anywhere near enough fuel oil available to provide for the needs of these engines. That is something it would be well to consider when discussing the exclusive use of oil as fuel.

Another thing to be thought of: There is, as you know, in the State of Washington and the State of Montana, a number of towns whose only industry is mining coal. Suppose that through the general use of fuel oil coal mining should stop, which it would have to do if coal is not used by the locomotives. The mines would not be able to sell their coal for any other purpose, and it would throw these towns out of existence, take their livelihood away from them.

Spark Arresters.

You cannot put on any locomotive a netting so fine that it will obstruct the draft. If you get it fine enough to stop the passage of all cinders that are large enough to set fire, the draft of the engine is obstructed. If anybody can show any railroad company an efficient and practical spark arrester I have no

MR. OSBORNE'S ADDRESS.

doubt they will be very glad to adopt it. Dozens of such devices have been tried, but I do not know of one that has been a success with all kinds of coal and not obstruct the draft. Different kinds of coal require different kinds of netting. Locomotives require netting as fine as six or seven mesh to the inch. You could burn some kinds of coal with that netting, and there are other kinds that would clog it. There is no one kind of netting that will do for every class of coal. The railway companies are willing to do anything to prevent fires or to stop them after started. They are just as much interested as the public in preventing fires. They want the timber to haul. They are going to be in the country a good many years and they want the timber protected—what is good for the country is good for the railroad. During the past four or five years most Representatives in the State Legislatures knew they need not expect any further political preferment unless they showed their constituents what they did to the railroads last session.

These papers have shown that the railroads intend to co-operate and are co-operating just as far as they can with the State Forestry Association and the Department of Agriculture.

W. C. Albee, the superintendent of Tacoma division, is here. He has had considerable experience in taking care of forest fires. He can go into detail about the work a great deal better than I can and can give you considerable more information in every respect. (Applause.)

President Flewelling: It has never been the disposition of this Association to ask for any drastic action against the railroads, or tell them what they must do and must not do in the way of using fuel. We have simply reasoned together. We feel that they know more about running a railroad than we do. We are getting very close to them; they respect us and we respect them. By working together, we will have no difficulty. We will be glad to hear from W. C. Albee, superintendent of the Northern Pacific Railroad Co., Tacoma, Wash.

MR. ALBEE'S ADDRESS.

As a transportation man I have been very much interested in the papers under discussion.

The period from 1880 to 1900 was a wasteful one. The railroad companies, in common with all participants, wasted largely. When we built roads through this Western country we were in a hurry to get somewhere; we did not value the timber; we did not have the money in the first place; everything was plentiful except money; so we mostly let the timber lay where it fell. You have been doing the same thing. When I came to Puget Sound twenty years ago all of the loggers had immense platforms, 15 or 20 feet high, upon which men stood to cut down the trees, and the snags which they left you have been burning ever since.

Regarding the policy of the railroads in co-operating with you in the matter of fire prevention, I think that has been admirably brought out in the papers today, and has been very much appreciated. The railroads want to co-operate with you in every way possible, and avoid any unnecessary fire risk.

Clearing Rights of Way.

It has been stated that our cost of clearing rights of way in this country was higher than in Europe, due to a great many causes. In the first place, in Europe no trouble is encountered getting people to clear the right of way for nothing. We are not so fortunately situated in this country. When we built a road from Hoquiam through to the Pacific Ocean the first thing we had to do was to clear a road through in order to get material and supplies with which to build that railroad. The clearing cost us \$1000 a mile. When you have to go through a jungle the matter of clearing a right of way is difficult.

During the past season the Northern Pacific Railway Co. spent \$4500 just for clearing obstacles from the right of way. On my own division, from Tacoma to the south and west to the Pacific Ocean, during the month of July the Northern Pacific spent for labor alone for fighting fire, which originated on or near the right of way, \$4,200; in the month of August, \$1500. We employed approximately 40 men during these two months. We do not think we are responsible for a great many of these fires that we spend money fighting. Unfortunately the people make a highway of our railroad; not only the Northern Pacific, but everywhere else. Walking up and down the right of way they do not think much of throwing matches down in dry places. The Fire Warden comes along and finds the fire on the right of way. Naturally he includes it in his report as a railroad fire. We cannot prove that it isn't, so we have to pay for fighting. We do not want to stand on technicalities in this matter. We realize that it is up to us to co-operate in every way possible. Our instructions to our employes are very rigid in that regard. Section foremen are instructed to keep in touch with the local fire wardens and co-operate with them in the matter of extinguishing fires, and not stand on technicalities, but go out and fight them anywhere.

Spark Arresters.

The big problem we have been trying to work out is to construct a spark arrester that is known as a three-mesh net, that is three openings to the inch. Any spark that goes through the stack has to go through that netting. As Mr. Osborne said, it does not always work with all kinds of coal. In the first place, you get a net small enough to stop the sparks and you will stop the draft. When the draft gets stopped up and the netting gummed up with soot and cinders, an explosion occurs, which blows pieces of inflammable material through the stack. That is a difficulty we have to avoid in making them too fine. We are experimenting with three or four different kinds of devices and netting, and we have found nothing yet that is absolutely satisfactory.

Mr. Osborne has said the problem of the use of oil is a very complicated one. We have built up towns and cities incident to the use of coal, and we feel we have to go slow in working out the problem of increasing the use of oil. The only thing we can do is to show good faith in trying to work these problems

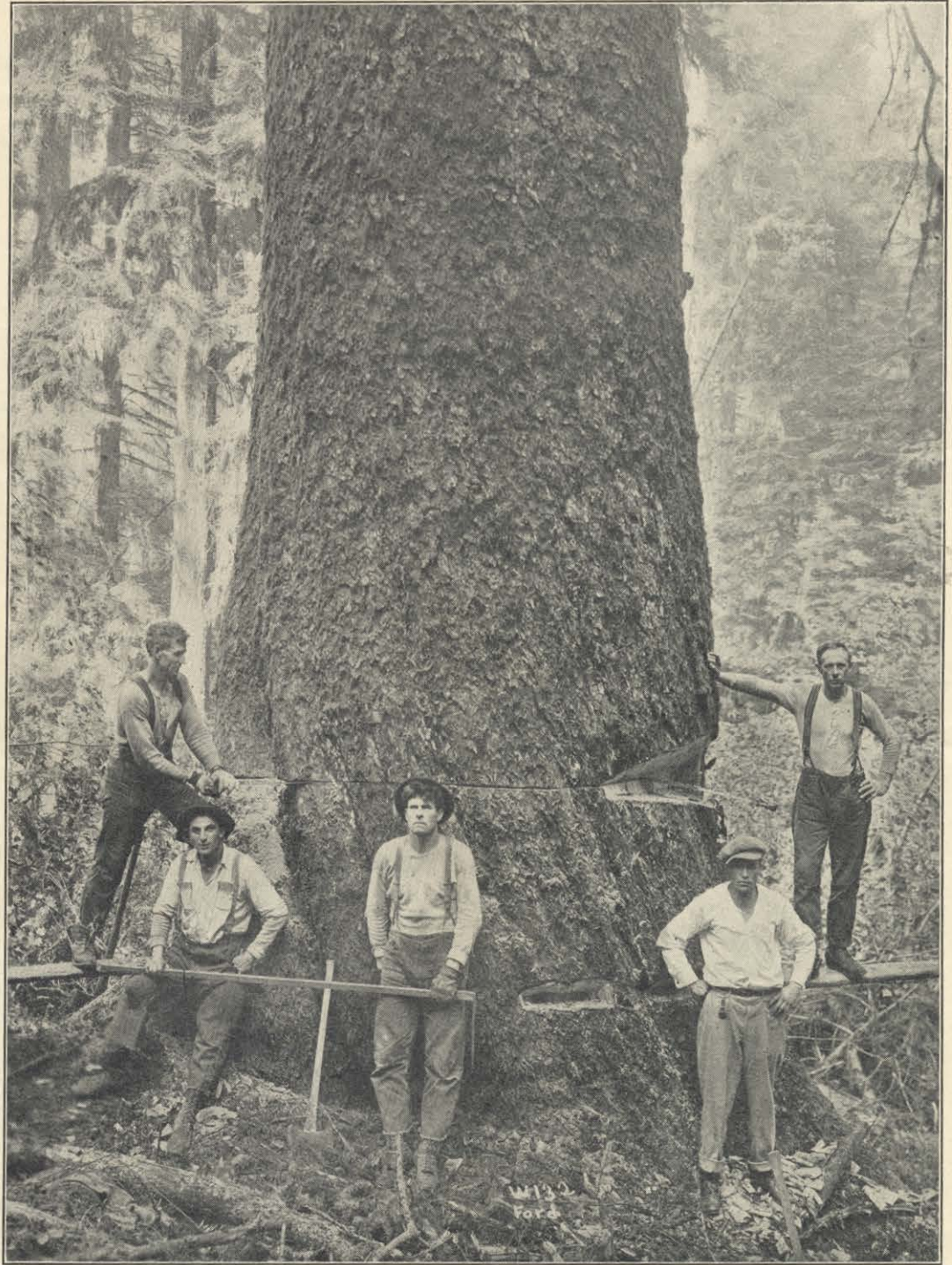
out to the very best possible advantage. Self-defense is the first law of nature, and we realize that if we burn up our resources we will kill our business. It is to our interest as well as yours to work out this problem of forest conservation, and we can assure you that is what we are trying to do and what we will do in the future.

Discussion.

J. P. McGoldrick: In the Puget Sound district railroads use oil burners voluntarily and give assistance of all kinds in putting out fires.

Forester Allen: We have brought out two things here today that are contradictory; one is the railroads have set a good many fires, and the other is they are doing their best to stop them, which shows that the railroads have facilities, or

partment has to make a record, the traffic department has a record to make, the legal department is interested in damage suits, and there are three or four departments that have an interest in this fire question, but widely different interests, so that it is very hard for us to get hold of the railroad to deal with them. In the Northern Pacific Mr. Cooper has taken an interest, and it has been comparatively easy—the other railroads have not. We do not know how to appeal to them; perhaps Mr. Osborne can help us with some suggestions as to some definite program. How shall we approach the railroads? Shall we go to the president of this department, or that department? How



SPRUCE.

we have facilities for getting the co-operation mentioned by Mr. Osborne and Mr. Albee. For the Northern Pacific I can say that when we attempted getting our material into the folders, a year ago last Spring, the Northern Pacific was the only road that paid any attention to us at all. We wrote to every transcontinental road, but none of them did anything except the Northern Pacific. This year we had it all to do over, and it took a good deal of time. One of the differences between the Northern Pacific and the other roads was that there happened to be one or two men we could get in touch with, and it pays. The Northern Pacific, for example, took the trouble to have Mr. Osborne and Mr. Albee come here to attend this meeting. I understand that no other railroad is represented here at all. The railroads are not interested enough to come and talk these things over with us. The railroads have so much system; the operating de-

can we interest the railroads when they refuse even to answer our letters?

M. J. Buckley, assistant general manager Oregon-Washington Railroad & Navigation Co.: I wish to say that I am here in the interests of the O-W. R. & N., and Mr. Graham, superintendent of motor power, is also here. We have been listening with a great deal of interest to what has been said, and as yet we have not found occasion to ask any questions. However, I want to assure the gentlemen that we are here and have taken enough interest to be here. So far as co-operation is concerned, the O-W. R. & N. Co., or the old original company, has taken very little interest because that line did not run through very much timber. We do not have any trouble along our line in finding people with whom to take up these matters; the wardens call upon us frequently without any hesitation whatever. We have had no fires of importance on our line in five years. We ex-

MR. ALBERS' ADDRESS.

ercise the usual precautions spoken of by Mr. Albee; I think Mr. Graham has possibly experimented along these lines. If anybody has a spark arrester or similar device I will be glad to have communications addressed to me, and I will see that they receive the necessary attention. (Applause.)

Mr. Allen: I want to apologize to the O.-W. R. & N. system and their representatives; of course, we know that the individuals we come in contact with are doing all they can. Mr. McMurray has been very kind in helping to get material into the folders, and Mr. O'Brien has been very courteous in sending material to the stations and putting up warnings; but the trouble has been, rather, lack of system, of getting together with the roads as a whole; we have never known with whom to deal; whether it was proper to approach the traffic department or headquarters. This was not necessarily criticism, but simply a request for information that will help us to reach more of them than we have been able to reach.

Mr. Albee: My experience has been that the fire warden can make it so hot for the Superintendent of the Division that there will be no trouble in getting in touch with the railroad company in case of a fire around their place.

Mr. Osborne: Mr. Allen mentions the difficulty of finding out the proper party to approach. I think he is on the right track and has done exactly the right thing, but it takes some little time to get a movement like this started.

Mr. Elliott: These talks seem to be bearing on transcontinental lines. My experience has shown this past Summer that less than five per cent of the fires reported to me have been started by the railroads on the right of way. The most trouble we have had has not been with the transcontinental lines, but the little logging railroads. (Applause.)

Mr. Shattuck: I am interested in learning what proportion of the logging railroads use oil as fuel.

President Flewelling: We have no tabulated information of that kind, and cannot tell how many miles of logging railroad there are nor what kind of fuel they burn.

Delegate: What is the cost of clearing the right of way on the Milwaukee through the National Forest, as compared with the ordinary right of way?

President Flewelling: I am not prepared to

answer that question; it would cost considerably more.

Delegate: They used all of the timber, didn't they? I think that is a demonstration of how a right of way can be cleared; I just wanted to get some idea.

President Flewelling: I am confident they did not get as much for the logs as it cost to cut them and get them out. I would like to hear from N. A. Grainger of the forest branch of the Land Department, Victoria, B. C.

N. A. Grainger: I do not know what I can say, except that we had no trouble until in 1910 when so many of the railways caused fires that application was made to the board that controls the county, to have the matter investigated. The application called for a patrol to be provided and maintained by the railroads at their expense. It has dragged along for two years, but we hope next season to see a patrol established. At present the Canadian Pacific has done a great deal of good along their line. We have no way to compel them; they do that at their own pleasure. The railway companies have so far been very good and have gone to considerable expense to clear up their line. Canadian railroads have spent thousands of dollars clearing the right of way on Vancouver Island. There is no antagonism between our railroad systems except in the matter of patrol system by law. (Applause.)

President Flewelling: We would like to hear from Geo. A. Day, of Idaho.

Geo. A. Day, Land Commissioner, Boise, Idaho: It is a pleasure and honor to be called upon to say a few words at this convention. I do not own a stick of timber on earth, except the poplars growing around my home in Southeastern Idaho, but I have been connected with the growth of Idaho for several years, and I have learned that we have a great industry in the Northern part of the State. I do not see, nor can I understand, how any good citizen can live in one of these states without being interested in the preservation of this industry. I never knew that Idaho had such large forests until three years ago, when I had the privilege of visiting them. It seems to me that one of the great questions of today is the preservation of the natural wealth of these States. I believe it is well to meet and discuss how each of the states is handling this question. The railroad companies will doubtless learn many things;

they will learn that they must do a little better, go a little further, in order to protect this industry. The companies will have to take a little more interest concerning the handling of waste, along with the logging process, the burning of slashings. I believe legislation along these lines will assist us. Idaho has over 400,000 acres of timber land; she is interested in what you are doing here. The state has been moving along very slowly; we asked for an appropriation from the last legislature and were allowed \$30,000 to assist in fighting fires in the State of Idaho, which it is hoped will be sufficient to patrol all of the timber. It will cost about 3 cents per acre this year. We think that is the minimum. The most part of this money has been spent in building telephone lines, houses in different sections and protection for those interested in fighting fires, and for other improvements. I wish you success. The Governor of the state is interested in your work. He wrote a personal letter to me to attend this meeting and glean from this association progressive ideas, that the State of Idaho may work in unison with you and assist you on every material question. I thank you. (Applause.)

Committees.

President Flewelling then appointed the following committees and ordered them to report at 2 o'clock the following day:

Resolution Committee.

A. P. Sprague (chairman), E. T. Allen, G. E. Ames, Coert DuBois, Geo. M. Cornwall.

State and Government Co-operation.

Geo. S. Long (chairman), C. S. Chapman, F. A. Elliott, E. H. Clapp, J. R. Welty.

Railroad Co-operation.

J. P. McGoldrick (chairman), E. W. Osborne, F. A. Silcox, E. O. Hawksett, F. J. Davies.

President Flewelling: There are a few words I want to say before we adjourn. I wish to thank you all for the attention you have shown and the interest which you have manifested in our proceedings today. I think this a wonderful meeting; contrasted with the conservation meeting held at Kansas City, there is everything to be said in favor of the interest which you have manifested at this meeting. At Kansas City the audience was constantly shifting; today I have noticed with a great deal of pleasure that those who looked at me this morning from these chairs are still looking at me tonight, and it augers well for the personal interest each of you have taken in this great movement.

METHODS OF REDUCING DANGER CAUSED BY HUNTERS, CAMPERS AND SETTLERS

TUESDAY MORNING SESSION.

President Flewelling: The first subject this morning is, "Fire Hazard: the camper, settler and hunter; methods of reducing danger; trail building vs. keeping country inaccessible; prosecution policies; changing hunting seasons." We will first listen to a paper on this subject by A. P. Sprague, president of the Oregon Forest Fire Association.

A. P. SPRAGUE'S ADDRESS.

The extent of the menace to which we are subjected by the camper, is a matter entitled to our serious consideration, for as long as we have forests that offer attractions to them, they will come. They are in a sense our guests; if they make mistakes, it is principally our fault for not having advised them on matters of mutual interest—as a rule they are agreeable and appreciative.

Assuming the term camper largely applies to a class of rest-hunting, pleasure-seeking town people who are intent on getting away from worry and trouble for a time, a forest fire presents a serious menace to their outing, with which they want nothing to interfere. They are rather awe-inspired amongst the great trees and partly timid in the midst of such a vast amount of inflammable matter; they have read exaggerated newspaper accounts of forest fires and certainly wish to avoid one, or anything that will disturb their recreation.

Enlist Services of Youth.

Amongst the younger set who annually respond to the call of the wild, we find more of a reckless tendency, an abandon of restraint as soon as they are past the last house, and a careless lack of consideration for the preservation of this woodland that attracts them, and for the perpetuation of its streams and game that they prize so highly. Generally this class consists of a party of boys—a bunch of school-boy chums who have talked of, planned and anticipated this trip for months, and of an age when their energy must find an outlet. They are more apt to use our fire notices for a target than to read or heed them. They like to feel that they are free from home or school domination, and it gives them great satisfaction to give free rein to that wild freedom which is born in all normal boys, and is doubtless a relic of aboriginal ancestry. But these boys, though mischievous, are not malicious and are susceptible to reason; a tactful fire warden can immediately enlist their energies to our cause, and once the problem of forest preservation is seriously presented to

them they become our enthusiastic co-workers, for they realize that the protection of forests means perpetuation of their Summer outings. The training of such an organization as the Boy Scouts should contain much of forestry, and while commendable efforts have been made to instill some rudiments of forestry into all our school children through distributing pamphlets by our associations and the medium of the State Forester's office, I feel that gratifying results would come from a more thorough and persistent campaign for instruction along lines of primary principles of forestry in our schools, especially in these timbered states, for with these who are the school children today, rests the fate of our forests.

Settler Important Factor.

The settler presents a very important factor in the problem of forest preservation; in our state where a large proportion of the cut-over timber land is capable of crop production, he is a big asset to the growth and progress of the state's wealth. Settlers are being attracted to the Northwest from all parts of the country; many of these (coming as they do from an untimbered country) need much instruction along lines of forest preservation, which to them means self preservation, lest in their ignorance they unmeaningly do much harm. I have found that this class is inclined to resent the restrictions placed on burning—it is natural that they see in the law no farther than that it hinders them from carrying out their land-clearing plans; but most of those I have come in contact with have failed to even read the Forest Fire Law, though copies of it were handed them. Others of them possibly cannot read; they are vitally interested in the matter, and it seems to me the best medium to bring about compliance with the law and co-operation with the settler class, is through the personal appeal and coaching of intelligent wardens, and right here I want to say that many of our wardens leave much to be desired as agents of preservation. Many of them are hired without possessing the essential qualities that make a warden indispensable, and I strongly advocate an examination by a competent board of all men applying for positions as wardens, as to their abilities along the most important requirements, such as tactfulness, executive ability, woodsmanship, familiarity with the Forest Fire Law, etc. These men are the guardians of our property and of the public welfare and should possess a high standard of intelligence, and command respect in their community. I fully realize that the perfect fire warden would have to possess all the qualities of an ambassador extraordinary and prime minister plenipotentiary in addition to his knowledge of woodcraft, to be able to successfully cope with all the conditions with

which he comes in contact with the backwoods settler. The best men we can get, will leave something to be desired, but consistent effort will steadily raise the standard.

The Hunting Problem.

Under the head of the hunter we have our most serious fire factor. The settler we know where to find; the camper does not usually penetrate the woods, but sticks to the streams or established camping grounds that are easily accessible, but the hunter goes far back in the hills, is not long at one place, making it impossible for our wardens to keep any track of, or place any responsibility on him; he is a despoiler to begin with, and has no regard for preservation or he wouldn't be a hunter. When all the large game has disappeared from our state, the hunter will also, and under present game laws that day is not remote, but I believe under proper laws, our game can be preserved and the hunter made less of a menace. It certainly seems most inconsistent in the face of the efforts for conservation, to permit hunters to go into the mountains in the middle of our dry season. The relative proportion of this hunter's interest in hunting compared to the great amount of property and life placed in jeopardy, is so ridiculous that it is marvelous. A change in the law regarding open season for deer in Western Oregon is absolutely necessary; the deer hunting season in Western Oregon should not open before October first and should not run more than fifteen days.

Discussion.

E. F. Cartier Van Dissel, Phoenix Lumber Co., Spokane, Wash.: I am not standing here as a soldier, as an officer, as a general or a secretary of war. I am a common plain lumberman, and I will tell you my views as I have stated them before. Ten years ago I was in Portland and I talked to a gathering of which Mr. Wilcox was the chairman. I pointed out the necessity of using the United States troops in case of fire. The United States troops ought to be, every year, detailed for two, three or four months to patrol the different timber sections in danger of fire. A little later Mr. Graves, successor to Mr. Pinchot, had a meeting and I brought up the same subject. Mr. Graves stated it could not be done, but finally, in 1910, the dangerous fire came; we went to the government and secured the soldiers, whom we ought to have had about

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two months previous. Could we have had the soldiers' help two months before the great fire started, there is no question but that there would have been a great saving of timber. They came too late. Anyway, now is the time to prepare our plans. The officials say the soldiers cannot do it. They would have no time to train. In European countries the soldiers are trained eight months and sent home, when they are again called for eight months the next year to take part in the general maneuvers. Here our soldiers are enlisted for three years. Why cannot we use them for three months every year for some actual service? They will learn much; they are always under control of an officer; let them go out and build fires of their own and find out how to fight them. This is good training for soldiers. We want them to patrol; we want them to protect the National timber. Why should they not protect it? I have no figures at my fingers' ends, but I can tell you this: the timber industry employs a great deal of labor in this country. I do not think there is an industry in the State of Washington that employs more labor than lumbering. No one gets any benefit from the timber consumed by fire. I would like to see some action taken, Mr. Chairman, and a committee appointed that will confer with the Secretary of War or the proper authorities, and work that out. I make a motion to that effect. (Applause and numerous seconds to the motion.)

President Flewelling: Gentlemen, it has been moved and seconded that the chair appoint a committee to take up the matter of the use of troops in the National Forests, with the Secretary of War. I am inclined to think that we must have legislation on this subject. The machinery of the Government as it is now planned, provides for no such expenditure, and the Government officers are great sticklers for the law, as they understand it. I think unless we have some positive statement in the law that makes it possible for the War Department to so act, we will always have difficulty in having it done. The committee which waits upon the Secretary of War and takes this matter up should also, I think, be empowered to put in the motion some sort of legislation which would accomplish the same thing.

H. D. Langille, Jas. D. Lacey Co., Portland: I have had a little experience with soldiers in patrol work. Whenever you use soldiers to look after timber you can make up your mind to do double your own patrol to look after the soldiers because the work will not be done. I don't believe, in the first place, the War Department would sanction the movement for reason that when you pay a man \$13 a month as a soldier you don't pay him to work. When special help is needed the Government will respond, the men will go out temporarily, work and do well, and do us all good. To detail these men year after year is impracticable and undesirable. When troops were in charge of the National Park in California, with all respect to the boys who wear the blue, they were failures. Trespassing in the park was forbidden by law and two troops of cavalry were there to enforce that law, but conditions reached a stage where it was necessary for me to send four rangers into the National Park to show the soldiers where the trespassing was going on. It is not practical and

I think you will make a mistake if you attempt to carry it out.

W. C. Calder, Wallowa Lumber Co., Baker, Ore.: Baker County and Union County brought in about 100 soldiers when we had no way of securing men. We plead for the soldiers to be sent in. Some of the things just spoken of were true. While they did not proceed just like a woods crew or like picked men, they did finally extinguish the fires. The soldiers stopped the cause of top fires and we did not have any more trouble before the rainy season came on. They were a great help. I talked with the men that were working. Some of them did not like the idea with the small pay they were getting and wondered if the lumbermen would pay them extra. We paid them a dollar a day. The majority of the men took an interest in the work. I think we can get the benefit of them after a certain length of time; anything new does not work satisfactorily. They have pack outfits and supplies, the main things in the case of fire in a large district. One of our fire wardens took charge of a fire in a remote district and equipment cost more than wages. It is an enormous expense to maintain camps and keep horses, and if we can secure the help of the Government, an enormous saving will be effected.

Mr. Langille: I am inclined to agree with Mr. Calder, provided certain changes can be brought about. He says that in time these men will become qualified and familiar with this work and know how to do it. The trouble is that the same troops are never put on duty two years in succession. They are transferred from time to time. I think I am safe in saying that the National Park has never been patrolled more than two seasons by any one company. The soldiers do not have a chance to get experience. A man here this year may be in the Philippines or Alaska next year. The officers do not have the knowledge; we presume they do not want it. If the time ever comes when we shall have a thorough system of training, effective patrol may be made possible. Our soldiers now can follow a trail, but get them off a blazed trail and we have to send woodsmen to bring them out.

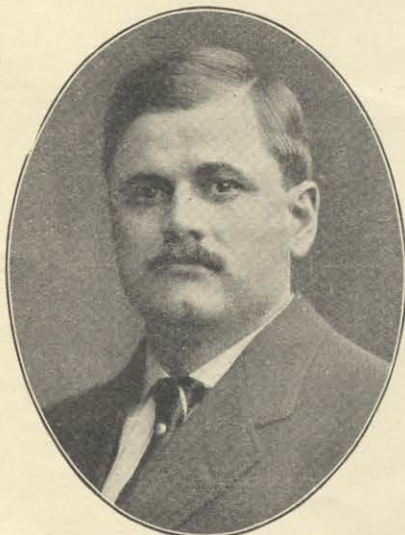
Mr. Cartier Van Dissel: Mr. Chairman, my idea was that the troops should be trained; that they should know how to take care of fires and how to patrol them; that should be one of the fundamental principles of army training.

E. E. Griggs, President National Lumber Manufacturers' Association, Tacoma, Wash.: I supported Mr. Van Dissel's motion. For some time I opposed this suggestion after Mr. Cornwall made it to me two years ago. I am very much in favor of it at this time. I believe protection is more desirable than to stop a fire after it gets started. Once the soldiers realize what their services mean in the National Park, they will find a hunter pretty quick should he start a fire. The forest rangers have adopted the same method. When I was hunting in Idaho two or three years ago they captured several hunters, brought them back many miles and made them put out their fire. Concerning the soldier that is working for \$13 a month: There is always an opportunity to rise from the ranks; a sergeant is well paid today. As Mr. Van Dissel has said, they ought to be educated; the officers ought to be better informed; if the soldiers or the cavalry men cannot find the way, it is time they were learning. If there was a patrol during the hot months to prevent fires which might occur from carelessness, we would soon educate these men

in the army; the soldiers and the officers would soon be able to prevent possible conflagration and in time of need the Government could be called upon to send the troops there. We want to prevent big conflagrations; we want the Government to look at it in that way, not that we want to relieve ourselves as timbermen of the possible expense of trying to protect the forests. It is a subject worthy of deepest consideration; it is good for the soldiers to spend three months in the timber, the best thing in the world for the National Government; a few weeks in the woods is ideal life for regular army men, and they should have some responsibility. There is a way to fix that responsibility so that Mr. Soldier will not forget it. We would soon have a police patrol which would appeal to the country. We should not shrink at shouldering expense. I believe we should prevent the conflagrations that may occur.

President Flewelling: While I do not think it was ever considered by Mr. Van Dissel or Mr. Cornwall, who are the fathers of the movement, that we should ask for troops anywhere except in the National Forests—we might later on have a police patrol outside the National Forests, but I am very much inclined to think that we will have to have some legislation on this subject, because the law is always stable and is always there, while the Secretaries of War come and go. We might get a Secretary of War or might have one now, who would be favorable to this propaganda, while next year, after the Presidential election, we might have another Secretary of War who would take another view. I am inclined to think the best way is to investigate and see if legislation of some sort cannot be taken up to cover this subject. Go at it in an easy way, try it a little and see how good it is or how bad it is. I have had men tell me that if we send soldiers into the woods we will have to send some one else to put out their fires. That is not a fair statement of the case. I have great respect for the soldier. He may, when he is around town, disgrace the uniform he wears by careless and heedless and not always law-abiding actions, but when on duty he is a substantial man. If he is not substantial, the officer makes him so. If it were known there was a soldier patrol, men would be more careful about leaving campfires.

C. S. Chapman, Oregon Forest Fire Association, Portland: My experience with troops in the National Forest was in 1910 in the forest service, with which I was connected. You all remember the season of 1910. Things got so bad in this particular section of the country that the troops were called upon and used in this district on the Crater National Forest, in the Wallowa National Forest, and in Washington. Their services were particularly valuable on the Crater National Forest, where they worked absolutely in harmony and in conjunction with the men in charge of the fire. It was eminently successful to use the troops in that particular case. This was due very largely to the attitude of the officers. When the troops went into Southern Oregon the officer in charge told all of his subordinates they were not fire fighters and knew nothing about fire fighting. He asked them to work under the direction of the forest. The result was that the men got in and did good work, assisting materially in suppressing the fires. Many of the fires were incendiary in origin. In some way or other it became rumored that any incendiaries caught by the troops would be immediately shot. The effect was



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Washington Forest Fire Association,
Seattle, Wash.



A. E. ADELSPERGER,
Coos County Fire Patrol Association,
Marshfield, Ore.



J. D. MEREEN,
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Marshfield, Ore.



E. O. HAWKSETT,
Pend d'Oreille Timber Protective
Assn., Spirit Lake, Idaho.

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rather good. People were more careful about setting fires after the troops arrived than previously. It was clearly demonstrated that the army is capable of doing good work in fire fighting. Some feel that the troops are more a menace in the forests than a benefit. My personal views in this matter are that the troops can be used to good advantage. Many of the men who make up the United States Army are country boys, boys that can go in and fight fire as well as any one that can be hired. (Applause.) The best results can be secured by using the troops as a reserve force. Have a camp of these troops at a certain place. In case of fire they can be called upon at any time to get in and fight it. It would be difficult except under certain conditions to use them as a patrol, because they are used to working in bodies and not individually. (Applause.)

Forester Allen: I have been unfortunate in this question by taking middle ground and not having the confidence of either side. I believe in troops as fire fighters, absolutely. They should be mobilized in forest regions. On the other hand, we cannot divide the responsibility in patrol work. If we want help we should be able to get them. The chief objects of patrol are prevention, get-

ting a better sentiment among loggers and campers. A patrolman's duties call for diplomacy, originality and delicacy. A soldier is not a man I would pick out for that particular duty. As a rule, a private soldier is not distinguished for originality, and those qualities we want in dealing with these people who are difficult to handle. I may be entirely wrong. The soldier may make an excellent patrol. An agreement should be reached with the Secretary of War to make the troops available and stationed in the Western regions. Trained, equipped and supplied, they should be made available for use in National Forests in any way that those who are in charge of the National Forests see fit to use them, but we should not go further.

President Flewelling: I would like to hear Mr. Cornwall on this subject.

Geo. M. Cornwall: The question of using the troops in the National Forests has been agitated up and down for the last two years. In July, 1910, while attending a meeting of the Western Pine Manufacturers' Association, which was being held in Spokane, the smoke on this particular day was rolling into the city. The Spokane Chronicle came out with a noon edition with flaring headlines, stating that fifteen or twenty of the Forest Service men had been caught like

rats in a trap—hemmed in by flames—and their lives snuffed out, while attempting to cope with a fearful forest fire.

The problem facing the Forest Service was to get men into the woods to help extinguish the flames. The blackboards of the employment bureaus proclaimed that forty cents per hour would be paid for fire fighters. It is needless to say that many of the men you often secure from employment offices are recruits from the saloon; men whose hearts are not in the work do not make very efficient fire fighters. I took the trouble to go over to Vancouver and ask the officers in charge about the type of men who were sent to the Crater National Forest where twenty-seven miles of fire line confronted the Forest Service, and scarcely a soul available to help prevent this terrible destruction of the Nation's timber. The majority of the soldiers on this particular occasion came from the mountains of Tennessee and North Carolina. They were American boys just like yours and mine and knew as much of the woods as the average man and much more than the bums who come from the saloons. I dare say it will not be disputed that the average soldier accustomed to discipline makes a more efficient fire fighter than the common man you pick up from an employment

agency who says he wants a job and prays God that he won't find it. The American soldier when you take him out on the fire line will generally do his part. He feels that he is an American citizen. He is wearing a uniform which designates him an American. The timber of this country is a National resource and the soldier should be willing to do his best to help preserve it. This is the sentiment we want to implant in the minds of these soldier boys. I cannot make myself realize that there should be any distinction between the man who wears the uniform and one who does not, when it comes to the question of serving the flag under which he enlists, irrespective of whether the duties be in the army or helping extinguish fires in times of great conflagrations. All we ask from the Secretary of War is to create a stated number of field posts with a given number of troops to be used as a third line of defense, as we may term it, and assist the Forest Service men when emergency arrives. The mobility of the army and the ease with which food supplies can be transported makes the army an ideal auxiliary force to the Forest Service.

In looking over the report of the Forester I find the statement is made that the percentage of incendiaries which were the direct cause of loss of timber in the National Forests in 1910 aggregated nearly six per cent. It is not very likely that many incendiary fires would occur if the army had been located in proximity to the National Forests. I do not think that Mr. Allen assumes for one minute that we should stand back and allow the Nation's timber to be burned up simply to maintain the esprit d' corps between the Forest Service and the army. The Forest Service has no warmer friend than myself, but we are not going to stand here and allow the Nation's timber to be destroyed if there be power within any branch of the government to co-operate and secure its preservation. The credit of saving the Nation's timber will redound equally to the Forest Service and the army. There is room and glory enough for both. (Applause.)

Coert DuBois: For the benefit of any committee that may be appointed to take this matter up further I might say something about the status of this subject. There was a memorial by the California legislature to Congress requesting that reserve troops be formed into fire-fighting organizations. This matter was referred to a committee of the War Department, which turned it down. A bill was introduced and was unfinished business at the end of last session and it is very probable that it will be again introduced in this present session of Congress. It strikes me that in order to get



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MR. SPRAGUE'S ADDRESS.

action it will be necessary to concentrate. The troops used in California during the season of 1910 were mighty well managed, because the officers worked in such close harmony and turned over affairs directly to the forest officials, who gave no orders to the men whatever. All orders were transmitted through the regular army officers.

Forester Allen: Gentlemen, as to the troops being used for fire fighting as an auxiliary force, I believe in it. My one objection has been to proposing that while responsible for results the Forest Service be forced to use the soldiers for patrol

or as individuals rather than companies. We can use them under their regular discipline and do the things they have done successfully; that I believe in thoroughly. I would like to move you that this committee which you are to appoint also be instructed to take the matter up with the legislative authorities, with the idea of getting action wherever it will do us the most good. I think the suggestion to take it up with the legislative body would be more effective than with the War Department.

President Flewelling: It has been moved and seconded that the power of the committee to be appointed be enlarged to apprehend and take this matter up with the legislative branch of the Gov-

ernment as well as the executive. I will appoint Mr. Van Dissel of Spokane, Mr. Cornwall of Portland, Colonel Griggs of Tacoma.

M. J. Kinney, Clatsop Mill Co., Astoria, Ore.: We have fire wardens and we have game wardens and we should teach the fire wardens the game laws and the game wardens the fire laws. These two people are in the field—we must not turn down the hunters as a nuisance; we must have playgrounds; the people of this country need playgrounds and it is a resource if we have interesting places, have amusements for the persons who come to this country and live in this country, it will add to the prosperity of this country. I think these two should go hand in hand. (Applause.)

SELECTION, DISTRIBUTION, SUPERVISION OF MEN IN PATROL AND FIRE-FIGHTING

President Flewelling: The next order of business is a discussion on organization: Selection, distribution and supervision of men, fixing authority and responsibility, report system; wages and equipment; co-operative vs. individual systems, etc. T. J. Humbird of the Pend d'Oreille Timber Protective Association, is not here and I will ask that his address be read by Secretary Cornwall.

MR. HUMBIIRD'S ADDRESS.

In order that we may realize the importance of the work to be undertaken, and the needs of organization, let us first consider the extent and value of the property that our organization is being built up to protect. Take the Pend d'Oreille Timber Protective Association; it includes within its limits 875,520 acres; 345,223 acres in Association, the balance Forest Reserve and owned outside Association. This includes patented and unpatented lands. The average assessed valuation of patented lands in Bonner County for 1911 is \$15.19. Taking this figure for a basis of value, on the acreage as above given, we arrive at a value for the area patrolled of \$13,299,148.80. The life of our business depends upon our protecting our raw material, so we have to consider not only the immense value of the property, but the very existence of our life's work. Our cost of patrolling the past year was \$10,200.21. Let us see what this figures out in the way of insurance. Using as a basis the figures arrived at above, we find the rate of insurance to be a percentage of .000767.

Now, having some idea of the importance of the organization, let us select for officers timber owners who can be made to appreciate the needs of the situation. As in most other co-operative organizations, the work generally falls on one man, he being Chairman of the Fire Committee. In the selection of a chief warden he has the benefit of the judgment of the other members of the committee, and on the selection of the right man for the position of Chief Warden very largely depends the success or failure of the work undertaken. After selecting the Chief Warden, next in importance comes the selection of his assistant. It is vitally necessary that the Chief Warden should have accurate and exact knowledge of the entire territory to be patrolled, in order that he may properly place his patrolmen. In the selection of patrolmen it is necessary to have active men who have a thorough knowledge of the woods. Usually these men can be recruited from woodsmen who have been employed in the camps in the neighborhood of the districts to be patrolled. The different timber companies, realizing the needs of having active, intelligent, watchful men, aid the Chief Warden in selecting such men from their crews. In this way, picked men are taken from the crews of the companies.

The past season the Pend d'Oreille Timber Protective Association employed 22 patrolmen for an average period of eight weeks. Had the season been a dry one, undoubtedly the patrolmen would have been doubled in number. The mistake of the past has been in trying to economize in this short period of eight weeks on the number of patrolmen, and the result has been that the added cost of employed fire fighters, because of the few patrolmen, has been many times what the wages of additional patrolmen would have been. One large fire, caused by reason of the patrolman's territory being so large that he cannot properly patrol it, will more than pay for doubling the number of patrolmen employed. In fixing responsibility, too much dependence must not be placed upon the local patrolman.

Locate Chief Warden Centrally.

In our own organization the past year we located our Chief Warden centrally, making his assistant cover the outlying patrol districts. In this way, in the event of a fire, the patrolman was able to get in touch with the Chief Warden because of his central

location, and in this way bring to his aid not only valuable counsel, but much needed assistance in the way of fire fighters. System is absolutely necessary in the carrying on of this work, and each year sees more system introduced into our organization. The loss of tools in the past has been large because of lack of proper system in handling them. Now, all tools are marked and boxed. Each patrolman has sent to him where he makes his headquarters covering the district he patrols, a box of these tools, and on the inside cover of this box we have a list of the tools, and we require that he give us a receipt for them. These boxes are locked. He has one key, and another key is left in the custody of the keeper of the house where he boards, or makes his headquarters. Thus, in the event of his being absent and there being need of using the tools, the keeper of the house has access to them. Presumably within a very short time the patrolman is on the scene and can see that tools are returned.

Fire Reports.

Blanks are provided and reports made of all fires, and their origin. This enable us to analyze the causes of fire and plan more intelligently to prevent them from year to year. The past season shows 120 fires put out within the limits of our territory patrolled. Causes as follows:

Sparks from locomotives and logging engines.....	46
Sparks from other fires.....	3
Unknown origin.....	24
Believed to be incendiary.....	6
Ranchers burning without permits.....	9
Smokers.....	7
Lightning.....	7
Spring burning.....	5
Mischievous boy.....	1
Campers and berry pickers.....	9
Men doing county road work.....	2
Careless workmen.....	1

The benefit of co-operative over individual effort in this work can hardly be over-estimated. This is the age of co-operation, and in no line or work that I know of can greater benefit be derived from systematic co-operative effort. There yet remains a great deal to do along these lines, but what has already been done has demonstrated the value of the work beyond question, not only to the individual, but to the State and Nation as well, and I feel that as the value of the work becomes more fully realized, it will have more consideration given to it, and the results obtained will be that much more satisfactory.

Much benefit is to be gained from an inter-change of ideas covering this work, and the Western Forestry and Conservation Association is in a position to make known to the public at large the importance of this work and to impress upon all timbered areas of the country the needs of organizing against the one great enemy of the timbered States, that is—The Forest Fire. In closing, I want to express my appreciation of the good work being done by Mr. E. T. Allen in giving aid in all possible ways to our own, as well as other, associations.

President Flewelling: We will listen to Mr. D. P. Simons, of the Washington Forest Fire Association, on "Patrol Organization."

MR. SIMONS' ADDRESS.

It seems to me this subject, like the other two sub-topics placed under "Patrol and Fire Fighting" in the program, should be handled with a double purpose: (a) to prove the advantages of co-operative work, and (b) to contribute useful suggestions to co-operative systems already organized. To some extent, organization is a matter of local conditions, for some regions need more men than others and their duties vary with the degree of accessibility and fire-producing activity. But there are many principles of method, supervision and responsibility which association work has established. It would be interesting to

hear what you consider the ideal, and what experience led to these conclusions.

Borrowing Company Employees.

The Idaho idea of borrowing company employees for wardens is better than the general plan elsewhere of picking up so many unknown men who may be poor for a season without its being discovered. There is also much controversy as to whether a resident of the locality is more or less useful because of his local affiliations. Should men be chosen chiefly for fire fighting ability, or for their ability to prevent fires by tactful persuasive talks? The grading of authority in handling fires, issuing burning permits, etc., from local warden up through the district warden to the association headquarters is an interesting practical question. Inspection to watch each man's methods has been worked out at length by the Washington Association.

All these things, as well as more detailed points, like systematizing reports, communication between the men in the field, covering particular danger points, etc., furnish opportunity to show how co-operative work aids their solution.

There is no question but that we are agreed on one point and that is the prevention rather than the fighting of fires.

Securing Force of Men Difficult.

No one not engaged in this work can realize how hard it is to put into the field a large force of men for a few months.—the Forest Fire Association covers the entire Western part of Washington, the ownership there are pretty well mixed up, and it seems feasible to patrol it under one head. The organization consists of a Chief Fire Warden, inspectors and rangers. The Chief Fire Warden has charge of the entire work and the inspectors under him have charge of the rangers in the field. In farming communities, ranch communities, where there is no longer any operation going on, it seemed advisable to put men in who were familiar with the local conditions, farmers and ranchers. Very few of the men employed in the Washington Forest Fire Association are experienced woodsmen. The inspectors are for the most part, but the rangers are picked out around the country, some of them being changed from one locality to another; sometimes you find a man in the district, a representative man able to handle the situation, but very often a man that is in the community is tied up and it is a hard problem for him to administer that work properly. They have a system of daily reports which come in about once a week. I have not been in touch with the work this last season and I am at a disadvantage. I expected Mr. Bridge to be here to help out on this.

Convictions Hard to Secure.

In the season of 1909 and 1910 we had a great deal of trouble in getting convictions when we arrested people under the fire laws but we got hold of a former deputy sheriff who had had some experience in gathering evidence. When we came to the prosecuting attorney and put a case up to him for handling he was a little dubious about taking it if he was not sure of winning his case. This man we picked up will go into the district where we are planning an arrest, or have made an arrest and will gather up evidence and present it to the prosecuting attorney. In every case where we secured a conviction it was after this man had worked up the evidence. That, I think, is a point that might be taken up by every Association, since it has worked out well with us. (Applause.)

Discussion.

F. J. Davies: Without cooperation we cannot accomplish very much; with it we do fairly well. Co-operation is the one way to prevent fires and incidentally, after they are started, it is the one way to fight them.

COMMUNICATION BY SIGNALS AND TELEPHONES—TRANSPORTATION PROBLEMS

President Flewelling: Mr. E. N. Brown, of the Clearwater Fire Protective Association, has an important paper. We will give him a little extra time and listen to him on the subject of "Communication and Transportation."

MR. BROWN'S ADDRESS.

The Clearwater Fire Protective Association was organized in 1905 with the State of Idaho, Clearwater Timber Co., and North Fork Lumber Co. as charter members. Prior to the year 1905 there were very few people holding and controlling timber on the North Fork of the Clearwater River with the exception of those above mentioned.

The Clearwater Timber Co. first became interested in timber lands on the North Fork in 1900. They

realized the necessity of protecting this timber from fire during the summer season. My father was then their agent and had had about seven years' previous experience in the state in the timber business, and I have often heard him say that if an organized force had been within the forests of the Clearwater and in the north end of the State of Idaho for the past 25 years, there would have been left standing the greatest contiguous body of white pine in the United States.

Up to the year 1905 we had experienced but little damage from fire, although fires had been burning to the east and north of us continuously. This thing no one paid particular attention to as the land was not owned by any one and was not considered of especial value.

In the year 1900 there was what promised to be a very serious fire in 41-1 east, about four miles north-

east from the town of Collins. A number of settlers in the vicinity were at once notified and organized as best they could to fight it. The state was also notified, but it seems that at that time the State Land Board was permitted to hire only a limited number of men, under the statutes. It therefore fell upon the settlers almost entirely to fight the fire, and at that time we discovered that unless we had an organized force to protect the timber during the summer season, we were likely to lose our homes as well as our timber, the timber being the chief value. I think the state realized that it would be necessary to co-operate and organize to protect the forests from fire.

First Organization Successful.

Though our first organization in 1905 proved very successful, since that time we have taken in all other persons owning and controlling timber on the North

MR. BROWN'S ADDRESS.

Fork of the Clearwater, and in no instance have we been unsuccessful in securing assistance from any person who had more than 160 acres, aside from settlers who own timber and stone entrymen who have left the country. Had it not been for our organization in 1910, I do not believe there would be a living white pine tree on the North Fork of the Clearwater River today, where we estimate there is now standing ten billion feet that is in a flourishing condition and owes its life to the combined efforts of the Fire Protective Associations.

In the summer season we give nearly all of our attention to this matter of fire protection. We keep accounts and records showing the number of men and horses required to protect a certain number of acres, and the cost of supplies, transportation, and so forth. Profiting by our previous experience we find that each year we are becoming more efficient in the ways and means of protection and in lessening the cost.

The government, within the boundaries of our district, is making wonderful strides towards the protection of timber from fire. In 1905 the government had a method of fire protection which consisted of two men riding over a million acres of land, armed with a fishing pole, a gun and a small axe, either together or separately, each having, usually, a saddle horse and pack animal. If they saw a fire the only thing they could possibly do would be to report it to the different associations or to their office. This condition has rapidly improved and now, for the protection of 500,000 acres, they have nearly as many men as our association protecting the same number of acres. We have been co-operating with the government for the past two years and find their men very efficient, accommodating and ready to give every assistance they can at any and all times, and we have tried to make ourselves agreeable to them.

Expense of Transportation.

Communication and transportation facilities is the subject I have been asked to write about. The expense of transportation is one of the heaviest we have to contend with, and we have given the subject particular attention. We haul our supplies in wagons from the town of Orofino to our headquarters, a distance of 38 miles, by road, and up a mountain that will average a 20 per cent grade for the first five miles, and so on through the woods and over the draws and creeks such as are generally found in the Clearwater country. From headquarters we pack our supplies in different directions, on horses, as far as 30 miles. In view of the cost of this transportation, which amounts to about 3 cents per pound to the farthest limits of our district, we find that it does not pay to buy a poor quality of goods. We figure that if there is any extravagance in purchasing good goods it is more than made up in the cost of transportation and the result of the man's day's work. In the case of canned goods, of which we use a considerable amount, we find that it does not pay to transport water over this distance.

For the work of protecting 500,000 acres of timber we keep at all times from 25 to 35 pack and saddle animals—mostly pack animals, for the more trails and telephone lines we build the fewer saddle horses used.

At first we tried selling our pack animals in the fall, but find that it is more convenient and less expensive to keep them through the winter. Animals of this kind are advancing in price each year. Then, too, an animal taken from the open country into the forests is practically of no value the first year as a pack animal. He may be used to some advantage as a saddle horse. The second year he has become acclimated and used to the trails and also capable of foraging and taking care of himself under any and all conditions. It is not unusual to pack half a dozen animals into the depths of the forest where there are no trails and nothing to eat except brush, and keep them there for two or three days or possibly longer. If they are not accustomed to this and have to be tied or hobbled it means their ruin.

For the past four years our horses have been turned out on the hillsides from October to May, practically taking care of themselves. In case of deep snow or in cold weather they are to be fed hay, but are not sheltered at any time. We pay two dollars per month per head for this pasturage and I do not believe we have lost an animal from starvation. Some die from old age or injuries received during the summer's work and some slide from the steep hills during a slight snow storm. In the spring of the year they get the benefit of the early bunch grass, which is very nourishing and seems to bring them out in fine shape,

and by the time we want to use them in the woods they are fat. At first, when we tried to feed them hay and straw during the winter, our horses were very poor in the spring and a good many died.

Superiority of Mule as Pack Animal.

In connection with transportation I have heard a good many arguments in favor of the cayuse as a pack animal, but personally I am frank to state that I am in favor of the mule, and I think I can prove my point, as I have had experience with both. Incidentally I will mention a few points in favor of the mule:

First—He lives longer.

Second—He requires less food.

Third—He is not so susceptible to flies.

Fourth—A mule will seldom eat a poisonous weed, while a cayuse will.

Fifth—His back is naturally constructed for a pack saddle or the bearing of a burden, and if well equipped with saddle and blankets, he will seldom have a sore back.

Sixth—He can carry nearly twice as much as a cayuse of equal weight.

Seventh—He is more careful with his burden, seldom tears his pack, is usually more docile and is altogether tougher than the cayuse.

We have proved to our own satisfaction that, outside of the cayuse, there is no other horse adapted to this mountainous work.

The expense and loss of time in gathering them up in the spring and returning them in the fall is one objection to hiring pack animals. I know of no one man from whom we could hire 35 head, and in hiring a number from one person he may insist on sending his own man with them who will be overzealous as to their treatment. Otherwise your own man may favor the horses you own and give the hired horses the worst of it. We have some animals which the association has owned since it began work and they are still in good condition and look as though they would be good for five years more. From our experience I judge that the life of a cayuse in this business, if well treated, should be at least ten years, and a mule fifteen. We have lost five horses in the five years, two being killed by falling trees, one burned and two killed by being carelessly tied by the neck.

Improvement of Roads and Trails.

The transportation of supplies for the year 1911 cost our association \$1807.85. Considering the fact that our transportation is all done by wagon and pack animals, we have given a good deal of attention to the improvement of roads and trails. In the spring of the year, with a crew of ten or fifteen men, we put in at least fifteen days on our roads, improving and straightening them, building bridges and fixing up grades, and we have just begun to reap the benefit of the widening of our trails and getting them laid out in the proper locations. We are now prepared to reach any part of our district with pack animals within at least one mile, whereas a few years ago our men often had to pack supplies on their backs for from four to nine miles. After careful examination of the country by our warden, these trails have been extended and widened each year, most of the work being done during the early spring and summer months. It is necessary to keep a considerable number of men at different lookouts during the dry season. We find that during electric storms fires grow to a considerable size before men can reach them, for the reason that so many fires are started by one storm—often 25 or 30 in the course of a few hours. The time that elapses after the storm until you see the smoke depends almost entirely on the amount of rain that has fallen and how much wind accompanied it. It is not unusual to discover a fire five or six days after a storm and find that it has been caused by lightning. Where the storm is accompanied by a heavy rain the fire may smolder for several days before the sun sufficiently dries the damp ground and rotten wood to permit a good lively burn.

The number of men that we keep in reserve at the different lookouts is governed entirely by the season. During the year 1910 we tried to get every man we could at the most dangerous points, whether there was any fire or not, and were at all times short of men, especially after the latter part of July.

We have one general lookout from which a fire may be seen in the Coeur d'Alene and Potlatch districts as well as anywhere in our own district, and this lookout is located in about the heaviest timber of the district and on one of the highest mountains in the country known as Bertha hill. At this lookout

we keep the largest number of patrolmen and the progress of any fire in view can be watched from this point. We have a map showing our different lookouts and the number of men at each, reference to which will guide the chief patrolman at this general lookout in sending as many men as he thinks will be required to immediately control any particular fire. When a fire is discovered the men at every lookout within view are to be ready to offer assistance, one man being left at all times on patrol duty, if possible. We have seventeen regular lookouts or stations in the district and employ, during the dry season, an average 45 men. We think this number can be reduced from year to year as telephone and trail facilities are increased. The district comprises about half a million acres.

We have no regular system of signals from one lookout to another, except a general understanding as to what is to be done in cases of emergency, and for the past three years we have had no conflicts whatever. It must be understood that no active lumbering operations are going on in our district and we do not have old slashings to contend with as in the other associations.

No Fixed System of Controlling Fires.

I do not believe there is any fixed system of controlling fires. In some instances they can be stopped by making a wide detour, if you have a sufficient number of men, and cleaning the ground from four to eight feet in width, making a trench from one to three inches deep, according to the condition of soil, then at night, or when the wind is down, start back firing from this line. Usually, if there is any wind, it is in the wrong direction. We have been the most successful with our big fires by abandoning them altogether and fighting them from the nearest old burning or creek by back firing. During our heaviest winds in the month of August, 1910, we fought our heaviest fires and did our back firing at night, when there was less wind and less danger of the back fire becoming uncontrollable. I think this is a matter that should be left to the warden, unless a fire reaches such size (as they did in 1910) that the warden has lost all hope of being able to control it, when it is time for the fire committee or board of directors of the association to determine what, if anything, can be done.

About the best thing we have ever discovered to control a very bad fire that has spread to enormous size and been driven by heavy winds, is about 24 hours of rain.

The number of men stationed at the different lookouts of course depends on the size of the territory they have to patrol, and as I have above stated, we figure on keeping at least one man at a lookout all the time. The balance of the men are not patrolling trails back and forth, or following up and down ridges looking for fire, but they are cutting trail, or opening up and widening trails, or improving them in some way.

Equipment of Lookout Stations.

At each lookout we have a cabin large enough to accommodate our men and supplies. Tents are expensive, lasting only a year or two usually. They are torn by passing limbs when packed, or damaged by fires built too close, and when brought in at the end of the season are often rolled up damp and in the spring are practically worthless. Aside from being shelters for the men, our lookout cabins serve as supply depots where we aim to keep thirty days' supplies on hand for the men stationed there.

We have had a telephone system only one year and do not feel qualified to comment extensively upon it, although so far we have found it of great assistance and a saving of men and horse flesh. We are now connected from our main lookout on Bertha hill with our headquarters, Pierce City, Orofino, and so on out to the outside world, so that in case of emergency we can rush men to any fire within the greater part of our district within 24 hours, whereas it was formerly necessary to send a man on horseback to Pierce or Orofino, and with the slow train service we considered ourselves fortunate in getting a crew of men from Moscow or Lewiston or elsewhere to the scene of the fire within 48 hours after the call for assistance.

We now have 27 miles of our own line and are interested in 45 miles more running through our district. We expect to add 30 miles to our general system this coming year. We have no portable telephones. We use No. 9 wire and hang the line through spools so that there is plenty of slack, and get it as close to the ground as possible so that falling trees will not destroy it nor break the spools.



E. L. NORRIS,
Governor of Montana,
Helena, Mont.



H. W. JOHNSON,
Governor of California,
Sacramento, Cal.



M. E. HAY,
Governor of Washington,
Olympia, Wash.



J. H. HAWLEY,
Governor of Idaho,
Boise, Idaho.

MR. BROWN'S ADDRESS.

We left our lines up this fall removing the boxes only to headquarters. (Applause.)

President Flewelling: We will now hear from Coert Du Bois, District Forester, California.

MR. DU BOIS' ADDRESS.

A good many minds have been figuring on the fire protection question for some years past. Most of us, I believe, have secretly hoped that this would some day result in one big discovery that would revolutionize fire fighting methods and do away with the necessity of getting in and digging with a shovel.

This may come. Some form of portable apparatus may be developed which will make fire fighting child's play. But until it does, our work is clearly cut out to perfect the equipment we know now to be effective, and to keep plugging away with the protective means we have.

Communication is, of course, a primary requisite of any systematic protection scheme. Of what use would 50 lookouts or patrolmen be in a district if there is no way in which fires they discover can be reported? The lookouts would be worse than useless and each patrolman would be simply one fighter at any fire that he might come upon. In California we are getting further and further away from the idea that an independent moving patrol can be depended upon to discover fires and, taught by experience, are depending more and more upon the lookout.

The ideal protection organization for a given unit of administration (say a ranger district) consists in a properly spaced series of lookouts whose radii of efficiency overlap slightly; a number of patrol divisions small enough for one man to cover easily with the patrolman stationed at the center of accessibility in each; and an officer in charge of the district stationed at a point easy of access to each division. But before this skeleton can be vitalized into an effective fire fighting machine it is necessary to tie all parts of it together with an adequate communication system.

Two Distinct Parts to Protection.

There are two distinct parts to the protection game; discovery and report of fires and mobilizing fighters on the line.

A fire will never report itself. Some one must see it and report its location to the man whose responsibility it is to see that it is put out. So far we have developed only three means of discovering fires—the permanent lookout—the patrolman and the volunteer reporter.

The lookout, we have found, must be at his station all the time, day and night. The patrolman becomes a fire discoverer only when his prearranged route takes him onto commanding points at certain times during the day. Volunteer fire discoverers may be settlers, miners, stage drivers or railroad employees. They often render most valuable service, but of course cannot be tied in to the organization to quite the same extent as the regular paid force.

After every possible precaution has been taken to provide that any fire that may start will be immediately discovered, the next step is to provide the means whereby each discoverer can report each fire to the right man. Opinions differ as to whom this man should be, some holding that the nearest patrolman should be notified and some the district ranger.

I am strongly of the opinion that the whole communication system of a district should center at a single point—the district ranger's station—and that each patrolman can more easily arrange to keep in communication with one man—the district ranger—than with several men—the lookouts.

Assuming, then, the discoverers are to report fires to the district ranger, what means are necessary? First, an adequate main line telephone system of standard construction, properly located throughout the district. In California we have about decided that standard construction means No. 9 line wire, split tree insulators and careful workmanship under the most expert supervision we can get. Second, the best instruments available for the purposes they are to serve.

The purposes are three—two of which require features not called for in ordinary telephone instruments. The ordinary 'phone may be used in the district ranger's headquarters and in the homes of volunteer fire reporters, but the lookout stationed on a high mountain peak and the traveling patrolman need specialized types.

Development of New Telephones.

By securing expert advice, the Forest Service has developed two new telephone instruments that meet these requirements. The lookout 'phone must be absolutely weather proof or else it must be disconnected and packed down into the lower country and stored each winter. This, we found, is dangerous on account of the uncertainty of getting it installed early enough the next Spring. The weather-proof 'phone developed is an adaption of a mine 'phone, with a strong iron case and all of the delicate parts that might be affected by moisture imbedded in a composition of beeswax and paraffine. While somewhat more costly than the ordinary 'phone, it saves the annual expense of transportation both ways to and from a storage point.

The heliograph has been tried as a means of reporting from lookout points, but has proved unsatisfactory, for several reasons. In the first place, it really needs two men to operate it properly, one to keep it in adjustment and to send, and one to receive. Men are too scarce and too valuable to station two at one point. Again, it requires familiarity with the Morse Code which, in the average patrolman, is hard to find. Then too, it is liable to be put out of commission entirely if the country fills up with smoke. But notwithstanding all these objections, I am not yet convinced that the heliograph cannot be used to advantage on some back country lookouts where telephone communication is out of the question for some time to come.

The problem of keeping the patrol in communication is an extremely difficult one. If the patrolman stays within hearing of a 'phone bell in a permanent camp, his value as a secondary lookout is lost. If, on the other hand, the primary lookout reports a fire on his division when he is out of communication, his value as a fire fighter is lost at the critical period of the fire—the first half hour. To meet this the Service has devised a portable telephone which, unlike other so-called portables, can really be carried. The trouble with all other portables on the market is that they

are too heavy to carry on patrol and are not equipped with generators strong enough to ring up the ordinary 'phone over any distance. The specifications given the expert who devised the present Service portable, and who worked out his tests under actual field conditions, were that it must not weigh over ten pounds and must ring through thirty miles and six instruments of the average Forest Service telephone line. The conditions were successfully met, the result being a small compact, leather-cased instrument weighing 10 pounds, equipped with batteries and generator of equal strength with the standard stationary 'phone, a one-piece aluminum receiver and transmitter and a specially designed grounding pin modeled after the English army bayonet. The line connection is made by throwing one end of an insulated lamp cord over the line wire and pulling on it till a metal hinge comes in contact with and grips the wire.

Reporting From Secondary Lookouts.

By running the main line over any commanding points on the patrol routes, the patrolman equipped with one of these new portables can report in anything he sees from these secondary lookouts and—most important of all—he can, by reporting at fixed intervals of time while on his route, keep in systematic touch with the responsible head of the protection organization of the district.

The only other way in which the district head could keep informed of just where each member of his protective force is all of the time, is to establish reporting stations (locked 'phone boxes) at intervals along the patrol routes. The portable system is cheaper and surer.

I have already touched on the need of all fire reports coming in to one man. This is still clearer when one stops to consider that the man who gets a report of a fire must be the man best fitted to see that a properly equipped crew of men are forwarded to the scene of that fire in the shortest possible time.

Take, for example, the ordinary ranger district on a National Forest where the protection system is developed up to the average. Lookout "A" reports a fire to the district ranger, stating that the smoke bears North 54 degrees West from his lookout station. The ranger calls up Lookout "B" who gets a cross shot on the smoke and reports it as bearing North 15 degrees East from his station. By referring to a map on which radiating degree lines in two colors are drawn in from these two lookout points, he gets the accurate location of the fire. He knows Patrolman "C" is due to call him up by portable in 20 minutes, and also that the nearest available help is much closer to him than to Patrolman "C." He calls up Mill No. 1 and asks the Superintendent to send out a logging engine with twenty men and tools to Section 18 where there is a fire. He calls up The Store and asks the proprietor to forward U. S. Supply List No. 3 (a standing order of grub for 10 men for three days) by team to a certain point on the wagon road where the logging road crosses it and hold them there till the supplies are transferred to the train. When Patrolman "C" calls up he is told he has a fire in Section 18, that the X. Y. Z. Company is sending up twenty men with three days' grub whom he is to meet at a certain point and take to the fire. Till they arrive he can locate a camp, size up the fire and plan his attack.

Advance Knowledge Necessary.

All this is simply to illustrate the need of knowing in advance just what is going to be done to get men, tools and grub to a fire and just who is going to do it. Once a fire starts, there is no time to cast about for means of moving men and supplies. The man in charge must know at the beginning of the season just what means of transportation he can lay his hands on for a fire in any given locality.

He has got to put in the Winter studying the location and availability of every sort of contrivance that can move men, tools and supplies in the area for which he is responsible—be it railroads, trolley lines, motor trucks, autos, wagons, teams, saddle horses or pack outfits. Simply to know they are there is not enough, he must know under just what terms and circumstances he can secure their use for fire fighting work and come to a clear understanding with the owners that under these terms he can get them. Where failure to agree on terms leaves a weak spot in his system he must find a way to strengthen up that spot.

It is at last becoming generally recognized among our men that the ranger who comes through the fire season with the cleanest record for his district is the man who fights fire with his head by out-guessing it, rather than the man who fights it with a shovel and his back. The old time ranger who, on getting word of a fire from a messenger on a steaming horse, seizes his shovel and ax and starts alone through the woods on a gallop, is being supplanted by the ranger who gets his fire call by 'phone, works out its exact location by triangulation and then, sitting down at his desk 'phone, moves his forces, equipment and supplies in on it with the speed and precision of a railroad train dispatcher. (Applause.)

President Flewelling: We have with us today a man who knows something about field telephones. Chas. E. Bush, of Seattle, has some paraphernalia here. I would like to have Mr. Bush address you and give his ideas of the type of instrument that ought to be used in our different districts, and the method of installation. He is building lines and we want some practical information from a practical man.

MR. BUSH'S ADDRESS.

This is an age of co-operation. That word has been used in this meeting more than any other one word. It calls for a great many different ways to prevent fire and to put fires out when once started. I have in mind four different, distinct means of co-operation with reference to handling the telephone equipment in connection with fire fighting.

The first is co-operation with the farmers' telephone line system in and through your holdings. The broad development of the farmer's telephone system is a wonderful thing. Five years ago the farmer's telephones in the United States, especially in the Northwest, were very, very limited, but today the telephone sales of the different manufacturers in the Northwest alone are exceeding fifteen or twenty thousand instruments a year. It is obvious that a great many of these telephones are going to be placed in and adjacent to your territory. Co-operate with

the man who puts in the telephone lines, help him build them by getting out poles suitable for the work, see that he uses the best wire, the best insulator, and is informed as to the best ways and methods; and keep him in touch with the proper man to whom the fire should be reported.

The next line of co-operation is with the railroads. Practically every railroad in the United States today is despatching some part of its train service by telephone. Arrangements can be made, I believe, by your organization and the Forest Service with the different railway systems so that in an emergency a patrolman may cut into the dispatcher's service and report a fire to the dispatcher and see that it is taken care of promptly. This co-operation is of value both to yourselves and to the railways.

Co-operation with the commercial telephone companies is of great value. They have toll stations surrounded by your property and also go into the National Forests. You can not do too much toward acquainting the company officials with conditions related to fire protection, and instructing the toll line operators as to what is to be done in case a fire is reported.

Last of all, and most important, is co-operation with each other in the building of telephone lines. This takes two distinct avenues; by co-operation you can purchase equipment cheaper than individually, and you can work together in developing new ideas for improvements in equipment. No manufacturer cares to develop these special inventions for forest use because sales would necessarily be limited. You will have to see that proper equipment is developed.

Further, Mr. Allen might have on file in his office booklets published by every telephone manufacturer in the United States, together with articles on the best ways of building telephone lines, such booklets and papers to be kept on file for use by the different members of the Association. Information can be gathered and put together that will enable a man, when he goes out to build a telephone line, to know precisely what he is to build, how and where and why, and thus save all experimental work. The value of your Association in this particular is of paramount importance. What is the use of trying a thing out to find whether it will work, when your Association can gather information through the different members of the service, and get it on record in such manner that you need make no mistake whatever?

The telephone is rapidly taking the place of every system of communication in the world, where communication between men of different degree of education, different temperament or different nationalities is desired. Wireless telegraphy has its place, but the telephone is the only means of communicating instantaneously and satisfactorily. In order to have a telephone system of real value it is necessary to build trunk lines of the very best material and workmanship, although these trunk lines may be supplemented with emergency systems so that the entire forest may be controlled. It is of prime importance that the trunk lines be built to stand wear and usage and that ingenuity be exercised and encouraged in devising and inventing adequate protection for these lines.

A telephone system is similar to the commissary wagon of an army. If supplies should be cut off, the cause is practically lost. A corps of fire-fighters sent into a district without adequate means of communication are apt to have their efficiency materially impaired. If you have no foundation system—trunk line—protected from the fire, you might as well put in no telephone system at all, because just as certainly as you find imperative need for it, the line will be down and useless. With a line properly built, a clear pathway for work through the woods, good substantial poles heavy enough to support No. 9, or heavier, wire, you will have a permanent trunk line. Once built, such a line can be tapped for transmission and a flexible emergency wire run in; the emergency wire should be protected with a good weather-proof insulator. A spool of such wire weighs about eight pounds per half-mile. A man can carry a couple of miles of it on horseback without great difficulty, attach it to the trunk line, run in a portable telephone system specially devised for this purpose, remain at the scene of the fire, report to the man in charge and keep the fire under control until help can be sent.

Nothing has been developed so far that can be laid in the ground or hung through the croches of the trees that will take the place of a good substantial iron wire, but this flexible insulated wire can be strung on the ground up to ten or fifteen miles, when necessary, and used with good success during fire times.

In connection with such an emergency equipment there has been devised a still lighter portable instrument which appeals to a great many people. With a few of these and the emergency wire you can rush in a crew with a live man in charge and a telephone and equipment at the base of supplies, and from this point can send out patrolmen or scouts with the extra light portable equipments.

Mr. Bush then exhibited the devices mentioned, also a permanent iron box telephone to be used where protection cannot be given by housing, of which he said: "This set is protected with beeswax compounds and different methods of wiring. A heavy door swings over the entire front and it has a mechanical protection against all weathers and against an ordinary calibre rifle. I would not say that it would stand a heavy rifle, but it is a good quality, heavy cast iron. This set would cost probably twice as much as the other set.

Delegate: Can you secure it to a tree on the mountain top and leave it all Winter?

Mr. Bush: It can be fastened to a tree and be entirely satisfactory. The idea is, however, that it can be placed at lookout points or similar places. At these places there may be temporary or permanent houses, but even so, these are liable to be entered during the Fall and Winter months and damage done to other equipment that cannot be done to this kind. There are other advantages in connection with the metal set.

W. D. Humiston: I would like to ask if you

MR. BUSH'S ADDRESS.

are in a position to make any recommendations as to the type of line and type of insulator that should be used, and how to hang the wire, especially if you are running the line near a trail and perhaps hanging the wire on trees?

Mr. Bush: There has been a great deal of telephone line building done with No. 14 and No. 12 iron wire, but they have comparatively low tensile strength. The objections to these wires, so far as transmission is concerned, depends entirely on the length of the line you have in mind, but under ordinary conditions you should not use a line smaller than No. 9 B. B. grade. Such a wire in this Western country, will stand from five to fifteen years when ordinary fence wire, single galvanized, would be rusty in a year or two at most. No. 9 wire has a breaking strain of about five times that of No. 12, consequently will stand the fall of a heavy branch and hang on where the other wire would snap. Even though it should burn down and lie on the trunks of trees or the dry ground itself, you would still be able to get fairly good service, while the No. 12 wire in some cases would be snapped and utterly useless. I would recommend that anybody using the No. 9 wire use a heavy insulator. It will cost approximately one-half more than the other insulator, but you use only 20 to 40 in a mile of line. The difference in cost is comparatively small. It is not worth while to use an inferior insulator. I do not advise fastening a wire permanently to a long tree, because the largest tree in the world, even the largest redwoods in California, do a certain amount of swinging and the wire has got to swing with it. It is easy to select a good tree and trim and reset it, or at least top it so that the wind will not sway it. However, if you want to fasten wires to trees there are two different styles of knobs used for that purpose; split tree insulators they are called. Let your main line run through the insulator and then support the insulator with a wire tied around it and to the tree. The line can then swing to conform to the movement of the tree. Any electrical apparatus is subject to lightning damage. All telephone manufacturers put out a lightning arrester meant to take the lightning from the wires and divert it to the ground before it goes through any of the instruments and does any damage. Lightning will go through the best arrester sometimes, but they are very efficient nowadays, and it is very rare that any great damage is done to telephone equipment when protected by them.

Delegate: We have considerable difficulty in securing a good tie on split insulators, the No. 9 wire used between the insulators and the tree being so heavy and stiff that it crystallizes where the sharp bend is necessary to tie the wire.

Mr. Bush: I think the answer to that question would be to use a twisted cable wire, such as the loggers use for logging, only very much smaller. You can get a strand steel cable of $\frac{1}{4}$ inch, $\frac{1}{8}$ inch or 3-16 inches in diameter, and it will not be any more costly than the No. 9 wire.

Mr. Allen: It occurs to me, from your description of the portable set, there might be something in each association having two or three of these to use in case of big fires. When you have a big fire, with 50 or 100 men, some one man must be in charge, with two or three scouts going around the fire line, or perhaps climbing mountains to see whether this or some other fire is getting away. Would it be possible, and how much would it cost, for every one of

our associations to have two or three equipments of this kind at the office or stored somewhere, to send it out for a day or two?

Mr. Bush: My idea of the light, portable equipment is that it would be used mainly in just such emergencies. With it should be furnished a few dry batteries, probably 25 or 30. The lieutenant at the different lookouts to watch the fire can be equipped with a light weight set which he can fasten to his suspenders and carry with him, and a reel of very light portable wire. If building a new system of telephone lines I would advise very strongly the securing of all the information on this subject possible before installing telephones on this line, because I think you will find it is possible to build your line in such a way that the whole line can be turned into emergency equipment. These emergency equipments left at headquarters can convert a whole trunk system into an emergency system. It simply means a little extra equipment.

These emergency portable outfits for auxiliary equipment can be furnished at about \$5 per set, and in addition a few miles of portable flexible wire is necessary to be picked up and taken out. This wire will run probably about \$10 per mile, depending on what orders are received for it. If buying such equipment I advise that orders be placed early so that the manufacturers can estimate the demand and be ready for it. Ascertain what will be done this Winter and place the order next Spring early enough to be taken care of.

Forester Allen: Our work extends over four or five states. Perhaps each association is planning to build 25 miles of line next year. Would there be any advantage in getting together and ordering 200 miles of wire and reshipping to the different associations, instead of each association dealing individually with the manufacturer?

Mr. Bush: I think there would be a great advantage. In the purchase of insulators, miscellaneous equipment, batteries, and equipment of similar nature, co-operative buying would show a considerable saving.

Delegate: I would like to know the greatest distance a light wire can be used.

Mr. Bush: It would carry 30 miles or greater distance, but my idea is that you would not care to use it for long distances because it is too apt to be broken.

Mr. Du Bois: I have had a little practical experience with this emergency wire. We thought originally that it would do to equip the permanent lookouts, but in stringing it around the ground, on brush and up through the branches, we found the wire tangled badly and was put out of commission for anything except real emergency use on the fire line. It is all right for that, but on the lookout it is almost out of the question.

Delegate: What I had in mind was, in the case of fire, stretching the emergency line from the trunk line to the fire, four or five miles.

Mr. Bush: That could be done for a matter of five or ten miles. It cannot be urged too vigorously, however, that no manufacturer will advocate insulator wire to be laid on the ground or pulled through tree tops as permanent equipment. Nor will this wire be of any service if it is wet, but all that is necessary is to dry it out.

W. E. Herring: In the early part of the season we were using a double braid insulation or triple braid insulation, which gave better service and better satisfaction than the light insulation, but the heavy insulation breaks down with wet weather just as quickly as the lighter.

I can perhaps also give you a little information as to what the lines cost in the Forest Service

in this district. Average lines have run up to \$30 and \$50, according to the cost of swamping. Under ordinary conditions and ordinary swamping a line should not cost over \$35 per mile, with No. 9 wire. We do not advocate the use of anything lighter than No. 9.

Mr. Bush: Something that should be looked into very carefully before building a line is the probability of its being paralleled by a high tension circuit.

President Flewelling: Isn't it a fact that most of these lines are built along trails and when you come to distribute the cost, the cost of swamping would be distributed to the trail rather than the telephone line? You would have no extra swamping.

Mr. Herring: The trails are built first and the swamping is not wide enough to carry the line. It will often pay you to take little short cuts where there are switchbacks on the trail. Often this saves building a mile of line.

President Flewelling: We would like to hear from Mr. Davies concerning the cost of his line.

F. J. Davies: Good substantial line, No. 8 wire, well hung, cost us about \$50 a mile for 25 miles, built along the trails, but we had to do more or less swamping all of the time.

President Flewelling: Did you connect that line, Mr. Davies, with the different settlers along the line, so they can cut into it?

Mr. Davies: We have six instruments in the homes of settlers, which lines we use as we please.

President Flewelling: You think that the good feeling the Fire Association gets from the settlers is sufficient to pay for free service?

Mr. Davies: We certainly do. They appreciate the line fully as much as we do.

President Flewelling: I would like to hear Mr. Adelsperger's experience.

Mr. Adelsperger: We have had a telephone system for two or three years and add a little every year. We also let the settlers in on our line. We furnish the instruments and equipment, but in return they hauled the wire and material and helped to build the line. It cost on an average about \$28 a mile when attached to trees. The pole line in the valley cost more.

President Flewelling: I would like to hear from Mr. Humiston.

W. D. Humiston: We have come to the conclusion that we want No. 9 wire and I have bought a few miles of such wire this Fall.

Mr. Bush: The No. 9 BB galvanized wire is entirely satisfactory under ordinary conditions for talking perhaps 100 miles, but I would not recommend it to be used for over that distance. No. 8 wire is good for 25 or 30 miles further.

Delegate: I would like to ask as to the advisability of making lines as direct as possible, or attempting to follow the routes of travel. For instance, if you have a main line connection and have a lookout point two miles distant, is it best to make the line direct, and thus eliminate as much as possible the danger of breakage from falling trees, or follow the trail, from which the line can be inspected more easily?

Mr. Herring: If the distance to the lookout is not more than five or six miles, I would say take a direct line, for the reason that some one at the lookout is testing the line all of the time, usually a half dozen or a dozen times a day. If there is any trouble it shows up immediately and a man can go over the line. But the main line, which has to be used the entire year and has to be kept up during the entire Winter, should be on the line of travel, not necessarily exactly on it, but the trail.

METHODS EMPLOYED IN FIGHTING FIRES VARY AS TO CONDITIONS OF LOCALITY

TUESDAY AFTERNOON SESSION.

As evidence of the sincere appreciation of the manner in which President Flewelling presided over the meetings, he was presented with a beautiful bouquet of American Beauty roses at the opening of the afternoon session, the presentation being happily made by E. N. Osborne, of the Northern Pacific Railroad. President Flewelling acknowledged the gift on both his own and Mrs. Flewelling's behalf.

President Flewelling said: If a great actress I would be expected to throw kisses to the audience. Gentlemen, I kiss my hand to you. This, being wholly unsuspected, rather upsets me a little, but I can assure you that I appreciate it very, very much, not so much on my own account as

on my wife's account. I hope that in the future my conduct of the meetings, so far as it continues, will be just as acceptable to you for the remainder of the day as during the past day. I heartily believe in what you have done, for this reason: I think we should buy flowers for people while they are living and not wait until after they are dead. (Applause.) I am sure if you came to my funeral you would all send flowers, but I appreciate these very much more on this occasion than I would at my funeral. (Applause.) The first speaker on "Patrol and Fire Fighting," our next subject, is Mr. F. J. Davies, of the Coeur d'Alene Timber Protective Association.

MR. DAVIES' ADDRESS.

After six years' experience as chairman of the fire committee of the Coeur d'Alene Timber Protective Association, during which period I have

spent a great deal of time on the fire line and among our patrolmen and fire fighters, it seems to me that the most important thing in fire protection is the receiving of a report of the location of the fire promptly upon its breaking out. To this end we maintain an adequate force of patrolmen. These patrolmen are located according to the topography of the country, their patrol districts being arranged so that each has one or more natural lookout points from which patrolmen may view the entire region over which they are in charge. These districts vary in size from twenty thousand acres to as high as sixty thousand acres, according to the topography, liability to fire and the ease with which they can be traversed. Our patrolmen are equipped with light axes, short handled shovels, with round point, and small sized water bags. In settled localities the patrolman works singly, making his headquarters with some settler at a central point within his district, and ranging from that place to the lookout points and thence over his district. In the unsettled portions of our Association district we furnish camp equipment for two men and place two patrolmen together, their camp being at some convenient point from which they range in opposite direc-

MR. DAVIES' ADDRESS.

tions, to meet at the headquarters camp in the evening

Duties of Patrolmen.

Patrol trails are established over which the patrolman is required to go every day, making in his rounds the lookout points above referred to. Should he in his travels discover a fire, it is his duty to go to it at once and, if possible, to control it without calling for assistance; if, however, the fire attains such proportions as to render this impossible, he returns to the headquarters camp, calling on his partner to go out and report the fire and bring in assistance, whereupon he returns to the fire and does what he can in the way of retarding its progress until help arrives. Should a patrolman within a settled district discover a fire he has no difficulty in getting a settler to go out with the news.

In getting early information from our patrolmen as to the location and extent of fires, we find the telephone the best means of communication, and for this purpose we recommend the building of local lines to points easily accessible from several patrol districts, and connecting with the existing telephone lines within the Association district.

In fire fighting it is needless to say that at the beginning of a fire a few men are of more value than a greater number when the fire has spread. With this in view the warden in charge of the district should at all times keep posted as to where he can get a few men at a moment's notice. He should have tools prepared for shipment or transportation, and in our

the long handle, round pointed shovel as more effective than the short handled, square pointed shovel, commonly known as No. 2. And these tools, whether new or second-hand, should never be sent to the woods except sharpened and in good condition for work as it is difficult to sharpen tools while on the fire line, and an attempt to do so consumes much time.

Having arrived at the scene of the fire the foreman in charge begins the labor of making a fire line or trench around the front of the fire; this trench should start on the sides and work toward the center of the fire front. By this method the fire is gradually pinched to a point and the fire line is rendered effective, whereas by starting near the middle of the fire front and working toward the sides, the fire will often run around and you will lose the work you have put on it.

There has been much discussion as to the number of men to be employed at a fire. Our experience leads me to say that it is almost impossible to get too many men on a fire line; it is much better to send twenty men to a fire that ten could control than to send ten men to a fire requiring twenty.

Fire fighting is, as you know, hard and disappointing work. Many times just as you are about to close your trench or fire line, a gust of wind will carry a live ember across the line and you will have to swing in a crew quickly to surround a new fire. The only efficient method of fighting a fire is by the trench or fire line, as back firing in general serves only to start more fires which also must be fought. By this I do not mean that there should be no back firing, but the only back fire effective and necessary is the back fire

quickest method of transportation to all points within his district.

Should a fire prove to be a large one and a great many men necessary for its control, it is better to have a foreman, or better still the warden, in charge of the entire party, he to appoint straw bosses for sub-crews not exceeding twenty men. These straw bosses will be immediately in charge of their small crews, directing their work, while the foreman in charge of the job will oversee the entire operation.

There has been considerable discussion among members as to the best method of working men. Our experience has taught us that the best method is to work them by the hour, or rather by the day of ten hours, paying overtime in such cases as may be required by the exigencies attending. We do not recommend night work or overtime. Fire fighting is hard work and if a man puts in ten hours of it it is all he can stand day after day. Night work is unsatisfactory and ineffective as men cannot see to do good work and will not make the same effort they will in day time. The only night work we recommend is watchmen for the fire line while other men are resting. The ideal time to fight a fire is from daylight until the middle of the forenoon when the wind usually rises, beginning again about four o'clock in the afternoon and working until dark. These hours have their drawbacks in that it is hard to get men who will take their rest in the middle of the day and we have been unable to regularly follow this plan successfully.

Keeping Time and Wages.

The method of keeping time of employees in this



LARCH OR NOBLE FIR.

district tools and camp outfit are kept prepared in kits for the use of five, ten or twenty men, put up in such a manner that they can be transported at once by train, team or pack horses, as may be necessary, so that upon receipt of information of a fire the warden from his personal knowledge of his district and the information received, proceeds to send out such men as may be necessary or available at the earliest possible moment; if but five men are available, sending a five-man kit with them, more tools and supplies to follow as the crew is increased. In each crew sent out the most important man is the cook; without a good cook, accustomed to cooking in the open and with scant equipment, a crew soon becomes dissatisfied and inefficient.

Demand High Class of Laborers.

The class of laborers employed should be the very best obtainable, woodsmen and rivermen preferred as they are accustomed to moving around in the timber and are less liable to become excited or nervous should a fire prove to be a bad one, and they are thoroughly versed in the use of fire fighting tools.

The most effective tools in use for fire fighting are the axe, crosscut saw, mattock and shovel; the axe, which should be double bitted, for swamping trails for a fire line; the saw to fall stubs or blazing trees within the fire line; the mattock and shovel for clearing a trench around the fire. These tools are all commonly used in woodwork and a description of them is unnecessary, except that we recommend the use of

from the trench as you go along; and one point I wish to emphasize particularly is that the fire line should be made as close to the fire as it is possible for men to work, and if careful watch is had it should leave the fire under control as built.

Methods of Procedure.

After the fire line is constructed, or as it proceeds, stubs or trees which retain fire should be fallen back into the burnt area, thus preventing the spread of fire by sparks and live embers being blown from a height and across the fire line.

In addition to this the care of a fire after putting it under control, is constant vigilance and the burying of smoldering roots or logs, cutting down all the stubs within the fire line, if the ground is open, and, if in heavy timber, the search for and falling of defective trees, in which if fire gets started, it will continue to burn for months and will at some time break out in flame.

In all this work it is understood that the warden has personal knowledge of his district; that he has made preparations to furnish tools, camp equipment and supplies on short notice; that he has located within his district or near by, certain men, such as logging crews, and has arranged with the proprietor of the works to furnish him with men upon request; and that he is thoroughly familiar with the best and

class of work is the same as that of river driving, railroad work, or any other work where men are scattered, and that is the employment of a time-keeper who makes the rounds twice a day, taking the time of those employed.

We think the wages paid fire fighters should be a little above local wages paid to woodsmen, but not enough higher to suggest to an unprincipled man the setting of fires to prolong the job. In Idaho the compensation of fire fighters is fixed by law at \$2.50 per day and subsistence; this we consider fair wages for the work.

At the organization of our Association we adopt the plan of paying the men on the spot by time checks signed by the foreman in charge of the work; these time checks when presented to the Chief Warden, who in our district has always been centrally located, and countersigned by him, are equivalent to bank checks and are accepted throughout our district as such. I can not lay too much stress upon the advantages of paying the men at once upon completion of their work, as we have demonstrated beyond a doubt that by this method we are enabled to get better men and to get them when others, who could not pay in negotiable paper, were unable to get help.

The foregoing is the result of six years' experience and close observation. We are still studying and hope and expect to increase the efficiency of our organization, but this is all sound and true practice, and, backed by harmony and the willingness of

MR. GRIGGS' ADDRESS.

my judgment that is one advantage. The United States owns the forest service and owns the army, they own timber, more than any company and we cannot tell but what, if properly brought before the government and with the elimination of a little of this friction between the different departments, we could get very good service by a system of patrol under the direction of the Forest Service, which is one of the best organizations we have. Nobody can tell me that the United States cavalry cannot take care of themselves in the woods. I have never seen the time when the army could not get through timber as well as anybody else and if they cannot they ought to learn.

As Mr. Van Dissel suggests, these men could bring to bear an influence that would benefit the people of the United States and there is not a better paid army in the world than our army.

Disposition of Waste.

The other feature that impressed me particularly is that we are not doing enough, possibly, in our Loggers' Association to get rid of the waste of this timber that is left. Fully 60 per cent of the log is left in the woods. What we have to do is to find a market for that rather than leave it in the timber. What the Lumber Associations are trying to do today is to find a market for the waste and they are taking up with the railroad the matter of rates on the stuff that you are burning up in the forests to-

day. That will stop some of the fires. Mr. Albee and these other railroad men here ought to be figuring out a closer rate that will enable you to move this stuff that you are now burning up. Now when timber is worth \$2.50 a thousand it is different from when it was worth only 10 cents, when the Northern Pacific built their road. Today the Milwaukee takes care of the timber. They have piled up timber all along the line and when I saw this saving of timber it carried me back to the time when I was in Europe where they save everything, the whole tree is saved, the twigs are saved and the shavings are saved; they get full value.

I saw, today, an article in the paper and it seems to me that, particularly, in the position I hold in the National Association, I cannot let it pass without calling your attention to it. If the gentleman was reported correctly I will say that he is misinformed. I rather think it is due to a tendency on the part of the press to elaborate on anything relating to timber trusts. I do not believe that Mr. Polson made the remark, I believe they have construed these things in such a way to get before the people and that they have misrepresented the attitude.

Fallacy of Existence of a Trust.

I take off my hat to Hines in the work he did for the National Association and the lumbermen at large. For two years he devoted every energy he had. I know something about the work he did. When we come to consider the announcement that there is a lumber trust it is about time we awakened and put a stop to it. I noticed in the last "Outlook" that there is a

suggestion that there are lumber trusts, retail lumber trusts and that they are dictated to by larger lumber trusts which are benefited by the tariff law that has been built up. If there is any lumber trust and if any of you men are making any money on lumber I would like to know it. We are endeavoring, as a rule,—a good many of the manufacturers are endeavoring to shift the responsibility of these claims and say there is a retail lumber trust. Good God! is there any thing in commercial life they do not endeavor to harness up in some way where they can make money? Can you take any business where there is not some value to be derived?

There are 48,000 sawmills in these great United States and we cannot control the output or the raw product. This association represents a good deal more than the lumber associations. You represent the raw product. Some time or other we are going to wake up to the necessity of getting back \$1.00 for every \$1.00 we put out. We are all slaving and we cannot replace the stumps that have been cut and have not made a dollar in the last three years. I think that is a point that ought to be followed out wherever it is brought up, and I certainly will take occasion at any convention to bring it up, even if the chair calls me down for talking about something foreign to the situation. We have got to make money to provide pay rolls, to provide operating expenses and protect our holdings, and we have got to get something to utilize this great waste.

Without capital we cannot handle these vast holdings. (Applause.)

SECURE ASSISTANCE OF ENGINEERS, FIREMEN AND AGENTS BY EDUCATIONAL WORK

President Flewelling: Gentlemen, we are now twenty-five minutes behind the schedule, and I will call on Mr. Cornwall for his paper on the subject of education.

Mr. Cornwall: The topic assigned to me by Mr. Allen was "Educational Work," which covers a very wide range. He undertook to indicate a few topics he would like touched upon. If you will bear with me for a few minutes I will try to cover the subjects as rapidly as possible.

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After all has been said on the question of securing preventative measures for safeguarding the timber of the country from the menace of fire, through such an organization as the Western Forestry and Conservation Association, it resolves itself into the one material problem of how to reach, interest and educate the largest number of people who are responsible for forest fires, and enlist their sympathy and co-operation. Education implies an intelligent understanding of a subject.

In the educational campaign being carried forward we must try and make as many bull's eye shots as possible. We must be concrete in our efforts. The railroad companies have been accredited with being responsible for a large percentage of the fires. Appeals to the higher officials have been productive of arousing interest to the extent of the substitution of oil for coal within the timbered areas; co-operative agreements for fire prevention between the railroads and the Forest Service in several states. To safeguard the timber tonnage and the safety of their property were the controlling factors in enlisting the support of the railroads in the movement for forest fire protection. This is enlightened selfishness and the direct result of educational effort. But while we are enlisting the support of the chairmen of boards of directors, presidents and high traffic and operating officials in the necessity for safeguarding the timber, and discussing the subject over polished mahogany tables, the real men after all have been overlooked—the men in the cab. Strict rules and regulations often go for naught unless you have the sympathy of the men who actually do the real work which is the direct cause of conflagrations.

I believe the Western Forestry and Conservation Association can do no better work than to make a personal appeal to the locomotive engineers and firemen on the transcontinental lines which traverse the five states covered by this organization, and imbue them with the responsibility of their positions and

their opportunity for helpfulness. The Brotherhood of Locomotive Engineers is composed of brave and capable men and the Firemen's Union is not far behind in point of power. Suitable addresses made at the roundhouses and before the Brotherhood meetings; and the distribution of a suitable badge of the Association, conferring honorary membership, would have a tendency to enlist the sympathy of the engineers and firemen in our defensive warfare. The careless fireman who forgets to turn his steam into the ash pit before dumping has been the direct cause of many dangerous fires. We must reach that fireman personally. The chances are that he does not read our literature, and our pay check announcements and stickers do not attract him.

Blanks should be provided for the engineer to fill out without much trouble, giving notice and location of any fires he observes along the road which could be handed to the station agent. The station agents should be constituted deputy fire wardens in the timbered districts and could communicate immediately with the local fire warden or wire the State Forester of the nature and location of the fire. By this means we could have a flying sentry battalion reporting danger along the entire route traversed by the railroads. The railroads I am sure would willingly instruct their station agents to co-operate. The engineer and fireman must, however, be touched directly. Their self-interest must be aroused through personal contact. It can be done.

Just one example: An old Southern Pacific engineer, a friend of mine, was telling me of his experience some fifteen years ago in the Cow Creek Canyon in Southern Oregon. Early one morning he was pulling a double header passenger train.

About two miles ahead he saw a small smoke arising. The company had several thousand cords of wood in that neighborhood. When he reached the fire he stopped the train and it took the crew 45 minutes to extinguish the flames. Unheeded the loss would have been serious, for besides burning the wood the timber would have undoubtedly been menaced in a large section.

Creating Legislation.

Legislation represents pretty nearly the concrete views of the people on any one subject. To influence legislation we must first influence the public and arouse their self-interest. This is public education. The boy and girl of today are the fathers and mothers of tomorrow. The country stores could be used as a means of distributing literature which would go into every home, carrying the message of fire prevention. A "Few Don'ts" put into each package of coffee and calico goes home. The children read it; mother reads it, and unconsciously perhaps the careless father

has his attention called more clearly to the subject than ever before. Every member of that family needs education; hence use the country store as a means of distributing the gospel of forest fire salvation. It is good doctrine to preach and better still to live.

The inspiration of the average member of the legislature emanates from the country store and post office. They are the local clearing houses. Here is where public sentiment is made. This is the real primary. Here is where we must begin our educational campaign. The advantage of the leaflet in the package from the store differs from the one-cent message from the post office—one has back of it the personal touch, the other is absolutely impersonal. Those of us who have been blessed with an intimate knowledge of country life can understand this distinction.

It might be a good plan to print these leaflets in various languages and thus insure the highest possible distribution of knowledge affecting forest preservation among its various recipients.

Improvement of Legislation.

The improvement of legislation as the result of the efforts of the Western Forestry and Conservation Association has been marked. The State of Oregon has one of the best fire laws in the Union, thanks to the splendid efforts of Mr. Allen and the organized sentiment of the State of Oregon he helped create. In the other states, Montana, Idaho, Washington and California, the present laws were retained on the statute books, unimpaired in some instances, and seed sown which will bear fruit at a later period in the enactment of better fire prevention measures.

Forest Fire Evil.

The menacing effect upon forest preservation is felt along the entire line of our industrial life. It directly and indirectly affects the payrolls; it increases the cost of lumber; it reduces the taxable value of property; it impoverishes the soil; affects stream flow; it hazards human life. It diminishes the longevity of the lumber business; it takes from the prosperity of the people. Eighty per cent of lumber is labor, hence there is scarcely any other industry in the country of which such a large portion of the cost is labor. In the virile yet graphic description of war, by Sherman, "It is hell."

Encouragement of Reforestation.

This is a subject to which the attention of the general public should be directed. The writer drew and introduced a measure looking toward a plan of cumulative taxation, in which the state would share when the timber was harvested, on cut-over lands, with a view of encouraging reforestation in the States of Oregon and Washington, some two years ago. The



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Standard Railway & Timber Co.,
Seattle, Wash.



E. F. CARTIER VAN DISSEL,
Phoenix Lumber Co.,
Spokane, Wash.



B. E. BUSH,
Idaho State Land Board,
Moscow, Idaho.



A. E. BOORMAN,
Northern Montana Forestry Assn.,
Kalispell, Mont.

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constitutions of neither state would permit its adoption. The State of Washington has a law which looks toward the reforesting of the cut-over timber lands, at the discretion of the land board. State Forester Welty, of Washington, can probably give us some light on the practical operation of this law.

Growing of timber is strictly a state and national function. Each state should condemn the cut-over lands most suitable for reforestation and go forward with a systematic reforestation plan. Within the National Forests the Government should be encouraged to continue its re-forestation efforts. West of the Cascades all that is necessary is to keep out the fires and nature will do the rest. The public should be educated on this subject. There is little likelihood of any change of public sentiment which will permit a revision of the laws that will make it possible for individuals to grow timber profitably; hence, it is up to the State and National Government to carry forward this important work. Liberal public education alone can make possible reforestation either by the State or Nation.

Understanding of Legitimate Forest Industry.

Probably no other industry in the United States, irrespective of its rank or position, has been more grossly maligned or misunderstood than the lumber business. It is the fourth industry in importance in the United States. From one end of the country to the other the cry of "trust" and "lumber baron" and other terms of opprobrium are applied. Almost every newspaper and magazine shrieks with startling headlines of the iniquities of the lumberman. He is either gobbling up all the timber or charging such high prices for his product that he almost incites riot, despite the fact, as a well-known lumberman and timber owner aptly stated the other day, he is in many instances "only two jumps ahead of the sheriff."

The public must be educated to the fact that as the country settles up and the local supply of timber is exhausted, the cost of transportation must increase, hence the price of lumber to the consumer must also advance. The average consumer of lumber forgets, or, more properly speaking, his attention has never been called to this point. A farmer in Dakota upon even a forty-cent rate must of necessity pay \$12 per thousand freight on rough fir lumber. The first cost at the mill very likely is about \$7. The freight and handling will in this case be twice the original cost of the lumber. The cost of transportation, while perhaps not excessive, is the principal cost factor. This condition cannot be remedied, and education alone is the corrective liniment which must be applied.

The Nebraska farmer who sells his hogs and corn to the Western lumberman at high prices, seems to forget that the lumber business constitutes one of the very best markets for his product. The lumbermen have equally as valid a criticism on the high prices of farm commodities, but realize that the cost of transportation and the limited amount produced at home have necessarily brought about high prices. The farmer, through the newspapers and the adroitness of political palaverers, gives voice to his resentment at his supposed grievances, while the lumbermen pay the bills, keep still, saw more lumber and sell it at a less price.

The timber owner who purchases timber, usually with an idea of future manufacture, pays his annual tax, reduces to a minimum the fire hazard, sweats often to pay the accruing interest charges, performs a public function of inestimable value to the community. Every stick of timber which escapes the fire demon through his watchfulness and care, adds just that amount to the total world's none too abundant supply. If he cannot be regarded in the public eye as a philanthropist he is certainly entitled to the credit of husbanding a necessary source of national wealth. Irrespective of the ownership, this timber is a collective asset belonging to all the people. This viewpoint should be strongly and earnestly presented to the public. It will require a heroic campaign of education to bring the public into the proper perception, but it must be done if the lumber industry is to throw off the incubus of the malevolent attacks to which it is now subjected. Lumbermen should take as prominent a part as possible in public affairs. In the cause of irrigation, dry farming, agricultural fairs and educational congresses of every nature the lumbermen and timbermen should be conspicuous by their presence and helpfulness. In every way possible the importance of the industry should be kept before the public. All this sort of campaigning costs money. This brings me to the close of this address and up to the point of the Different Publicity Methods and Costs.

It gives me great pleasure to present and endorse the statement of Mr. Allen on this subject: By way of preface I wish to say that for the money expended in an educational campaign, Mr. Allen has given you very excellent returns. Here is what he says:

"The general correspondence conducted through our office, by its variety and extent proves how rapidly our association is becoming recognized as an authority. Teachers ask for facts to give their pupils; timbermen and state officials consult about protective methods; public speakers and writers call for material to use in their papers; distant bond, insurance and timber-investment people ask for reliable information on risks and safeguards. This is hardly a measurable line of work, but certainly it involves increasing time and expense and can be made most of exactly in proportion to the facilities for reducing the time spent on other work.

"Another opportunity which cannot be reduced to dollars and cents is the furnishing of suggestions to others. It is well known that while a few years ago all fire warnings seen in the woods consisted of bald excerpts from the law, with threatening penalties, the modern fire notice is a catchy appeal to the readers' interest, which is far more effective. The publicity work through newspapers and magazines; trade journals, circulars of various forms, posters and stickers, used by other protective agencies of information and suggestions given them, addresses at meetings, and general correspondence with people of all kinds who write the association for information, is almost wholly measurable work and expense and can be prosecuted in direct proportion to your contribution toward them. The newspapers will use almost anything that is given them in the right form if it has some news that is new. To get out a bulletin to the 700 papers of our four Northwestern States costs about \$25 in material,

postage and labor; to include California would take \$10 more. There is scarcely any limit to our newspaper opportunity except this cost and the difficulty of getting information on which to base the articles. It cannot be improved much, however, without more local co-operation in furnishing this information.

"Missionary work by means of circulars, posters, stickers and the like, is almost wholly a question of expense. Mailing lists and methods of local distribution can be multiplied almost indefinitely. General publications can be supplanted by separate editions appealing more strongly to different classes. Strength can be enhanced by using better paper and illustrations. So far we have been limited in this work by the funds available. This year the forestry booklet cost us \$600 for 2600 copies, the school leaflet \$550 for 200,000, the "fire" circular \$150 for 25,000 copies, and the stickers \$100 for 150,000. Mail and express on the several thousand pounds of material brought up a total of over \$1500. Any one of these things, or additional ones, could have been distributed to advantage in much greater numbers, and proportionately cheaper owing to the discount on large orders, had we been able to finance it."

Conclusion.

Educational work may be summed up in the language of a well-known New York politician, who counseled his faithful followers at all times to "Agitate, Organize and Harmonize." This should be our text and on this motto we shall win.

President Flewelling: On this same subject, education, we will listen to Prof. C. H. Shattuck, Forestry Department, University of Idaho.

Prof. C. H. Shattuck: I was very much impressed with the topic under discussion. I do not know exactly what Mr. Allen meant by this subject, "Importance of Honest Education." It is hard to write about any educational work that is not honest. I suppose Mr. Allen has met with some educational work that failed to convey the truth; I think education that is true is bound to be honest education. I seem to be about the only one present who is actively engaged in school work. We are doing the best we can to conduct this work along honest lines; I want to say just a word about what we are doing in connection with forestry schools. We have very many problems in connection with our large school work and it is necessary here in the Northwest, where everything is somewhat new relative to Forestry work that we have to go pretty well to the ground, pretty well to the foundation or start. We have so many problems that we need reliable information, for instance: we have this problem of re-forestation; what kind of trees to grow. What we are trying to do at the University of Idaho, before we make any recommendation as to re-forestation, is to find out what trees will grow and for the purpose of giving out better information we have put out about 12,000 trees, rating about 140 species, and we are keeping a very close record, so that we can begin to say in a small way, rather an uncertain way as yet, that certain trees will do well and what trees will not. Now, as this experiment goes on we expect to be able, in a little while, to say definitely that we can plant this tree in such a place; that we can grow elm trees in a certain place in Idaho, and oak in another, and hickory in another.

Another question which needs to be discussed just briefly is that of by-products. We have been very much interested in what has been said relative to by-products; it is a fact that we are not able to save quite 40 per cent. Now, if a farmer should grow a hog that weighed 100 lbs. and attempted to market it and could sell only 40 pounds, he would think there was something wrong; in fact there would be something wrong; but that is the condition we are in. One of the problems of the school today is the lack of chemical laboratories to conduct experiments. One of the problems is to ascertain what these by-products are. That would be nearest to getting them out and devising some practical means of developing them in the Northwest. We know very well that the by-products saved in Germany have produced as much, or more sometimes, than the timber itself. We want to take up this by-product work and get at some more truth, but until we get the facts we do not care to say very much about it. So much for what we are trying to do from an educational standpoint.

Now, throughout this entire meeting I have been impressed with the general spirit of co-operation; I believe that word has been used more than any other word; I do not think you can use a better word than that; there seems to be a spirit, a desire, to co-operate on the part of the Forest Service, on the part of the lumbermen and on the part of the railroads; in fact a general "get together."

It seems to me that the Forest School has about three different lines of work. The first would be a course of instruction in all that pertains to forestry and lumbering so far as we can get it; another would be research and experimental study in utilization; these I think are especially important; lastly, I want to emphasize the value of education—that is, distributing reliable information to the people, and I believe that they are more inclined to listen

to what we say than to what the lumbermen say; they think it is more apt to be correct, but we want to be interested only in things that are absolutely true. I do not mean to say that the information gotten from the lumbermen is not reliable, but people are apt to say, "Well, he has an ax to grind." Now, I think along that line especially, in time, as we proceed on a more extensive course and send more young men out who have been trained, then we can co-operate a little more fully. I bring you the greetings of the Forestry School of the Northwest. (Applause.)

President Flewelling: Now, gentlemen, to go on to the program with something that we have overlooked, I will vary somewhat from our outline by calling upon Chas. E. Glafke to address us on "Oil Burning in Donkey Engines, in Logging Locomotives."

MR. GLAFKE'S ADDRESS.

In seeking fire protection for the timber of the Pacific Coast, the use of crude oil as fuel has not been given nearly the attention it has deserved in the discussion of ways and means.

As a fuel it is not only ideal from the standpoint of fire risk, but without doubt is cheaper in cost than even the cull timber when such timber necessitates the use of the donkey equipments to handle it into a convenient position near the boiler in which it is to be burned.

When the best clear logs are used as fuel, as is the case in more camps than otherwise, it must be characterized as not only extremely expensive but criminally wasteful.

A barrel of crude oil of 42 gallons will, when properly atomized under a donkey boiler, evaporate approximately as many pounds of water into steam as 500 board feet of sound fir timber. On this basis and including the cost of the labor of cutting and firing, oil at \$2 per barrel is as economical as wood for fuel in the donkey boiler. Or in other words the use of crude oil at \$1 per barrel, at which figure it can be landed at almost any camp on the Columbia River, Puget Sound, Grays Harbor, Coos Bay or Humboldt Bay, will cut down the fuel cost, which includes cutting and handling, fully fifty per cent.

To accomplish this result a burner has been designed that will do away with the necessity of elevating the oil to get a gravity feed, or the use of a pump, as either of these two methods of creating a pressure on the oil would be too cumbersome and complicated for use on a donkey sled.

A further necessity was to make the burner automatic and save the cost of having a man to regulate the feed of the oil to the burner according to the need of the engine.

These two points have been overcome. This burner is equipped with ejector tubes that create a high vacuum and make it possible to suck the oil up from a level of 15 or 16 feet.

Atomizing the Oil.

The oil and steam mix in the tubes and pass through to the tip or nozzle, where a further atomization of the oil takes place as it discharges into the furnace. The automatic feature is secured by combining a diaphragm control with the steam valve inlet to the burner, this diaphragm control being actuated by the boiler pressure. Thus the burner can be set to operate and hold steam at any pressure desired on the boiler; when steam rises to the set pressure the diaphragm control checks the volume of steam passing through the burner, thus reducing the vacuum generated with a consequent decrease in the amount of oil sucked into it. When engine throttle is opened and steam used from the boiler and steam drops a pound or less the steam valve gradually opens and fire is increased as needed to maintain close to set pressure.

As to the question of the action of oil flames on the tube sheet of donkey boilers I want to say that the burner just described does not set up the intense blow-pipe action common to the ordinary pump or gravity pressure burner, for the reason that the velocity of the steam is checked by its practical expansion in the ejector tubes before reaching the tip or nozzle. The fire, therefore, is much softer and more nearly resembles the flames from wood. The exhaust of the engine is not discharged through the stack as when wood is utilized as fuel. The fierce draft generated by the vacuum in the stack causes a great loss of heat units, which is saved when oil is used as fuel. To gain fire box room the grates are dropped down to bottom of mud ring and a specially designed, keyed fire tile setting made to fit the diameter of the boiler, is placed thereon for the flames to strike and break against. This increase in furnace area and the protection of the fire tile setting together with the soft character of the flames, make it impossible to damage any part of the boiler, no matter how heavily it may be fired. The time has come when the use of oil must become general in the timber. Its use on logging locomotives has proven an economy and has solved the problem of fire risk on that score and can now be extended to the donkeys with a greater economy and satisfaction.

The question as to difficulty in getting oil out to the boilers can easily be solved by the use of a small tank car to refill tanks at donkeys close to the rails, and by specially constructed tanks for swing donkeys that can be dragged out to the boilers by the trip line. (Applause.)

President Flewelling: I would like to call on E. S. Collins on this subject.

E. S. Collins: Mr. President, I think you had better call on some one else, as I have had no experience whatever, so I will give way.

President Flewelling: We are sorry we made a mistake. I will call on J. J. Dempsey of Tacoma, Washington.

J. J. Dempsey: We have not used oil, Mr. President, so I know nothing whatever of oil in locomotives.

NEED OF CLOSER RELATIONS BETWEEN PRIVATE, STATE AND FEDERAL SYSTEMS

President Flewelling: We are getting a little behind our schedule and as Mr. Geo. S. Long promised to be a repeater and is on the program I will now ask him to repeat.

GEO. S. LONG'S ADDRESS.

The subject assigned to me is "Public and Private Co-operation, Need of Closer Relations Between Private, State and Government Fire Systems to Prevent Neglect of Territory, Duplicate Effort and Confusion of Responsibility or Authority; Principles and Methods of Co-operation."

I am really glad I did not prepare an article. I think if I had I would have had the pleasure of reading here, at the conclusion of this performance, what has been so eloquently said by every speaker who has preceded me, because everybody has touched upon co-operation, the necessity of co-operation. I feel that we should congratulate ourselves and this Association, this great Northwest country, on the fact that we have had almost ideal co-operation here. We have heard today and yesterday what the Government Forest people have said and done, what the state officials have said and done, what the different forest fire associations have said and done, we have had also, by word of mouth of the railroad officials themselves, heard what they are doing and what they propose to do. After all, it is one great story of hearty co-operation. There has not been, to my knowledge, any conflict between any of these forces, and while I am willing to speak for closer relations, I do not like to suggest, even by this topic, that the relations which have existed have not been cordial; they have been friendly, they have been intelligent, they have been earnest and very, very effective.

Laws in Different States.

In the State of Idaho there is upon the statutes of that state a most excellent fire law. The legislature of that state has been liberal in its appropriation for fighting fire, it has joined in a practical way with the association by saying, "Gentlemen, you know more about the work than we do, go and protect the forests and we will pay you."

In the State of Washington, four or five years ago, the legislature gave us a most excellent forest fire law, and every time we have gone back to them for suggestions or remedies they have improved conditions, and they have given it to us cheerfully; they have given us also a liberal appropriation. The men who worked hardest for that first fire law—four out of the five Commissioners—were the men who labored on the floor of the house of the legislature or in the lobby for it; they were appointed from the ranks of the timber men and the lumbermen, and there has not been one of them removed. Mr. Joseph Irving has been one of the staunchest friends of logging, not only as a logger, but as a member of the legislature and as a member of the State Fire Commission. Mr. Condon has been exactly the same; Mr. Veness has been equally sympathetic; Mr. Lamb has always had the keenest appreciation of what can be done in joint effort, and Mr. Welty, in the State of Washington, has been the continuous Fire Warden since we have had a law. We have had in him a friend and a man who has worked with us on every issue that has ever come up for the protection of the forest from fire. In every county where he appoints fire wardens he has not chosen political men for the positions, but he has gone to the lumber men and gone to the timber men and has said, "Gentlemen, who is a good man for fire warden; name him and I will appoint him." He has helped us all down the line.

Here in Oregon you have a new law and a new State Forester, and he has been earnest and sympathetic and is working right along with our force. In

Montana, to a certain extent, it has not been so effective, and yet public sentiment is better. In California we have two men who have come here, without coming from our Association, but come on a general broad policy; they like their state to be represented in this grand work.

Relations Ideal.

Closer relations, yes; but the relations they had have been ideal. It is to the credit of the communities, of the lumber men, of the timber men and the state officials of the National Forestry Service that such is the case. Right here, gentlemen, I wish to pay tribute to the Forest Service alone. Under the influence of that great man, whom a great many of us admire and whom some censure, yet under his influence has sprung up a sentiment about forest protection that has made it easier for all of us to get more effective work. I refer to Gifford Pinchot. (Applause.)

Under his influence, directed by his patriotic spirit, he has drawn to him the very best class of bright, keen, earnest, trained young men. Many of us have found them impracticable, probably, in the first principles of lumbering, but, gentlemen, they are among the best men we have today, and we should recognize their merit.

The railroads have been censured too much on this score. I want to tell you that in my opinion 75 per cent of the fires in the State of Washington are more attributable to us, ourselves, who do not do our work right, than to railroads. There are more fires started by loggers on logging roads than are started on all of the transcontinental lines, and it is up to us to make good. We cannot preach the doctrine of forest protection unless we get in and be good ourselves; we have to set the example and we are doing it. It is a common practice to lambast the railroads; we are all doing it, but they are doing effective work in Idaho and Washington, and they are not the only sinners.

Practicing True Conservation.

A few years ago there was a great furore throughout the country for conservation—it got the public mind probably more quickly than almost any other subject that has been thrown into public discussion in the last five or six years. Today all of those who are earnestly in favor of conservation are still giving it thought. Today the association, the group of men, the community, the district that is practicing true conservation the best and most intelligently is the community, the district that is represented by the Western Forestry and Conservation Association. It is all right to talk, but it is work that counts, and we are doing more today for practical conservation than any other district in the United States. We are doing more, I take it, through our agency and through Mr. Allen's public work, to get out the right kind of ideas and call the attention of the people to what is wrong and what is right, than any other place in our country, and we ought to. Gentlemen, we have a priceless treasure west of the Rocky Mountains; in that district there stands today 800,000,000,000 feet of timber, which is more than 50 per cent of all of the merchantable timber that stands in the United States, and at the present rate of cutting in this district it would not be cut over for 100 years. But large as the interest is today, it is still in its infancy, 80 per cent of the value, I hear, of all that lumber stays with the state. Remove the timber, if you please, the wealth still stays here, and 80 per cent of all of the Eastern tonnage shipped out of the state is forest products. Over 80 per cent of all the cargoes that leave the harbors of Washington and Oregon is lumber product. It is the overshadowing industry, and well may we who

stay around here, look upon this task which is ahead of us in the future, that is, taking care of the forest.

Lumbering a Glorious Industry.

This cutting the tree down and making lumber is a glorious industry, it is also a great trust which we should faithfully perform, and right here I wish to emphasize, even more so if I knew how, what has been said by Mr. Cornwall about the necessity of reforestation. Why do we have here on the Pacific Coast this grand standing timber? Two, three, four, five times as much as any other place in the United States. Why is it here? It is because nature put it here. Why did she put it here? Because this is the best place on earth to grow timber. Why not continue it? Look about you the next time you go into the woods; forget business, look at the young trees coming up everywhere, all about you—we look at the tree and we can see so many thousand feet in it—but look at the little timber coming up everywhere. I came up through Northern California the other day and everywhere along the railway cut, through the gravel, and everywhere the ground was broken up the young forest was trying to grow up.

We have in this area west of the Rocky Mountains fully 75 per cent fitted for nothing so well as to grow natural forest. Some one has said that it is the function of the state and the nation to grow these forests, and I think that is so—no individual, no corporation, can do it with profit, but, gentlemen, the state should do it. The states in every one of these communities should set aside money for reforestation of logged-off lands not suitable for agriculture. If you will do that, forty or fifty years from now you will have lumber; you will have new forests; you will make provision for your children and your grandchildren. Take care of the forests and you will have no trouble to get public sentiment to help you preserve your forest. The public is interested and it is a practical proposition. I think it is one that should have been touched on more here in this discussion. We call ourselves the Western Forestry and Conservation Association—that we are. We have been talking about fire protection here more than anything else; that is a most important question, but right next to it is the necessity for every state in this country to inaugurate a system for the regrowth of our forests.

Have Worked in Harmony.

One other little point, which I almost overlooked—a detail, a mere detail. I have so much faith in the good feeling existing between the different organizations, the state, the national and the local; we have worked in harmony that all of the little problems and friction that may arise will be worked out—these people are not going to let little details get in their way, but there is some little trouble occasionally about who shall handle the affair, whether the state or the county association; who will be responsible, who will pay the bill, who will take charge of that particular locality or local trouble? I will say we have had so little of that in the State of Washington it is hardly worth mentioning, but the time to think that over is between now and the next forest fire season. I think it will be well worth while for all of us to give it a little thought.

I shall also say here—a little differently from the honorable Chairman's reference to Oregon—I think Oregon has done very well. Oregon was all disunited here a few years ago; they carried on a little association work, a few people here, a few people there; they did not see it the way we do about getting together. There are half a dozen little associations in the state, but I think Oregon is going to line up and do its work as well as any of us, and I think she will soon see the necessity for united effort on all these lines we are working now. (Applause.)

HOW TO SECURE GREATER BENEFITS FROM LAWS IN FORCE IN SEVERAL STATES

President Flewelling: Gentlemen, we are again on schedule time and if the chairman said anything against the State of Oregon which he should not have said he now apologizes. The next topic under discussion is "Important Points of Existing Laws." The first speaker on that subject is C. S. Chapman of the Oregon Forest Fire Association. We will be glad to listen to Mr. Chapman.

C. S. CHAPMAN'S ADDRESS.

The securing of fire laws has during the past few years consumed no small amount of the energies of those interested in forest fire prevention and forestry generally. Many states, among them Oregon, now have laws far more comprehensive in their scope than most of us would have considered possible a few years back.

It is striking evidence of an awakening public opinion in a matter of vital importance to the Northwest.

Most of our laws are new. They have not been thoroughly tried out, and sufficient cases to test their various provisions have not come up. It is never possible to get a law which will cover adequately every emergency. The best we can do is to get the law which comes as near to this as possible and then by careful and resourceful use of the law make it serve all practical purposes. Consequently at this time, particularly with laws as new as those of Oregon, it is far more important to devise means for making it cover cases than to figure out how it should be changed to meet them. Needed changes are important, but there will be another fire season before they can be acted upon and our experience will then be broader. Another point to consider in changing laws is that provisions may be slipped in

which are far from beneficial and result in weakening an existing law in most of its provisions.

Resemblances of Western Laws.

Laws of western states show close resemblance in the object of sections punishing carelessness or willful setting of fires, varying only in clarity of language and penalties. There is more difference in the attempt to regulate dangerous clearing or logging operations. All the laws suffer from lack of practical experience in enforcement on the part of those framing the laws. Due to past leniency or absence or machinery little was discovered of loopholes available to clever attorneys for the defense, and since it is impossible to write a tight law or enforce it without considerable record of cases, and we are remiss in not arranging for such study and exchange of results, we suffer accordingly. Everyone involved in a solution of the law suffers from this confusion. The law is apt to be ambiguous because the framers, through no fault of their own, could not foresee all contingencies. Even if the violators understood its spirit, it is not a living reality with the desirable restraining effect because he has no examples of convictions to frighten him. The same uncertainty deters injured parties from complaining against them. The fire warden who should proceed as a matter of duty has not the information as to how similar cases have resulted that is necessary to guide his collection of evidence. The district attorney is unfamiliar with the whole business and hence unlikely to handle it with vigor or skill. The jury or court is without precedent to guide its decision.

For these reasons, I believe that in discussing our fire laws, whether from the standpoint of improving them or of enforcing them, such as they are, the most important single point is not one of any specific policy or detail that we can criticize, but is the desirability of collecting and distributing more information on the subject; information that any one concerned can apply in the solution of each problem that confronts him. There should be an available record of as many past prosecutions as possible, showing the

nature of the case, the bearing of the evidence and the result. In other words, such information as put in their hands would often deter anticipated offences, suggest the action of wardens, stimulate district attorneys, and afford guiding precedent to juries and judges. Since only superior court cases are of printed record, the compiling of this record must be by the aid of all those who have been convicted with bringing violations before district attorneys, magistrates and grand juries. Such a record would be scrappy in many cases but there have not been so many attempts at prosecution or so many people interested in the work that a very fair history could not be secured if all would try.

Analysis of State Code Necessary.

Next there should be a careful analysis of each state code based upon the proposed history and upon the judgment of the leaders in each state, to bring out its strength and weakness in actual operation. This analysis should be given similar men in each of the other states. I promise you it would give them something to think about. Ambiguous language, technical loopholes and constitutional weakness exist in nearly all our forest laws, but we only find them by test cases. It took a court ruling in California to show that practically every burning permit law in the West would break down if contested. Luckily, there was opportunity to amend before the public also discovered it, but this can not be counted on to happen. The similarity of our laws creates both necessity and opportunity for better team work in improving them.

Possibly third in practical importance at present and largely for just the reasons I have related is the necessity for developing experts to handle prosecutions. In the absence of either available history or any powerful stimulus by public sentiment we cannot expect district attorneys to have the competence or interest in fire cases they have in more familiar lines of criminal procedure. Lack of confidence marks every step in the majority of fire cases, on the part of both complainant and prosecutor. Pub-

MR. CHAPMAN'S ADDRESS.

lic attorneys should, and I believe they would, welcome assistance that would strengthen the prosecution and in some instances relieve them of local political embarrassment.

Preferably the expert assistance should come from the state for this would give it more weight and lessen the damage of hostile prejudice. Where the state will not furnish it, however, there is probably no alternative but for our associations to assume the burden. An association can at least do it more effectively and less dangerously than the individual. We can most of us no doubt recall cases which failed not because of insufficient evidence but because the evidence was not brought out and the prosecution was not sufficiently vigorous. I have in mind one case in which members of the jury admitted they believed the parties guilty, but since the district attorney was so evidently against prosecution they saw no need of bringing expense on the county which would result in no good. If the fire laws are not to be farcical we must have prosecutors who are fearless and who know how to push their cases.

Need of Trained Men.

Along the same line as the collection of evidence, all our rangers, private, state and government, have police power and therefore theoretically at least are supposed to need it sometimes. As a matter of fact, it is seldom that they know the wording of the various punitive sections and are able to judge which sections have been most clearly violated, and still more rarely do they know what evidence is and how to get it.

It is expert work and they are seldom qualified in this particular line of their duties. They may err by being too eager and bringing cases which cannot be brought to successful issue, or by being too timid and allowing the prosecuting officer to persuade them to drop a really strong case. Again, I believe this problem will be best solved by having the state maintain the necessary trained force for this work, and until this happens by having the associations hire similar trained men to relieve the local patrolman. Usually a stranger can get evidence a local man cannot. More training of this kind is needed, however, by our ranger force who might after awhile handle any ordinary case.

One thing we should be careful to avoid is criticism of the state and county officers enforcing the law and of the law itself before making every effort to assist these officers and to figure out means for making the law fit the unusual case.

I have purposely spoken chiefly to generalities rather than to specific points of the fire laws, because the program indicated that other speakers would probably bring out the most important of them in connection with their particular topics, and because I am not very familiar with the details of any but

the Oregon laws. Whatever the details, however, I believe these principles are equally or more important. We cannot get away from the fact that prevention of fire is the chief thing to be aimed at and that this involves changing people's habits in two ways; appealing to the better reason of the majority, and curbing the minority which cannot be reasoned with through laws as real and severe as those affecting other crimes. The latter means enforcement; making it known that violations bring trouble to violators and that this trouble is swift and sure.

While in the past we have devoted our efforts chiefly to putting out fires criminal or careless people have set, we know this is too hard and expensive work to keep up indefinitely. We must give the legal machinery for heading off fires equal attention. This requires study and action like the other work and like it funds are required for success.

Summary of Things Strived For.

To sum up the chief things to strive for, I believe they are as follows:

1. Stronger state machinery for exerting the police authority which the state alone can exert adequately; this to include sufficient field men especially trained in preventive measures affecting those whose dangerous conduct can be anticipated and in apprehending actual violators; also expert legal representation in prosecutions.
2. The development of similar expert facilities in our associations to assist the state and to act when they do not.
3. Immediate collection and exchange of information on past cases that will help all of us in dealing with offenders. This to include, of course, the systematizing of the gathering of such information hereafter.
4. Delegation to those who compile this information, with such assistance as they require, of the duty of analyzing our state laws and proposing necessary changes.
5. More vigorous attempt to bring every offender to account whether in or outside the timber industry.
6. A greater degree of publicity to every prosecution.

All of these things will tend to prevent carelessness with fire and consequently reduce the cost of protection. If work to this end is not taken up vigorously the tendency will be to make protection more costly from year to year as the country is opened up, new industries developed and existing ones extended.

President Flewelling: We will listen to Mr. F. H. Cowles, of the National Fire Protection Association a few moments.

MR. COWLE'S ADDRESS.

The National Fire Protection Association, with which I am connected has created a new committee,

namely, the committee on forest brush and grass fires. As a member of this committee may I take the liberty to place before this gathering a consideration of the advisability of joining our association in its fire protection campaign, and in turn I feel sure, I would be voicing the sentiment of the National Fire Protection Association in saying it would be considered a great privilege to be permitted to enlist with the Western Forestry and Conservation Association in the effort it is making for those who will not only benefit by this labor after we are returned to earth, but who will carry the standard ever forward.

There are features of the work undertaken that require close application of scientific remedies, the discovery of which will be possible only by those who make the particular field a life study. To attempt to trespass upon such ground, an unfamiliarity with which would result in positive detriment to the cause, is an act not to be excused upon the premises of either enthusiasm or devotion to public welfare. It is not my intention to come before your meeting with such an object. There exists a certain field which has a direct bearing on your work as well as our own.

The field referred to is that which embraces education in public, private and parochial schools.

Not alone an elementary knowledge of the thousand and one little things that are responsible for fifty per cent of fire, both in the forests or in cities, but an education which will instill into the young receptive mind a sense of the moral obligation.

In Ohio, Nebraska, Montana and Iowa such systems are in force through acts of legislatures, for in no other way can the proper results be accomplished. Something has been said of the prejudice existing against too much legislation, but it will not be difficult to convince the most skeptical of the full warrant of such a procedure in this case, while the East and Central West have pointed the way. You will be interested to learn, perhaps, that this idea has met with favor in both the state and in Portland. At present I am giving a series of lectures to the children in some of the Portland schools, with the idea of stimulating public interest in the proposed legislation. These lectures have the approval of the School Board and the Commercial Club, while some of the papers have been kind enough to editorially favor the idea of teaching the children. In closing permit me to inquire if it is in order to solicit an opinion from the Western Forestry and Conservation Association as to whether it is willing to go on record as favoring such legislation? Remember that in one sense you make a losing fight in the continuous effort to educate a grown-up public the ranks of which are constantly being augmented by the millions of children whose civic and moral sense in these matters has never been cultivated until the pressing demands of modern life tempt to the surface all the latent qualities that most of us possess in the form of carelessness, ignorance, or greed, and fortunate indeed is the man or woman who can plead "Not guilty" to any one of these three indictments.

RESOLUTIONS ADOPTED BY WESTERN FORESTRY AND CONSERVATION ASSOCIATION

President Flewelling: Gentlemen, we are a little ahead of time but I feel that many of you are getting restless; we have had a long session although a very interesting one and in order to make our adjournment fifteen minutes earlier than schedule I will now call for the reports of the Committees heretofore appointed by the Chair. I will ask the Secretary to read them.

Private, State and Government Co-operation.

Your Committee beg leave to report as follows: Whereas, In the scope of territory embraced by the work of the Western Forestry and Conservation Association is included all of the timbered areas west of the Rocky Mountains in the States of Montana, Idaho, Washington, Oregon and California; and

Whereas, In this territory the standing merchantable timber constitutes at least fifty per cent of the entire stand of merchantable timber in the United States; and,

Whereas, In this territory is also situated the greatest of the Government forest reserves and large holdings of timber owned by States as well as individual ownerships; and,

Whereas, The preservation of this timber from destruction by forest fires is both a patriotic and an

economic work which should meet with the hearty approval and co-operation of the National Government, of the State government, of all private ownerships, and of the public at large; and,

Whereas, The past two years the forest fire organizations of the Government Forestry force and of the State forest fire forces as well as the forest fire associations of private organizations have worked harmoniously together in the most effective manner, clearly demonstrating the value and effectiveness of joint co-operation; now therefore,

Be It Resolved, That it is the sense of this Association that liberal appropriations should be made by the nation, by the State, and by the individual owners for the better maintenance of this protection and for such legislation and public approval as will render this co-operative work even more efficient in the future than it has been in the past.

- E. A. CLAPP,
- J. R. WELTY,
- GEO. S. LONG,
- C. S. CHAPMAN,
- F. A. ELLIOTT.

Railroad Co-operation.

Whereas, The protection of the timber resources means: The stumpage value to the timber owner of approximately \$2.00 per M feet B. M., employment

and remuneration to the wage earner of approximately \$8.00, tonnage to the railroads both in supplies, equipment and forest products approximately \$6.00-\$8.00 per thousand, benefits to the farmer and merchant through the use of supplies, an insurance of community prosperity and the general public welfare; and,

Whereas, It is recognized that the railroads operating in forested regions are a source of fire danger menacing the preservation of this resource for use; and,

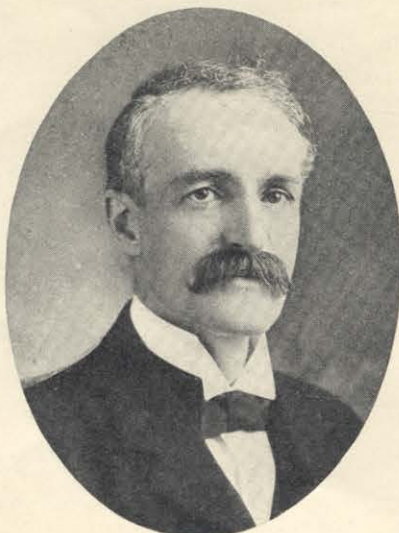
Whereas, The danger from forest fires is common to all and co-operation is necessary to meet this danger.

Now, Therefore, Be It Resolved, That in order to secure the best results this co-operation be systematized along the following lines:

1. Clearing up rights of way of railroads of all combustible material on ground; not necessary to take down trees or take out stumps unless punky, rotten, or hollow.
2. Establishing efficient patrol of tracks during dry season, both night and day.
3. Increase efficiency of spark arresters and transforming all engines being operated through timbered districts to oil burners as far as practicable.
4. More strict enforcements of order that steam



H. S. GRAVES,
United States Forester,
Washington, D. C.



GIFFORD PINCHOT,
National Conservation Association,
Washington, D. C.



EVERETT G. GRIGGS,
National Lbr. Manufacturers' Assn.,
Tacoma, Wash.



F. E. AMES,
United States Forest Service,
Portland, Ore.

RESOLUTIONS ADOPTED.

be turned on all ashes dumped from engines. Stringent enforcement of orders that no ash pans be dumped while train is in motion.

5. That orders be given expediting the furnishing of men from road gangs and section crews.
6. Reports of all fires by all train crews at first telegraph or telephone station.
7. Sharing expense of patrol by railroads.
8. That association, federal and state organizations furnish their regular employees within their respective territories to assist in fire patrol.
9. That authentic information of the condition of railroad rights of way, the methods used under different conditions, and of all fires originating on or adjacent to the right of way be obtained by federal, state, and private organizations in order to present definite data to effect improvement in methods.
10. That this situation be kept before the railroads, the organizations interested in fire protection and the general public in order to insure a practical working out of these recommendations.

J. P. MCGOLDRICK,
E. W. OSBORNE,
F. A. SILCOX,
E. O. HAWKSETT,
F. J. DAVIES.

Co-operation in State and Fire Policies.

Whereas, In its dual capacity of protector of the consumer and representative of the largest single timber ownership, the Forest Service is in position to exert a profound influence not only upon the protection of all forest resources, but also upon business conditions involving the welfare of both producers and consumers of lumber, and

Whereas, There should be the utmost degree of confidence and understanding between the Forest Service and the owners and manufacturers of private timber in order to prevent ill-considered action by either;

Be It Resolved, That we recommend mutual provisions for systematic conference, upon subjects of joint interest, including representation by the Forest Service at meetings of lumbermen's associations and consultation of the latter by the Forest Service in matters of sale and protective policy for Government timber.

The Weeks Law.

Whereas, Congress has authorized and appropriated for co-operation between the Department of Agriculture and the States in preserving the forests on watersheds of navigable streams,

Be It Resolved, That we urge upon the forest officials of each state the early submission, to the proper federal authorities, of such data and application as are necessary to secure its deserved share of such

appropriation in the approaching fire season of 1912.

Public Schools Should Teach Forest Protection.

The starting point in the education of the public against wanton waste occasioned by forest fires should commence in our public schools. The Western Forestry and Conservation Association believes that a regular course of instruction in forest protection should become a part of the curriculum of the public schools in the States of Oregon, Washington, Idaho, California and Montana, with a view of creating in the minds of the rising generation the important relation the forests bear to the permanent prosperity of the nation.

Troops as an Auxiliary Fire-Fighting Force.

The Western Forestry & Conservation Association again most heartily endorses the proposed plan of establishing summer field posts for United States troops within the National Forests, to be utilized in cases of emergency as an auxiliary to the Forest Service in protecting the National Forests from fire.

State Action.

We recommend and appreciate the increased aid to fire protection afforded by state legislatures, but believe they have a further and equally important duty to provide for a comprehensive and far-seeing state policy covering all phases of forest preservation, including reforestation, the conservative management of state-owned forest lands, the purchase of denuded lands particularly adapted to public management, and the consolidation of state forest lands by exchange with the United States.

State, Private and Federal Co-operation.

Whereas, With the pronounced recent increase of fire preventive effort by private, state and federal agencies has come also greater complication of organization and consequent danger of duplicated effort and confusion of authority, and

Whereas, There should be vigorous and immediate concerted action to secure the highest efficiency and simplicity in the joint relations of these three agencies;

Be It Resolved, That we recommend early conference by the chief authorities of private, state and federal protective effort in each state to outline plans for closer and more constant co-operation in all matters involving responsibility of expenditure, organization and authority.

Associated Effort.

Experience having demonstrated that co-operation rather than individual effort secures to private owners of forest land, the greatest economy and efficiency in fire work, and also the greatest advantage in dealing with other protective agencies, we urge upon all such owners the establishment and support of co-operative forest fire associations.

Whereas, It has been demonstrated beyond ques-

tion that the associations of timber owners represented at this meeting have found it a business necessity to expend from two to ten cents per acre for forest protection, and since the Federal Government in Montana, Idaho, Washington, Oregon and California owns and controls a vast amount of standing timber in which that owned by members of the association is commingled, and

Whereas, A consistent system of protection must extend over all of this timbered area regardless of ownership, and

Whereas, The volume of administrative work which must of necessity be conducted by the Federal Government on the national forests, curtails the amount available for forest protection, and

Whereas, Roads, trails and telephone lines are sorely needed in the more inaccessible districts of the national forests, and

Whereas, Any systematic plan of reforestation or regulated cutting is of little avail without adequate protection from fire,

Be It Resolved, That this Association expresses its commendation of the work of the Forest Service in fire protection as far as its limited funds permit and urges the increase of the appropriations of the Forest Service for this purpose, and

Be It Further Resolved, That a copy of this resolution be sent to the President, the Secretary of Agriculture, the Chairman of the Agricultural Appropriation Committee of the House and the Senate and to the Congressional delegates of each of the interested States.

County Assistance.

Whereas, The protection of the forest resources of the west is of the highest importance to every citizen, community and industry and thus lays a burden of responsibility upon every unit of community endeavor, and

Whereas, The states, the federal government, and the timber industry have each responded to this responsibility by increased expenditure and effort;

Be It Resolved, That every forested county of the Pacific Coast States should also bear its share of expenditure and effort and co-operate with the other three agencies mentioned by appropriation for the maintenance of fire patrol and fire fighting forces, and vigorously enforcing all statutes seeking the prevention of forest fires and punishment of fire law violators.

A. P. SPRAGUE,
E. T. ALLEN,
E. G. AMES,
COERT DU BOIS,
GEO. M. CORNWALL.

Upon motion duly seconded and carried, the resolutions were adopted as read.

CO-OPERATION BETWEEN EASTERN WASHINGTON LUMBERMEN AND RAILROADS

President Flewelling: We have a report on co-operative patrol in Kittitas County, Washington, between the Cascade Lumber Co., of North Yakima, and the Northern Pacific Railroad, by A. H. Huebner, of the Cascade Lumber Co. The secretary will please read it.

REPORT FROM KITTITAS COUNTY, WASH.

A little over a year ago, on June 27, 1910, we organized a system of fire service patrol in conjunction with the Northern Pacific Railway Company, who in turn represented themselves and the Northwestern Improvement Company.

The territory embraced practically ten townships, in all about 230,000 acres. The greater part of the timber in this territory is owned by the Northern Pacific Railway and its auxiliary companies. There are quite a number of ranchers owning a few thousands feet of timber in connection with their homesteads and ranches, and last our own.

We were interested in forming an association that would be a part of the large organization with which you are connected, but the railway company was loath to join in with any organization, so our organization is still tentative in form. The expense is wholly borne by the Northern Pacific Railway Company and our company.

A full report was made of last year's report at the

annual meeting of your Association at Spokane. Below I hand you a brief outline of this year's work:

The Fire Service Patrol for 1911 was begun June 22nd, when we assigned three forest rangers, under the supervision of J. E. Fulkerson, chief clerk, with headquarters at Cle Elum, Wash., to cover the territory which was divided into three districts, as follows:

District No. 1—Teanaway and Swauk.
District No. 2—Yakima, Cle Elum and Taneum.
District No. 2—Easton and Cabin Creek.

The forest rangers went out into actual patrol on July 6th.

These patrolmen were commissioned state forest rangers by State Fire Warden J. R. Welty at our request, in order that they might have authority to impress service if necessary and make arrests if advisable. No arrests were made for illegal setting of fires this season.

Districts No. 1 and 2 were patrolled on horseback, owing to the extent of the territory embraced and the openness of the country. District No. 3 was patrolled on foot as this was deemed the easier, more accessible way of traversing the mountainous country above Easton. The ranger there spent some time in locating and cutting out trails in different parts of his district so that the movement of men and supplies might be made easier should fires get started in the timbered country tributary to Cabin Creek. He at all times worked in perfect harmony with the

government forest rangers assigned to the reserve bordering his district.

The equipment of each ranger consisted of an axe, shovel and collapsible pail.

The Cle Elum office, to which all rangers reported regularly, was at all times posted as to the routes adhered to by the patrolmen, and could speedily notify any one of them if necessary.

During the season 32 fires were reported, as follows: July—District No. 1, 2 fires; district No. 2, 1 fire; district No. 3, 14 fires; total, 17 fires.

August—District No. 1, 1 fire; district No. 2, 7 fires; district No. 3, 6 fires; total, 14 fires.

September—None.

Total—32.

The time spent in extinguishing fires, or getting them under control, varied from half an hour to ten days, and additional help was used in a number of cases.

The large number of fires in district No. 3 was probably the result largely of the extensive practice of camping and fishing on the Yakima River above Easton and on Cabin Creek. However, no appreciable damage to timber was done by any of the fires in this district, the forest ranger being exceptionally efficient in getting the fires under control.

It was necessary in one or two cases to secure the help of logging crews nearby so that the expense was



LEONARD BRONSON,
National Lumber Mfrs. Assn.,
Tacoma, Wash.



C. M. CREGO,
Wm. Musser Lumber & Mfg. Co.,
Spokane, Wash.



C. H. SHATTUCK,
Professor of Forestry,
Moscow, Idaho.



A. H. HUEBNER,
Cascade Lumber Co.,
North Yakima, Wash.

CO-OPERATION IN WASHINGTON.

increased somewhat, but the assistance rendered by the crews in time of need was a great help.

No permits to burn slashings were issued during the season, memories of the disastrous fires throughout Washington and Idaho in 1910 probably influencing

ranchers to postpone such work until a safer time of the year.

Some heavy rains in July and August helped wonderfully to make the danger of fires small, and the continuous showers from September 1st to 12th made it possible to discontinue the service for 1911 on the 12th of September.

Summing it up, will say that the district included

within the patrol suffered practically no fire loss during the season. The actual number of acres burned over were about one hundred, mostly all cut over land, so that the loss to timber was very small.

The total expenditure for the season of 1911 was \$971.80, the greater part being for the salaries of the three rangers and the chief clerk. Included in the above was \$192.05 paid out for outside help.

FIRST ORGANIZED EFFORT IN REDWOOD FOREST PROTECTION AND REFORESTATION

President Flewelling: We will not detain you very much longer, gentlemen, our work is rapidly drawing to a close; there is one more paper by Robert E. Swales, of the Union Lumber Co., of Fort Bragg, California, which we shall hear before we disperse.

Secretary Cornwall: The following is a summary of the forestry work that the Union Lumber Co. has been carrying out with their virgin timber and cut-over lands in the redwood forests, at Fort Bragg, Mendocino county, California:

REPORT FROM FORT BRAGG, CAL.

In 1909 we started the making of fire trails and burning, in the water shed of the Ten Mile River district, and at the present time, we have been protecting some 52,000 acres. This work will be continued until the entire water shed is thoroughly protected.

We started one man to patrol for three months of the year in 1910 in this district, and in the two years of this patrol, have put out four fires that would have been serious, and cautioned all campers and hunters to be careful with their camp fires.

Average width of fire trails made are 20 to 40 feet. Total cost of work for three years as follows:

Work done—	Expense
Cutting trails	\$1,812.88
Burning	348.00
Patrol	391.06
Supervision, etc.	820.78
Total	\$3,372.72

On the Noyo River, where company is now logging, some nine miles of fire trails have been cut and burned, and a good deal of the tanbark oak slashings burned. In all we have spent on this work on the Noyo River some \$1,200.00. No segregation of this cost has been kept.

Fire Fighting.

The actual sum we have spent in fighting fire, the amount of timber burned, and the amount of timber saved for 1909 and 1910 is summarized in the following table. The amount of timber destroyed was arrived at by timber experts who counted and measured actual number of trees destroyed on the entire burned area; the area saved, by estimating from the area burned over in given length of time, character of country ahead of fire and lapse of time between control and first rains; the amount of timber saved, by actual estimate of timber experts who thoroughly knew the character of country and timber that would have burned, and their observations from other fires that have occurred in the redwoods where other companies allow them to burn without making any effort to put out. In 1911 we had no fires, mainly on account of the efficiency of our patrol.

Year—	Acres burned over.	Cost to put fire out.	Timber burned, board feet.	Acreage saved.	Timber saved, board feet.
1908	240	\$285.00	650,000	10,000	10,000,000
1909	2,500	877.10	1,000,000	5,000	2,000,000
1910	8	18.73	None	10,000	5,000,000
Total	2,748	\$1,180.83	1,650,000	25,000	17,000,000

Reforestation.

In the winter of 1909 and 1910, we planted some 500 acres of cut-over land to blue gums (Eucalyptus Globulus), planting about 500 trees to the acre, with the idea of having a fast growing tree like the gum to help force the redwood sucker to height growth, figuring that when the gum commenced to over-top the sucker, some of the thrifty ones around each stump would reach up for light. Now, all this work is in the experimental stage, as the success of planting the blue gum rests with the following figures:

We have lost of our planting through natural causes, cattle, deer and rabbit, at this time, about 25 per cent, and the remaining 75 per cent of living trees have divided up as to their rate of growth as follows: 40 per cent have made a growth of from 1 foot up, and 20 per cent of this amount have made a growth of from 3 feet to over 14 feet. The success of the planting remains then with the 60 per cent of living trees that have not reached a height of 8 to 12 inches.

If by next year these trees do start to make growth, then it would be a good policy to plant Eucalyptus on cut-over land to help stimulate the growth of redwood suckers.

The cost of this work has been:

	Per acre.
Slashing and burning.....	\$5.00
Nursery charges of trees.....	2.00
Planting	3.50
Board of men.....	.75
Railroad haul .....	.40
Total	\$11.65

Or approximately \$12.00 per acre.

Some 50,000 Eucalyptus trees have been set out for wind breaks around the Fort Bragg and Noyo harbors. We have built a nursery where we can raise and handle one million Eucalyptus trees.

We are now taking some of the cut-over land and cutting it up to ranches, some 2,500 acres has been put to this purpose and will be sold for apple orchards, and the rest of the cut-over land, in time, will be examined for the purpose of protecting the second growth from fire and the reforestation of certain areas.

The total outlay of money the company has so far spent in the last three years for all this work has been in the neighborhood of \$15,000.00.

President Flewelling: There is one more subject that I think ought to be touched upon by the

No. miles.	Cost per mile.	Acreage protected.	Cost per acre to protect.
56	\$32.37	52,000	\$0.034
54	6.81	52,000	.006
..	.....	52,000	.007
..	.....	52,000	.015
Total .....	.....	52,000	\$0.062

chair and that is the question of finance; we must finance every institution we have or it will fail. So far the Western Forestry and Conservation Association has been financed by the State, by the private institutions and private associations in the States of Idaho and Washington alone. Not one dollar has been contributed by the great State of Montana, the great State of California, the great State of Oregon, except from Oregon, \$250.00 as a personal contribution has been sent to Mr. Allen by the C. A. Smith Lumber & Mfg. Co. Now, gentlemen, you are all as much interested in this as I am, and it goes without saying that the burden of carrying on this great work should not all fall upon Idaho and Washington. Without further comment I think you should get the other three States, together and help us in some measure toward the financ-

ing of this institution. I will now consider a motion to adjourn.

Mr. Gilbert: Mr. President, will you tell us just exactly what is the source of revenue from the States that are providing funds?

President Flewelling: Idaho is organized into four districts, Pend d'Oreille, Clearwater, Potlatch and Coeur d'Alene. In the State of Washington we have two contributing associations. These associations are levying upon the membership a tax of one-fourth of one cent per acre which goes to maintain the office in Portland, Oregon, pay for the publicity work and pay Mr. Allen's salary. That is the way it has been financed; if you people in the other States will do the same

you will have no trouble and surely one-fourth cent per acre is a very small sum. It is up to you to be organized and do it; I cannot do it for you and Mr. Allen cannot; we are doing the best we can to help you, but it will require action of the men in these three States to raise money, and money is most essential.

Mr. Albee: I would like to say to the members of the association that your president has succeeded in doing something that no railroad has ever succeeded in doing yet, and that is to put a first class passenger train in fifteen minutes ahead of schedule time; I notice that when the engine begins to work pretty hard on a hill and throws out sparks he simply sets out a few cars.

President Flewelling: I have not set out any cars.

Mr. Albee: Oh yes you did; you cut out the discussion on education and I hesitate at the eleventh hour to introduce a jarring note in the convention, but I want to tell you that as far as the railroads are concerned the campaign of education goes clear on down the line.

President Flewelling: If there is any other car on the side track that has been set out of the train we will cut the train in two and put it in.

Mr. Cowles: If I can prevail upon this organization to become members of the National Fire Protection Association the dues of which are \$15.00, if we may be permitted to join your association, I think I can at least assure you that your money will be returned by contributions.

President Flewelling: I would suggest to Mr. Cowles that we should be glad to have him join our association. I wish to express appreciation to these gentlemen who have come from Montana and California to assist us. We have been very slow to organize; we have a good start. Three years ago we could not have gotten six men into the room to talk on these subjects.

Mr. Gilbert: We are going to come through on this proposition. Now, if the chairman does not rule me out of order I want to rule that it be the sense of the meeting that we extend a vote of thanks for his impartiality.

President Flewelling: Modesty forbids me to put the motion. (Motion was put to vote by delegate and duly carried.)

President Flewelling: It would be unbecoming of me if I failed to state my appreciation of the many honors which you have bestowed upon this meeting. I hope, always in future meetings, whether I preside or some one else presides, that the business will go along as smoothly as it has during this present meeting and that as good a feeling will always be manifest in all of the meetings of the Western Forestry and Conservation Association.

President Flewelling: Is there any other business coming before this meeting? We are a little ahead of time and I am glad of it.

Geo. Long: Mr. Chairman, I wish every member here, if he has not already done so, would get one of Mr. Allen's books and if he knows of any one interested in Forestry matters who has no copy, get an extra one and send it to him. It is one of the very best books that has been published on the subject we have been discussing here.

Upon motion duly seconded and carried the meeting adjourned sine die.

POLICY OF FOREST SERVICE IN REGARD TO CO-OPERATION WITH PRIVATE OWNERS

H. S. Graves, United States Forester, Washington, D. C., was represented at the Conference by Earle H. Clapp, assistant forester. Forester Graves sent a letter on "Co-operation in Fire Patrol," which, with Mr. Clapp's address, follows:

Washington, December 1, 1911.

Mr. E. T. Allen, Forester, Forestry and Conservation Association, Portland, Oregon.

My Dear Mr. Allen:

In accordance with your suggestion, I am glad to give you a brief statement of the policy of the Forest Service as regards co-operation with timberland own-

ers in protection from fire. I shall be glad to have you present this statement to the forthcoming meeting of your association at Portland.

It is a universally accepted principle that protection from fire is the first and most important step in the practical conservation of timber resources; and that common effort is essential to economy and effectiveness in meeting the common danger which threatens timber properties at periodic intervals in nearly every portion of the United States. In its administration of the National Forests in the West the Forest Service has consistently recognized the necessity for joint effort with States and private owners having local interests at stake identical with our own. We have

recognized in the opportunities afforded us for co-operation in fire protective measures not only an opportunity for effective missionary work in extending and emphasizing the most fundamental things in the conservation of forest resources, but also, and this has been given particular weight during the past three years, the direct value of such co-operation to ourselves as an administrative organization responsible for the protection of a large acreage of timbered land.

Our experience has developed several different lines and methods in which the foregoing policy has been applied. It may be of interest to the members of your association to indicate briefly the more important of



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STAND OF DOUGLAS FIR.

MR. GRAVES' LETTER.

these as expressing concretely just what the Forest Service is ready and willing to do.

Co-operation With Private Owners Important.

The most important form of co-operation yet developed has been with private owners of timberland, either individually or as associations, whose property is so situated in reference to National Forest lands that joint effort will mean more efficient and economical protection of both. The co-operative agreements entered into with the timber protective associations in northern Idaho in the spring of 1909, and which have now been in effect during three fire seasons, are perhaps the best illustrations of co-operative fire protection of a specific, detailed, and administrative character. These agreements provide for the joint protection of some 750,000 acres of heavily timbered land. The Government and the protective association, respectively, furnish patrolmen in accordance with their financial resources. The territory under the co-operative agreement is divided for patrol purposes between the employees of both parties in accordance with a specific plan covering the disposition of all the patrolmen however employed. A similar division of territory is made to establish the jurisdiction of the rangers and fire wardens in directing work on fires which may gain headway. Extra expenditures incurred for labor, supplies, and the like in extinguishing fires are divided between the Forest Service and the private owners in accordance with an agreed ratio based upon the percentage of the buildings of each in the total acreage of each co-operative unit. To facilitate the actual operation of the agreement in the field, the employees of the private associations have been appointed as officers of the Forest Service at nominal salaries to give them the requisite authority to enforce Federal fire laws and National Forest regulations. A flexible arrangement has been worked out for the prompt payment of bills and the division of fire expenditures on the ground between the Government and the associations in accordance with the ratio established at the beginning of each fire season. Special effort has been made to place all necessary authority re-

quired in carrying out the agreement with the local officers of the service, in order that immediate action may be taken by the man familiar with conditions on the ground without the delay incident to the reference of such matters to superior officers at a distance. I believe that the operation of these agreements has been effective in this respect and have demonstrated that it is possible for a Government bureau to meet a practical situation like this with dispatch and effectiveness, with no more routine than would be required by any private organization for effective checking and supervision.

Plans Made Flexible.

In a number of cases where the private owners involved have not been prepared to commit themselves to such definite obligations as were assumed by the Idaho protective associations, plans of a more flexible character have been worked out. These plans have the same objects in view and are based upon the same principle of joint effort in the protection of areas where the fire risk is determined by topography rather than arbitrary land subdivision, but differ in their administrative application. In an agreement with one of the larger timber-owning companies of western Montana, effective during the past two seasons, a number of patrolmen paid by the private owner are appointed as members of the Forest Service to give them requisite authority. These men are turned over to the local officers of the Service to be employed jointly with our regular corps of Forest Guards in the protection of areas which contain lands owned by both the Government and the co-operating owner. In this case the owner has, for his own convenience, turned over the administrative direction of his patrol to the Service in order that it may be most effectively used by amalgamation with our field organization. The cost of extinguishing fires which occur on such areas is borne by both parties to the agreement under a division fixed after investigation and conference in the case of each fire. The essential features of this agreement were incorporated in a plan put into effect in the spring of 1911 between the Forest Service and the Northern Pacific Railway Company applicable to a portion of its holdings within the Na-

tional Forests of the Northwest. The number of patrolmen furnished by the railroad company in this instance is determined definitely by the number employed by the Forest Service for corresponding acreages. Agreements of this character are perhaps preferable from the standpoint of private owners who maintain no field organization of their own and who may therefore find it most simple and economical to turn over the actual organization and direction of their patrol to the Service, which has developed a responsible field force for this identical purpose. The service is willing to assume the obligation of directing the work of such men to the best of its ability where the private owners employing them desire it, although the other plan as perfected in the agreements with the Idaho associations in which the co-operator maintains his own independent field organization, is in my judgment preferable and should be the final goal to be attained.

Other Assistance Rendered.

From co-operation of the character above described the efforts of the Service to assist other owners to mutual advantage have ranged over a great variety of means and methods, many of them wholly informal in character and consisting simply of local understandings reached through our respective employes for mutual assistance in notification of fires and taking effective steps to extinguish them. The Service is ready for anything of this sort which is found to be feasible. It has no distinct or inflexible plan of co-operation. It is ready to adapt its means and methods to the exigencies of each local situation as far as possible and to the local conditions which must always determine the ways by which the common object can be most successfully attained. A very large degree of discretion and authority is given to local officers of the Service in working out and conducting such measures as are found practicable, since it is only by placing the men on the ground in a position to really do things that success can be secured.

A distinctive form of co-operation has been developed between the Forest Service and several of the railroad companies traversing National Forest areas. In these agreements the Service has aimed to share with the railroad company the effort and cost required to reduce the fire risk occasioned by the operation of its lines. In return for the railroad's clearing its right of way of inflammable debris and such adjacent strips as may be necessary to give adequate protection to surrounding timber lands and furnishing all of its available employes to assist in fighting fires, the Service has undertaken to patrol the trackage within National Forests during dangerous periods and to furnish necessary equipment in the form of fire fighting tools, telephone communication, and the like to make our organization, in conjunction with the employes of the railroad company, an effective fire fighting machine. The agreements have also aimed to settle in part the question of liability for fire damage by providing a simple, definite scheme under which fire expenditures will be paid by one party or the other in accordance with the distance from the tract within which it started, without the necessity of fixing absolute responsibility for its origin.

Railroads Meet Half Way.

These agreements have been questioned on the ground that it is the duty of the railroad companies to overcome themselves the menace created by their presence in timbered localities. The immediate consideration, however, is the protection of Government property. I am satisfied that the co-operative plan will accomplish this most effectively. Believing that the railroads are disposed to take up aggressively the question of eliminating fire losses in the territory which they serve, I have felt it to be the better policy to meet them half way in handling this extremely difficult situation. In other words, the solution which in my judgment will be most effective is the practical application of the principle and spirit of co-operation rather than resort to processes and methods defined by law. This, to my thinking, is the significance of co-operation, as a broad principle now being generally applied in many lines of industrial enterprise, and I have felt that the railroad situation in the National Forests furnished an admirable opportunity for its application.

Certain limitations are necessarily imposed upon the Forest Service in making and carrying out co-operative agreements of all kinds. The greatest of these is the limit upon our financial resources. I am glad to admit that many of the Western timber land owners have developed more intensive and more effective systems of fire protection and spent more money upon them per unit of area than it has been possible for the Forest Service to yet bring about under the limited funds at its disposal. In certain Western States it has been impossible for the Service to meet its private co-operators half way. Other limitations are imposed by legal restrictions upon the functions of the Service and by routine in the matter of expenditures which is unavoidable in the handling of Government appropriations. These various limitations have prevented us in some instances from going as far as we desired in effective co-operation with private owners and in taking up certain projects upon which, although of unquestionable desirability, the legality of expending Federal appropriations was in doubt. With these limitations, however, I propose to make our co-operation with states and private owners as extensive and efficient as our organization will permit.

I hope that ways and means to this end will be one of the subjects considered by your association in this meeting. I shall greatly appreciate any suggestions which your members may offer as to how the Forest Service can, in accordance with the policy which I have endeavored to outline in this letter, make its co-operation with you and similar timber owners elsewhere in the country more effective.

Very sincerely yours,
H. L. GRAVES,
Forester.

MR. CLAPP'S ADDRESS.

The statements already made by members of the Forest Service indicate the progress in methods of fire protection and fire fighting in the Northwest during the past year. The work of the Service as a



SPECIMENS OF CALIFORNIA AND OREGON SUGAR PINE.

MR. CLAPP'S ADDRESS.

whole has been characterized mainly by the following lines of activity:

- (1) Efforts to systematize patrol and protection, to bring all of these activities under well defined plans adapted to local conditions and based upon careful investigations and experience.
- (2) To base the allotment of the fund available for protection upon the value of the timber involved and the degree of risk, or, in other words, to use more patrolmen, to supply more fire fighting tools and to build more telephone lines and trails in the heavily timbered districts.
- (3) The use of a very large percentage of what is

called our permanent improvement fund, ordinarily used in the construction of headquarters for rangers and other improvement work, in the construction of telephones and trails, thus insuring more efficient protection.

(4) And finally, every possible effort has been made to secure co-operation with timber land owners, fire associations and state organizations.

I believe that the best results in fire protection can be secured only by the combined efforts of individual owners of timber lands, fire protective associations, state organizations and the federal government. I can assure you that it is extremely gratifying to members of the Forest Service that we can be a party to the kind of co-operation that now exists in the Northwest. The principles which should govern the co-

operation in this region have already been worked up, and to a large extent so have the details. It will be difficult to better the spirit of co-operation which now exists. The main problem which confronts us is to perfect the details on the ground; to make sure that every protective officer, whether a representative of the Forest Service or of a state or fire association, or an individual, knows his own responsibility and the responsibility of the men with whom he is co-operating, that there is no duplication of effort, and that every timbered area is actually protected. For the perfection of these details, many of which even now are securing excellent results, we must depend upon our local representatives, and this work should not be left until the beginning of the fire season, but should be taken up at the earliest practicable date.

THOSE IN ATTENDANCE AT CONFERENCE OF FOREST PROTECTIVE ASSOCIATIONS

- H. J. Anderson, H. J. Anderson Lumber Co., Spokane, Wash.
- John W. Alexander, Weyerhaeuser Land Co., Portland, Ore.
- Waldo Avery, Jr., H. B. A. Logging Co., Portland, Ore.
- E. T. Allen, Forester Western Forestry and Conservation Assn., Portland, Ore.
- E. G. Ames, Washington Forest Fire Assn., Port Gamble, Wash.
- A. E. Adelsperger, Coos County Fire Assn., Marshfield, Ore.
- W. C. Albee, Supt. N. P. R. R., Tacoma, Wash.
- R. E. Benedict, U. S. Forest Service, Portland, Ore.
- Carl Bush, Western Electric Co., Seattle, Wash.
- Chas. G. Briggs, Holland, Briggs & Avery, Portland, Ore.
- P. S. Brumby, Blodgett Co., Ltd., Portland, Ore.
- Leonard Bronson, N. L. M. A., Tacoma, Wash.
- Henry P. Buehner, Portland, Ore.
- E. N. Brown, Clearwater Timcoer Co., Orofino, Idaho.
- S. C. Bartrum, Forest Service, Roseburg, Ore.
- Ed. A. Brown, Portland, Ore.
- M. J. Buckley, O.-W. R. R. & Nav. Co., Portland, Ore.
- E. Blockley, Southern Pacific R. R., Portland, Ore.
- H. M. Burns, S. P. & S. R. R., Spokane, Wash.
- J. L. Bowers, Spokane, Wash.
- H. W. Bush, Sunset Timber Co., Raymond, Wash.
- J. A. Byerly, Silver Lake Ry. & Lumber Co., Castle Rock, Wash.
- W. W. Barr, Seattle, Wash.
- T. R. Bolden, Union Lumber Co., Fort Bragg, Calif.
- B. E. Bush, Idaho State Land Department, Moscow, Idaho.
- Ralph Burnside, Willapa Lumber Co., Raymond, Wash.
- F. A. Blackwell, Blackwell Lumber Co., Coeur d'Alene, Idaho.
- H. C. Clair, Clarke County Timber Co., Portland, Ore.
- R. W. Condon, Puget Mill Co., Port Gamble, Wash.
- Earle H. Clapp, U. S. Forest Service, Washington, D. C.
- A. W. Cooper, Sec'y. Western Pine Mfrs. Assn., Spokane, Wash.
- C. S. Chapman, Oregon Forest Fire Assn., Portland, Ore.
- Geo. H. Cecil, U. S. Forestry Service, Portland, Ore.
- T. A. Cornwell, Portland, Ore.
- John Ceschiem, Fire Warden, Tillamook, Ore.
- C. M. Crego, Wm. Musser Lumber & Mfg. Co., Spokane, Wash.

- W. C. Calder, Wallowa Timber Co., Baker, Ore.
- O. M. Clark, Clark-Wilson Lumber Co., Linnton, Ore.
- Peter Connacher, Twin Falls Logging Co., Yacolt, Wash.
- F. H. Cowles, National Fire Protective Assn., Medford, Ore.
- E. S. Collins, Ostrander Railway & Timber Co., Ostrander, Wash.
- Wilson Clark, Clark-Wilson Lumber Co., Linnton, Ore.
- Geo. M. Cornwall, The Timberman, Portland, Ore.
- G. W. Cain, West Coast Lumberman, Tacoma, Wash.
- Ben Cobb, Lumber Review, Kansas City, Mo.
- John W. Cochran, The Oregonian, Portland, Ore.
- H. B. Clark, Portland, Ore.
- F. G. Donaldson, Traffic Department West Coast Lumber Manufacturers' Assn., Portland, Ore.
- Coert DuBois, Forestry Service, San Francisco, Cal.
- Geo. A. Day, Land Commissioner, Boise, Idaho.
- F. J. Davies, Edward Rutledge Timber Co., Coeur d'Alene, Idaho.
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- F. A. Elliott, State Forester, Salem, Ore.
- J. W. Ferguson, Jr., Deputy State Forester, Salem, Ore.
- E. E. Fox, Crawfordsville, Ore.
- F. A. Freeman, Lumbermans National Bank, Portland, Ore.
- C. H. Flory, U. S. Forestry Service, Portland, Ore.
- A. L. Flewelling, Milwaukee Land Co., Spokane, Wash.
- N. Allerdale Grainger, Forest Branch Land Department, Victoria, B. C.
- L. R. Glavis, State Conservation Assn., San Francisco, Cal.
- Wells Gilbert, Drew Timber Co., Portland, Ore.
- M. C. Griswold, Portland, Ore.
- E. G. Griggs, St. Paul & Tacoma Lumber Co., Tacoma, Wash.
- W. B. Gaskins, Portland, Ore.
- J. F. Graham, O.-W. R. & Nav. Co., Portland, Ore.
- Chas. E. Clarke, Loggers Oil Equipment Co., Portland, Ore.
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- Frank H. Heydon, W. W. Mitchell, Falls City, Ore.
- E. O. Hawksett, Panhandle Lumber Co., Ltd., Spirit Lake, Idaho.
- M. R. Hunt, Washington Forest Fire Assn., Portland, Ore.
- W. D. Humiston, Potlatch Lumber Co., Potlatch, Idaho.

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- Geo. Henderson, Humboldt, Cal.
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- Ed. Ostrander, Claim Department, West Coast Lumber Manufacturers' Assn., Portland, Ore.
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- F. A. Silcox, District Forester, District 1, Forest Service, Missoula, Mont.
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- J. R. Welty, State Forester, Olympia, Wash.
- L. J. Wentworth, Portland Lumber Co., Portland, Ore.
- A. B. Wastell, Whitney Co. Limited, Portland, Ore.
- A. Whisnant, The Timberman, Portland, Ore.
- V. O. Wallace, Deputy State Fire Warden, Mayfield, Ore.
- J. H. Walker, Willamette Pulp & Paper Co., Oregon City, Ore.



J. B. KNAPP, Assistant District Forester, Portland, Ore.



A. W. COOPER, Secy. Western Pine Mfrs. Assn., Spokane, Wash.



R. H. BURNSIDE, Willapa Lumber Co., Raymond, Wash.



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