REPORT OF OFFICES IN DISTRICT OFFICE

DISTRICT 6

FISCAL YEAR 1911

PUBLIC SENTIMENT

It is hard to prove just what change has taken place in the sentiment of the people toward the Service during the past twelve months. It seems likely that the general sentiment for and against us is less intense, more calm and judicial than it was a year ago. At that time the controversy between the Service and the Department of the Interior was more fresh in the mind of the public and partisanship more strong.

During the summer of 1910 the Service figured in the public eye mainly by its fight with fire, and generally speaking, I believe the disastrous season left us in a strengthened position with the people at large. Naturally there was a criticism, including one groundless charge of incompetence in handling a fire.

The advocates of the "light burning" theory welcomed the opportunity to put forward their arguments in the press and probably they gained some converts among those unacquainted with forest conditions. On the other hand, many people had their first opportunity to gain a realization of the terrors of forest fires and the vigilance and devotion of the rangers gained many friends. I have in mind an instance where the sentiment of an entire settlement has been changed as a result of generous assistance in fire-fighting given by the Service. The crystallized sentiment of the people of Oregon is shown in the fire law passed this spring, one of the best fire laws in the country.

In Alaska the failure of Congress to provide a method of leasing coal lands and the long drawn out investigation of the Cunningham and other groups of claims has created considerable ugly lawless sentiment and though it usually seems to be directed mainly at Congress and the Department of Interior, the Service comes in for a share of it.

On the Tongass our adaptation of timber sale administration to the peculiar conditions of the country has apparently silenced the complaints which we used to receive.

The attitude of the press has not changed notably though partisan feeling is much less intense than when the Service was more in the limelight. The Oregonian, in its editorials, now makes only sarcastic slurring references to "Pinchotism" where a year ago its attacks were continuous and ignorantly venomous. The largest Seattle papers are hostile; the Spokesman-Review of Spokane friendly.

From his interview with many lumbermen in gathering data for the Tax Study of the State of Washington, Mr. Frank Kellogg has had an opportunity to gauge their sentiment and he tells me he believes them generally very friendly disposed. Addresses at gatherings of lumbermen and publicity to the timber work of the Service have resulted in a better understanding and greater confidence in our intentions. At the annual meetings of the international Wool Growers Association, the Oregon Wool Growers Association, and the Eastern Oregon Mining Congress, resolutions favorable to the Service were passed.

To sum up, I feel that the sentiment of the people at large is not unfavorable to the Service.

EDUCATION

Last December a circular letter was sent to all Forest officers urging that they make a special effort to read, during their leisure time in the winter, a number of technical books on Forestry. This reading course was recommended in the hope that many of the Rangers would, by reading these books, obtain a comprehensive conception of the meaning of Forestry, and a clearer understanding of what the Forest Service is striving for in the development of a sane and conservative National Forest policy, thereby increasing their enjoyment of their work and their usefulness to the Service.

The books which were recommended for study, with the time to be devoted to each, were as follows:

"Primer of Forestry," parts I & II,	4 weeks
Schwappach's "Forestry,"	2 weeks
Fernow's "Economics of Forestry,"	4 weeks
Cary's "Manual for Northern Woodsmen,"	3 weeks
Sudworth's "Forest Trees of the Pacific Slope,"	4 weeks

There was also on the list Fernow's "History of Forestry," but as it is not now in the Supervisors' libraries, it could not be studied by the Rangers.

Reports have been received from most of the Supervisors showing the reading which has been done by members of their force during the winter. These reports show that a good deal of reading has been done along the lines suggested which is most gratifying for it indicates the very keen desire on the part of many of the Forest officers to increase their knowledge and to better themselves.

A tabulation of the reports from the 20 Forests which have been heard from shows that the following number of officers have read the prescribed books:

"Primer of Forestry," part I,	83
"Primer of Forestry," part II,	81
Schwappach's "Forestry".	41
Fernow's "Economics of Forestry,"	31
Cary's "Manual for Northern Woodsmen,"	43
Sudworth's "Forest Trees of the Pacific Slope,"	68

Some of the books have, of course, not been read in to, but the list indicates the number of Forest officers who have really studied the books. In addition to these books, several Supervisors report that some of the rangers have read, during the winter, such

books as "Principles of Handling Woodlands," "First Book of Forestry," "Forest Mensuration," "First Aid," "Pack Trains and Packing," "Elements of Botany," and similar books on forestry, engineering, and allied subjects. Many of the Rangers were at the Ranger School where they pursued a much more thorough course of study and reading.

I feel that suggesting a short prescribed course of books very decidedly stimulates the Rangers to read books which they would otherwise not read, and I propose to issue similar suggestions for a reading course next fall. Some of the Supervisors have spoken of the inability of their men to assimilate the material in some of the books, and I therefore plan next year to send to each Forest officer an outline to use in the study of each book, as has already been done, I believe, in some of the other Districts.

RANGER SCHOOLS

The Ranger School, or rather Short Course in Forestry, mentioned in the foregoing has been carried on for three years in connection with the University of Washington at Seattle. The faculty of the University has furnished short courses in:

First Year

1. Silviculture
2. Forest mensuration
3. Forest surveying
4. Forest law
5. National forest administration
6. English composition (elective)

Second Year

9. Silviculture
10. Forest mensuration
11. Forest surveying
12. Lumbering
13. Forest management
14. Geology (elective)

Elective - First or Second Year

15. Botany
16. Veterinary science
17. Animal husbandry

While the Forest Service has, through the District office at Portland, given a course of lectures on National Forest administration embracing Silvics, Timber Sales, Tree Planting, Grazing, Claims, Settlement, and in fact all the lines of National Forest work. The course takes about three months, including two weeks field work and has been of great benefit to the men availing themselves of this opportunity to further their knowledge and increase their usefulness to the Service. In 1909, 42 men, of whom 38 were on furlough from the Service, attended the school; in 1910, 43 men from the Service and this year 23 men including Rangers and Guards. Each man receives a rating for the work done and this rating is furnished the District Forester for his information.

The lectures given by men from the District Office at the last session of the school were mimeographed and sent to every Ranger in the District in order that those unable to attend the school might have the advantage of at least a part of the lecture course.

During the year, in addition to the lectures at the Ranger School, the following talks were made by members of the District Office:

Subject	Location and Body	Name
Range Development and Improvement on National Forests	Portland, Ore., National Wool Growers' Association	C. S. Chapman
Grazing on National Forests	Portland, Ore., National Wool Growers' Association	C. S. Chapman
Forest Taxation	Spokane, Wash., Western Forestry and Conservation Association	C. S. Chapman
Forest Fires	Spokane, Wash., Western Forestry and Conservation Association	C. S. Chapman
Relations between the Forest Service and the Miner	Sumpter, Ore., Eastern Oregon Mining Congress	G. F. Mead
Logging in the National Forests	Portland, Ore., Pacific Logging Congress	F. E. Ames
Wood Using Industries of Washington	Seattle, Wash., Semi-annual Meeting Washington Conservation Ass'n.	J. B. Knapp
Branch of Products, Forest Service	Seattle, Wash., Forestry and Engineering Students, University of Washington	J. B. Knapp
Wood Block Pavements and Forest Service Tests	Portland, Ore., Monthly Meeting, Oregon and Washington Lbr. Mfg. Ass'n.	J. B. Knapp
Wood Preservation	Agricultural and Engineering Students, Oregon Agri. College, Corvallis, Ore.	J. B. Knapp

SUPERVISOR AND RANGER MEETINGS

No Supervisor or Ranger Meeting was held in the District during the past fiscal year because of the lack of funds occasioned by the serious fire season of last summer. Since however, a meeting of the Supervisors was held in March, 1910, the previous year, as well as Ranger Meetings for every Forest in the District it is not believed that this inability to get the men together for a consultation this year will be a serious drawback to the work.

INFORMATION

As previously stated elsewhere the press took an intense interest in the fire situation of last summer and representatives of the Portland papers visited the District office daily. Since the close of the fire season this demand for information has fallen off until aside from occasional visits from the reporters of the Oregon Journal, a paper favorably inclined toward the policy of conservation, and the representatives of the lumber trade journals, requests for information have become rare.

The Trade Journals however, are anxious to get all the information possible and an effort is made to supply them with a full account of what the Service is doing.

The attitude of the Oregonian, one of the most influential and widely read papers of the Northwest, has not changed toward Conservation, or, as it is called in the Northwest, "Pinchotism." The attacks made upon the Service itself have become less violent, and its criticism more logical.

WATER POWER

When the District organization took place it was realized that one of the first steps to be taken in connection with the water power work was the reconnaissance of the District to ascertain in a general way the number and amount of these powers and to get acquainted with the various watersheds upon which development might be made. To that end Mr. Herring, the District Engineer, spent practically the entire field season of 1909 in the Cascade Mountains in Washington, and all of the field season of 1910 in the Cascade Mountains in Oregon.

During 1909 he examined and reported on the following streams in Washington: The Skagit River on which are some of the largest possible developments in the District, and two of its largest tributaries, Thunder Creek and Cascade River in the Washington National Forest; the Stehekin River, part of Bridge Creek, Railroad Creek, Agnes Creek and Chelan River in the Lake Chelan drainage on the Chelan National Forest; the Twisp and Methow Rivers in the Okanogan Forest; Icicle Creek and a portion of the Wenatchee River in the Wenatchee Forest; a portion of the upper part of the Cowlitz drainage in the Rainier Forest.

In Oregon, during the same year the following streams were examined: The North Fork of the Santiam and Clackamas Rivers in the Oregon National Forest; North Umpqua River in the Umpqua Forest; Crane Prairie and the upper Deschutes River in the Cascade Forest.

During the summer of 1910 Mr. Herring made a long pack trip from Mount Hood just east of Portland to the Southern Oregon line, in which he examined the upper reaches of all the more important streams heading in the Cascade Range, among which were the Salmon, Clackamas, Breitenbush and the North Fork of the Santiam Rivers in the Oregon National Forest; the McKenzie River, Lost Creek and Horse Creek, Roaring River, the North Fork of the Willamette, Salmon River and Salt Creek in the Cascade Forest; North Umpqua River and Lake Creek in the Umpqua Forest; practically all of the tributaries of the Rogue River above Prospect, Oregon, in the Crater Forest; the lower Rogue and the Illinois River, one of its largest tributaries and the South Fork of the Coquille in the Siskiyou National Forest. A portion of the spring of 1910 was spent in Eastern Oregon, making investigations of the Big Minam, Little Minam and Eagle Rivers in the Wallowa National Forest, and on Rock Creek and the North Fork of the John Day River, together with some of its principal tributaries on the Whitman National Forest.

In addition to the work which Mr. Herring has done in connection with the water powers he has also carried on improvement work and made improvement inspections on the Forests where he has been. This work involved traveling in 1909 over about 1800 miles of trails, the longest single trip covering about 600 miles. During the field season of 1910 he traveled over more than 2400 miles of trails in the different Forests, the longest single trip being one of over 1300 miles. I now feel that we have a splendid first-hand knowledge of the power possibilities in this District and a knowledge which is of great use to us at all times. Mr. Herring has gathered a large amount of valuable data, the larger portion of which has been included in two reports which he made during the year 1909 on the water power situation in Western Washington and in his progress report for 1910 which deals with the water powers in the entire District I believe that too much importance cannot be given to the reconnaissance work which has been done, and while it has been necessary to do it rapidly in order to cover the ground, yet the knowledge which has been obtained is well worth the time and expense in securing it.

I further believe that we have a better first-hand knowledge of the streams in this District than is possessed by any one else, and in fact, it is of such an extent that it will be necessary for the District Engineer to make but few field trips in connection with preliminary applications received for power developments. The Olympic country, which has a number of possible power developments, as well as Northeastern Oregon and Northeastern Washington, still remains to be investigated, and it was the intention to have this done as soon as the opportunity occurs. The opportunities for power development in this District are extremely large and it is estimated by conservative people that nearly one-third of the possible water power developments will be outside the boundaries of the National Forests but there are many extremely large developments inside the boundaries, some of the possible developments running as high as 50,000 H.P. With the advent of a market for these powers the construction of

plants to meet the demand will be rapidly taken up. Until a demand exists for the power many of these possible developments must lie dormant.

At present time the largest operating plants in the District are outside the boundaries of the National Forests. There are three large power markets in this District, the largest being the Puget Sound country with Spokane and Portland ranking next. The total installation in central stations both steam and water power in the Puget Sound country is in excess of 89,000 H.P., in Spokane 91,000 H.P., and in Portland 70,000 H.P. In the Puget Sound market before the end of the year 27,000 additional horsepower will be ready for use. This will make a total of 116,000 H.P. in the Puget Sound country. This market is practically controlled by the Stone and Webster Corporation, the only opposition being the Seattle Municipal Power Plant. Plenty of opportunities exist for the development of power which could be transmitted to this market but owing to the strength of the Stone and Webster Corporation, much difficulty is experienced in financing an opposition company. Until the present year, the Portland market has been dominated and controlled by the Portland Railway Light and Power Company. A new company has made its appearance since the first of the year, known as the Mt. Hood Railway and Power Company, which, from all evidence, appears to be a competing company. The initial installation in their water power plant will be 24,000 H.P. In the Spokane market there are two operating companies but there does not seem to be any competition at the present time.

Two other large operating companies have entered this District in the past year, one being the H.M. Byllesby Company of Chicago, with headquarters in Chicago, and the other the Pacific Power and Light Company, a subsidiary corporation of the American Light and Power Company. The former company is operating several small plants in the west central portion of Oregon, and is constructing one hydroelectric plant on the McKenzie River outside of the National Forest boundaries. The other company is operating several hydroelectric and steam plants adjacent to the Columbia River in both Washington and Oregon, extending as far east as Walla Walla, Washington. They also own and operate the steam plant in Astoria.

No large additional consumers of power have appeared during the past year, yet the steady increase in the demand for both light and power has been very gratifying to operating companies. This increase has been remarkably constant for the past several years, and each year has shown an increase over the preceding year of about 25%. But few speculative developments have been made in Oregon recently, due probably to the new water law adopted in that state on May 22, 1909, which imposed a high charge for water used for power development. The remarkable increase in population in the population centers in these two states shows conclusively that the states have just started on their growth. With splendid transportation facilities both rail and water, hydroelectric potentialities sufficient for many years and raw material suitable for manufacturing on the greatest scale, there seems to be nothing lacking to prevent their rapid growth and incidentally a large increase in the amount of power needed and that will be developed in the District.

The new water power regulations which went into effect December 29, 1910, have been on the whole very favorably received by applicants for power developments. The general feeling seems to be that they fulfill the conditions better than did the former regulations but there is still a feeling that there is opportunity for disagreement as to the interpretation of some of the regulations and also as to the manner in which the charge will be determined. This it is thought can be overcome through consultation with the interested parties. Several applications have been received for both preliminary and final permits and in one case a protest has been made on the amount of the charge imposed and the company reserves the right to protest at a later date. It is expected that within the next 30 days at least ten cases will be forwarded to the Forester for action. At the present time there are 32 cases in this District for which permit has been issued or the application for permit is completed. In addition there are 13 cases for which the preliminary papers have been received but the preliminary applications have not been completed or the companies have notified us that they desired to take out a permit. These may be classified as possible applications which will be perfected within the near future. At the end of the present calendar year it is expected that we will have more than 50 cases under permit in this District. Of the 32 cases for which permit has been issued, nine are operating plants and seven are plants which are under construction.

If all the plants for which permits have been issued are constructed the annual revenue which will be derived from them at the end of five years from date will be in excess $25,000 and at the end of the tenth year it should be approximately doubled. This is provided of course that no new applications are received which will not be the case, since we already know, as stated above, of a number of new cases that will be presented in the near future.

With a constantly increasing knowledge of the run-off in the various streams and with the additional knowledge secured by the District Engineer on his various trips through the Forests, it is the intention to have him make each year a progress report on the conditions within the District. In order to do this it is necessary not only to know the conditions in the Forests but also the market conditions in the various localities. In order to obtain a knowledge of these conditions it is necessary to study and become familiar with the operating plants and the use to which their power is put. This study has been started by the District Engineer and much valuable information secured. It is planned to have him continue this during the next fiscal year and add to the knowledge which we already have along these lines. It is also planned to have him make a water power reconnaissance of the Olympic Forest during the coming year. He will also inspect and report on several applications which have not as yet been acted upon. In addition to the water power work he will supervise the stream measurement work being carried on in cooperation with the Geological Survey and will make certain field trips in connection with improvement work.

In the cruising work carried on in the Forests it is very often necessary to run base lines along certain streams. Where these base lines are along a stream of any importance it is planned to have the District Engineer use them as a basis for working up thoroughly

the possible water power developments on the stream. In addition to this it is thought that it may be possible later on to have surveys made on streams that are known to be especially desirable from a water power standpoint and have the different possible developments shown, together with all data that can be secured in regard to them. It is a question with me if this should not be done in certain instances on some of the more important streams and the information published and given to the public in the same manner that we make a timber reconnaissance. This resource is, I believe, next to the timber the largest that we have and I believe that we should exploit it to as large an extent as possible. I am not in a position at the present time to recommend the streams on which such surveys should be made nor can I furnish an estimate of the cost, but before the end of the present year I hope to be able to send you a plan of this kind together with an approximate estimate of the cost for your consideration.

STREAM MEASUREMENTS

One of the most serious drawbacks in connection with water power developments is the lack of knowledge in regard to the flow of the different streams. With all the large and important streams in this District it would be natural to assume that much would be known of the run-off of the streams, but such is not the case. On but few of them have regular measurements been made for any period of time, and when such data is needed it is usually computed from precipitation data. Such a determination cannot be depended upon for several reasons. The Geological Survey has been carrying on the work of stream measurements as extensively as the funds at their command would permit, and a number of companies and individuals interested in both irrigation and water power developments have been making such measurements on different streams for several years. Many of the latter records, however, are not published and the results are not known to the public. During the past summer the Forest Service cooperated with the Geological Survey extensively in this work and we now have approximately 40 regular stations established in this District on which we are getting frequent readings. It is hoped that these can be increased during the coming summer and every resource will be used to further the work. It is realized that it is extremely important that as many streams be rated as is possible, not only for water power purposes but for the purpose of determining the relation between stream-flow and forest cover.

SILVICULTURE

FOREST MANAGEMENT

Stand and Distribution of National Forest Timber

The total stand of timber on the National Forests in District 6 is regularly estimated to be 287,202,000,000 feet board measure. This includes the timber on the two National Forests in Alaska which is estimated to be 69,000,000,000 feet. It must be remembered that this estimate should be considered as only an approximation. It is based to a small extent on careful cruises in which from 5 to 10 per cent of the timbered area was

covered but to a much greater extent on calculations based merely on the forested areas and average stand per acre. This approximation of the timber stand will each year be converted more closely to accurate figures as the timber cruising work progresses. At the present time it must be taken for what it is worth.

An estimate based on our present approximation of National Forest timber and on the estimate of the total stand of timber in the Pacific Northwest States made recently by the Commissioner of Corporations shows that in Oregon the National Forest timber comprises only about 25 per cent of the total stand of timber in the state and in Washington only a little more than 20 per cent.

Cut of National Forest Timber

The cut of National Forest timber in District 6, during the fiscal year 1910, was 72,602,000 feet B. M. Of this amount about 17½ per cent was cut under free-use permits. If cutting should continue at this rate, according to the present estimate of what we have, the timber on the National Forests in this District would last 3956 years. It is evident then that much more timber could be cut from the Forests each year without impairing their productive capacity and it is believed that about 2,250,000,000 feet, B. M. could be cut each year with safety. This is based on the assumption that one per cent of the faster growing stands – Douglas fir – and one-half of one per cent of the more slowly growing stands – western yellow pine – could be cut each year.

There cannot be said to have been an improvement, on the whole, in the lumber market over the preceding fiscal year. The main trouble seems to be over-production. A great number of the sawmills in Washington and Oregon are in the hands of creditors who desire to keep them operating in order to obtain some money returns and in order to keep them in running condition until the better times, which they think the opening of the Panama Canal will bring, shall come. It is a well known fact that a sawmill deteriorates more rapidly when shut down than when in operation. The results has been an over-production of lumber. While a good price is still received for the higher grades of lumber, the common grades are being sold at a price which is lower than their total cost of production. There also seems to be a lack of cooperation among the lumber producers. None wishes to shut down but all wish to keep their mills running and the result is over-production. There has also been a surplus supply of logs and in order to give some relief to the sawmill men the loggers have recently reduced the market price of logs on the Columbia river $1.00 per M. on all log grades. This may relieve the situation somewhat but probably not much. If this state of affairs keeps up long it may ultimately result in a reduction of the stumpage price of privately owned timber, although, as a rule, this is the last item to be affected by a dull lumber market.

In spite of this sluggish condition of the lumber market there has been an increase in the National Forest timber sale business during the present year. This increase is mainly in certain localities where conditions appear to be more favorable for timber exploitation.

The chief increased demand is for western yellow pine timber on the east side of the Crater National Forest in Southern Oregon. Here the timber is tributary to Upper Klamath Lake and it is a comparatively short haul to the lake shore whence either the logs are towed or the manufactured lumber taken by barges to Klamath Falls. At this point the lumber is transported by rail to lumber markets in California and the Middle States. The manufactured product commands a fair price since a stumpage price of $3.25 per M. is usually secured for western yellow, western white, and sugar pines in Forest Service sales in this region. Besides four sales which were made in previous years in this locality, ranging in size from 5 to 10 million feet each, there are three new sales now being negotiated of 16, 59, and 103 million feet respectively and it is probable that further applications for timber in this region will soon be received.

Another region where there has lately been an increased demand for western yellow pine is on the Whitman National Forest along the Sumpter Valley Railway in Eastern Oregon. Here also logging is comparatively easy but the freight rates charged by this railroad are excessively high. In spite of this, purchasers have been attracted to logging propositions in this region. Since last summer one sale of approximately 20 million feet has been in operation, and the same purchaser desires 50 million additional feet of timber. Another sale of 73 million feet is being advertised, another of 50 million is being cruised and an informal application for an additional 50 million feet has been received.

On the Colville National Forest in Northwestern Washington a considerable timber sale business has been inaugurated during the year mainly on account of the demand for western red cedar poles and piling in the Spokane market. During the present year six tracts of timber have been advertised for sale under a general notice and six contracts for the purchase of large amounts of National Forest timber on this Forest have been approved. These are mainly for western red cedar poles and piling but some are for Douglas fir railroad ties and some include saw timber of other species, mostly western yellow pine.

In Alaska the demand for lumber for boxes and building purposes and piling for fish traps has resulted in an increase in the timber sale business on the Tongass National Forest during the current year. The Supervisor has thus far approved fifteen large advertised sales ranging in size from 100,000 to 1,400,000 feet B. M. each and aggregating approximately 3 million feet B. M. Sitka spruce and western hemlock are usually included in the sales which are near the shores of the islands and mainland. Occasionally a few yellow cypress trees are also cut.

On the Snoqualmie National Forest in Washington two rather large sales were approved during the year. One is of 28 million and the other of 42 million feet, Douglas fir being the leading species in each sale. Both of the sales are to responsible logging companies who are logging their own timber near the National Forest. These sales are most opportune, therefore, because the Government timber can most economically be logged at this time along with the privately owned timber. In one of these sales an innovation has been made by including in the contract a stipulation that the purchaser shall render a certain amount of assistance in the form of labor for the purpose of

planting up the area cut over, under the direction of Forest officers. The sale has not yet progressed far enough to start this work but the operation of this clause will be watched with interest. It is thought that in this way a much more satisfactory new stand will be established than if natural seeding were depended upon for the regeneration of the stand. This method is obviously cheaper than leaving individual or groups of seed trees which would represent just so much capital tied up.

In Northern Washington there has been some demand for western red cedar for shingle material. During the year four sales have been made on the Washington and Snoqualmie National Forests which aggregate 4,200 cords of shingle bolts. This cedar is usually found in the river bottom and can be driven in the form of shingle bolts down rivers and streams in which saw logs cannot be driven. Most of the cedar material included in these four sales was cut from trees which had been killed by fire over 50 years ago.

On the Olympic Peninsula in Washington the timbered areas within the Olympic National Forest is surrounded by a fringe of privately owned timber. This situation almost bottles up the more inaccessible Government timber, since the private owners generally hold the key to the logging situations by controlling the natural outlets for government timber. It would appear, therefore, that we must look for relief largely to the owners of these key situations. At the present time one of these companies is negotiating for the purchase of 100 million feet on the east side of this Forest and it is hoped that this will be followed by sales of large amounts to other similar companies.

Fire Killed Timber

Much difficulty has been experienced in disposing of the timber on the National Forests that was killed or damaged by the fires of last summer for the main reason that it is situated in such inaccessible places that the cost of logging is almost prohibitive. The greatest amount of such timber aggregating 134,500,000 feet B.M. is found in three places on the Crater National Forest in Southern Oregon. There is an additional amount of 117,000,000 feet B.M. of live timber which could be logged at the same time with this dead timber but none of the three propositions are attractive enough to secure a purchaser for the timber as yet. The timber on one of these areas consisting of 20 million feet, in which about 70 per cent is fire damaged, has been advertised for sale at a flat rate of $1.20 per M. for both live and dead timber but none of it has yet been sold. Attempts are also still being made to sell the timber in the other two propositions but since the timber is on the west side of the Cascades and tributary to the Southern Pacific Railroad which charges a high freight rate, and since the differentials charged by local railroads are excessively high and since the construction of the necessary many miles of logging railroad will be very costly, it is doubtful whether our attempts to sell it will meet with success. The Supervisor of the Snoqualmie National Forest has been successful in selling approximately one million feet of fire damaged timber near the Northern Pacific Railroad at $1.00 per M. for Douglas fir and western red cedar and 50 cents per M. for western hemlock and amabilis fir. On the Wallowa Forest a tract of approximately 5 million feet of live and fire-killed western yellow pine timber has been

advertised for sale but on account of its inaccessibility no purchaser has bid on it. On the Chelan Forest the advertisement of two similar propositions of 19 million and 10 million feet, respectively, have as yet resulted in no sales.

Timber Sale Policy

The aim in National Forest management is to cut first those bodies of timber which has passed maturity and have begun to deteriorate. The disposal of this class of timber, however, is dependent upon the demand for it and although for some time accessibility will govern the location of a good many of the sales, the cutting in such sales will usually be in stands which are over-mature and decadent. This is because there is such a large amount of timber of this class on the National Forests. The western yellow pine stands include a relatively large proportion of timber which has passed maturity and which is ready for the ax. In the Douglas fir stands the proportion of over-mature and decadent timber is relatively large. Reconnaissance studies have disclosed the fact that on the Olympic and Snoqualmie National Forests in Washington 89 and 92 per cent respectively, of the total area of accessible merchantable timber is over 200 years old. The advisability, therefore, of cutting those older stands of Douglas fir timber in order to secure a proper distribution of age classes for the purpose of making possible a sustained annual yield during the second and following rotations without the sacrifice of volume production in these rotations by having to cut immature stands or holding stands until they are greatly overmature, is quite apparent.

In cutting these mature stands the construction of many miles of logging railroads will be necessary. In order to encourage purchasers to incur heavy expenses in exploiting the timber in this manner it will be necessary to offer special inducements. Large amounts of timber will have to be placed under contract in order to justify the great outlay of capital, longer periods than five years will be necessarily required for the removal of the timber, and in some cases it may be necessary to make a reduction in the stumpage price, at least in the price of timber cut during the first few years of the sale. In determining how much the stumpage should be reduced in a sale of a part of the timber on a watershed where the proportion of privately owned timber on the watershed is insignificant, the whole body of timber tributary to the railroad should be taken into consideration, that is, the cost of the railroad should be charged against all the timber tributary to it and not merely against the first sale of timber on the watershed.

Railroad Development in the District and its Relation to National Forest Timber

Until recently the Pacific Northwest has been one of the portions of the United States most undeveloped by railroads. Large areas of timber and agricultural land situated back from the Pacific Coast and in the inter-mountain region have necessarily been unexploited on account of the lack of transportation facilities and it is only within the last year or so that steps have been taken to open up this country by the building of railroads.

The most conspicuous development in this line is in central Oregon where the parallel Oregon Trunk and Oregon-Eastern Railroads are being constructed south from the Columbia River along the east slope of the Cascade Mountains through 300 miles of one of the largest western yellow pine timber belts of the west. These railroads will make more accessible the National Forest timber along the east slope of the Cascades throughout the length of the state and already the construction of these railroads has resulted in many inquiries concerning the sale of National Forest timber in this region.

The Natron cut-off of the Oregon-East Railroad across the Cascade Mountains southeast of Eugene, Oregon, will make accessible not only the Douglas fir stands of National Forest timber west of the summit of the mountains but also the readily logged stands of western yellow pine on the eastern slope.

In the Okanogan Valley in northeastern Washington the Great Northern line from Oroville south to Pateros will undoubtedly increase the sale of western yellow pine timber on the Okanogan National Forest. Similarly, the sale of timber on the Olympic Forest will be stimulated when the projected railroads on the west side of the Olympic Peninsula are constructed.

The building of smaller projected lines will also make possible the exploitation of much mature National Forest timber which is ready for the ax. Two of these are the Mt. Hood Railway and Electric line across the Oregon National Forest south of Mount Hood and the North Coast Railroad up the Cowlitz River on the Rainier Forest across the summit of the Cascades eastward to North Yakima, Washington.

Reconnaissance and Cruising

Much progress was made during the year in the extensive reconnaissance of the National Forests west of the Cascade Divide. The work on several of the Forests was completed and large portions of other Forests were covered. The results of this work have given us information on the types of timber, the location of age classes, a rough estimate of the amount of timber, and the localities where timber should first be cut and how it should be cut which will enable us to manage properly the timber until more detailed information can be secured.

A similar study was started on the western yellow pine Forests east of the Cascade Mountains in Washington and Oregon and much progress was made in covering large areas of these Forests. The results of this work will also help us in the plans for the proper management of the Forests and more particularly will make it possible to direct logging operations to those localities where the timber is most in need of cutting.

A timber cruise of an intensive nature was also made during the year on the Crater, Olympic, Snoqualmie, Umpqua and Whitman National Forests and approximately 173,500 acres were covered. This work was conducted on the watersheds where the timber is mature and where there is, or soon will be, a demand for it. The cruises were carefully made and sufficient data secured to make possible the preparation of accurate

maps and working plans for the proper management of the stands for many years to come.

Work for the Ensuing Year

During the ensuing year further efforts will be made first, to dispose of the timber which has been killed by fire and second, to estimate and map bodies of overmature timber in order to offer them for sale.

Much of the extensive reconnaissance work yet unfinished will be brought to a conclusion so that we shall have more accurate information on which to base our general plans for forest management.

On six of the National Forests cruising work will be carried on and as much information as possible will be obtained so that definite working plans can be made for certain working circles where the demand for timber is great. The greatest effort along this line will be made on the east side of the Crater National Forest in Southern Oregon. It is thought that this work will coincide nicely with the most important work of fire patrol since the cruising parties will be fully equipped and readily available for fighting fires in the region of their work.

Douglas Fir Study

The tabulation of the data collected in the study of Douglas fir on the western foothills of the Cascade Mountains in Oregon and Washington has been completed, and two reports on this subject prepared. One is a report of sixty-five pages which discusses fully all the information collected in this study, and the second is a more popularly written and much briefer discussion of the same subject. The latter is to be issued as Circular No. 175, and is now in press.

Yellow Pine Study

The major study undertaken in this District during the past field season is the study of western yellow pine in Oregon, particularly of its growth and yield, and of the characteristics which have a bearing on the silvicultural management of the tree. Two crews of three men each devoted about three months to this study, one crew working entirely in the Blue Mountains of Oregon and the other entirely in Klamath County. 2,482 trees were measured, of about two-thirds of which stump analyses were made; of the remainder only volume measurements were made. In addition, 461-1/2 acres were calipered in order to get data in regard to the normal stand of the tree in this type. Work on the tabulation of this data has been in progress almost uninterruptedly for the past four months, but it is not yet completed. Part of the data, particularly the volume tables, has already been found very useful. One of the most striking lessons from this study is the extreme slowness of the growth of yellow pine in Oregon, particularly in the Blue Mountains. It indicates the necessity of cautious cutting in order to conserve a perpetual supply. The use of the growth and yield data in conjunction with the timber

reconnaissance now in progress should make it possible to determine what the annual growth for the yellow pine type (**the** commercial type of the eastern Oregon Forests) is, and what the annual cut should be. This data will be particularly applicable on the Whitman and on the eastern side of the Crater National Forest. Some data was also obtained in regard to the soil moisture requirements of yellow pine, and its reproductive characteristics.

It was at first intended to prepare a report for publication as a circular, based on the work of this one season and called "Western Yellow Pine in Oregon." Owing to the great variety of conditions in various parts of eastern Oregon, in only a few of which the study was conducted last summer, it is thought better to continue this study along similar lines this coming summer in order that the published circular may be based on enough information to be reliable and convincing, and be broad enough in its scope to include all parts of the yellow pine region of Oregon.

The total cost of the field work in connection with this study amounted to approximately $1,850, exclusive of Mr. Munger's time in the field on this study, which amounted to about five weeks. From this amount should be subtracted $125. in consideration of the fact that about a week was spent by each yellow pine crew in fire fighting.

Study of Avalanches

In May, 1910, and in August, a brief field study was made of the avalanches of the Cascades in Washington, with a view to determining what relation exists between forest denudation and the formation of avalanches, and what practical measures are possible to decrease this occurrence. The conclusion reached was that a certain kind of avalanche, i.e., slope-slides, such as the destructive one at Wellington, are possible only when the forest cover has been destroyed. Efficient fire protection and the forestation of the denuded slopes which will not restock naturally, will tend to decrease the occurrence of avalanches. The report which was prepared as a result of this study is now being revised with a view to publishing it as a circular entitled "Avalanches of the Northern Cascades."

Intensive Study of Cut-Over Area

A cut-over area in the Douglas fir timber of the Wind River Valley on which single seed trees were left after logging and broadcast burning, was selected for intensive study. An area of seventy-five acres was established in June, all the seed trees upon it measured, tagged, and platted on a map, and a series of 110 square-rod reproduction plots laid off and permanently marked. The seedlings on all these plots were then counted and tallied by age and species. They were recounted five months later after the close of the vegetation season; it is the plan to again recount them every six months for a year for three or four years.

It is expected that the repeated examination of this area will lead to definite conclusions in regard to the success of this method of Douglas fir management, the distance to

which seed is disseminated from seed trees, the relation of brush and weeds to the growth of seedlings, the factors which are particularly favorable or unfavorable to the germination of Douglas fir seed and the development of the seedlings.

Brush Disposal Experiments

In addition to the two experimental areas already established on which the two methods of brush disposal in the yellow pine type, piling and burning and scattering and not burning, are being tried, a nine-acre plot has been laid off on the Deschutes National Forest. Here the soil is an extremely dry pumice, yellow pine reproduction is rather poor, and therefore the conditions are particularly favorable for a conclusive experiment.

Study of Damage Done by Surface Fires

Owing largely to the repeated appearance of statements saying that frequently recurring light surface fires do not harm the forest, but that they consume the combustible material and make impossible the occurrence of severe fires, a study was made of the damage actually done by typical surface fires in several localities in both eastern and western Oregon. Strips were run across the burns and all the trees scrutinized and thrown into classes according to the damage which had been done to them by the surface fires. Burns on six Forests were so studied, partly by Mr. Munger and partly by the local Forest Assistants. The data has been tabulated and it shows most strikingly the large number of trees which are either burned off by the surface fires or are fire-scarred. The serious effect of such fires is particularly apparent in yellow pine stands.

Insect Infestation Investigation

One of the most important lines of work which has been conducted by this Section is the reconnaissance of the bark beetle infestation in the Blue Mountains of Eastern Oregon. The infestation which has been present and rapidly spreading in the lodgepole type of the high mountains for several years, appeared abundantly in the yellow pine of the Whitman National Forest in the spring of 1910. A rough reconnaissance of the Forests of the Blue Mountains was undertaken in order to find out the areas infested, the rapidity and direction of spread of the invasion, and the practicability of control measures. The Whitman, Wallowa, Malheur, Deschutes and Wenaha National Forests were so reconnoitered, but widespread, serious conditions were found only on the first two of these.

In the fall of 1910 active control measures were started on the Whitman Forest in the yellow pine type. The infested trees on 340 acres were cut and burned, and 1,000 acres of adjacent forest was minutely examined and declared to be free of bark beetle work. The control operations will be continued on an even larger scale this spring on the Whitman National Forest, and probably started on the Wallowa National Forest.

Western Red Cedar Study

In January a crew of three, Forest Assistant Jackson and two Rangers, went into the field to make a study of western red cedar, in particularly to gather data for volume tables, growth tables and silvical notes. This work will be confined entirely to the commercial zone of red cedar on the western foothills of the Cascades in Washington. This crew will probably remain in the field three months, at the end of which time, if the data is found to be sufficient in conjunction with that already available, a report will be prepared, for publication as a Forest Service Circular, descriptive of this tree, its range and abundance in the Northwest, its rate of growth, commercial use, and adaptability to management for the forests of the future.

Experimental Sowing and Planting

In the division of work in this office the conduct of experimental sowing and planting, as well as of extensive artificial reforestation, has been handled by the Section of Planting, but on several occasions work of this nature has been done by Mr. Munger, principally on the Wallowa National Forest where some of the old experimental areas were looked over, new areas selected, and plans for the experiments made, and on the Wenatchee National Forest where the sowing operations were supervised.

Herbarium

During the year considerable dendrological data concerning the trees of the District, and some rather notable additions to the hitherto reported ranges of several trees have been obtained. Several new specimens have been added to the herbarium of this office.

Library

The library has grown decidedly both in number of books and in the use which is being made of it. It now occupies sixty-four feet of shelf, and the card catalogue consists of approximately 5,300 cards. Its increased usefulness is largely due to the fact that, during the last five months, Mrs. Miller has had her desk in the library, and devoted considerable time to the library work, and in this way gained a familiarity with the books and catalogue which makes them readily accessible to those in search of information which the library contains than they were before.

Computing Clerk

A large part of the year the computing clerk has devoted her time to the tabulation of the Douglas fir and yellow pine data, and during a short time she was assisted by a temporary employee. While not engaged in work in connection with these studies, her time has been filled with computing of timber sale reports, products, and other routine data.

Lectures at Ranger School

A course of sixteen lectures was delivered at the Short Course in Forestry at the University of Washington by Mr. Munger in February, on the subject of Silvics, Reconnaissance, and planting on the National Forests. These subjects have not been taken up fully at this course in previous years, yet it is essential that the rangers should know about these important phases of National Forest administration.

Clover Fire Line Experiment

On the Colville National Forest an experiment has been initiated by the local officers to test the practicability of making fire lines by sowing strips of clover, which in that country remains green in the summer, and which it is thought may serve to stop a surface fire. A strip 75 feet wide and over one and a half miles long was sown with 116 lbs. of clover seed this fall, and the growth of the clover will be closely watched and its efficiency in stopping light fires tested.

Annual Silvical Reports

Annual silvical reports have been received from most of the Forests of the District this year, since with but one or two exceptions every Forest now has a Forest Assistant. For those Forests for which a silvical report had not previously been prepared, this first report was of a general nature descriptive of the forest types and trees. For the remaining Forests, the reports dealt with some specific topic, which was assigned by this office, after receiving suggestions of possible subjects from the local officers. Many of these reports are excellent, showing live interest in and close observation and thought concerning the local problems. Others of the reports are very disappointing in that they reveal a failure to appreciate the technical problems, and a failure to see thoroughly and accurately forest conditions as they are.

There is also, I am glad to say, but on a very few Forests, a tendency in both Supervisor and Forest Assistant to regard the Annual Silvical Report as a very difficult and unnecessary task, imposed as a matter of routine by the District office. This attitude is being overcome; but, needless to say, where that attitude is shown, there is a tendency for the technical standard to be lowered.

It is planned this next year to still more intensify the importance of the annual silvical report, to require one from each Forest Assistant, even where there is more than one on a Forest. Subjects will be allotted by this office, with full instructions in some cases as to how to conduct the study, and a thorough treatment of the subject will be expected. It is intended to make the scope of these subjects as broad as possible, in order that there may be full play for individual ability, and preference in the choice of topics. In order to make this report cover a wide range of subjects, it is suggested that since the quarterly technical reports have been made noncompulsory, the name of the annual silvical report be changed to annual technical report.

Without a regular compulsory report of this character, there would be a tendency for the technical ideal of the Forest Assistant and other officers on a Forest to lapse into apathy

toward investigative work, experimentation and improvement in technical methods, which would be very regrettable. This report should serve to arouse interest in the one who makes it, and indirectly in those about him, in some one problem, it will sharpen his power of observation and develop a habit of studying forest conditions which cannot help but make him a more useful Forest officer. The reactionary influence of the silvical report on those who make them is not by any means the chief value of these reports. They each year add materially to our store of knowledge in silvical matters, assist us to a better understanding of the problems of forest management, and thereby promote better forestry on the National Forests. They are, moreover, the only regular outlet for the information and observation on forest conditions which the Forest Assistant has been collecting during the year, which without this channel might go unrecorded. Following is a list of the titles and authors of the annual silvical reports received this year:

Cascade	"The Natural Reforestation of Burns on the East Slope of the Cascade National Forest	by E. B. Starr
Crater	"Commercial Trees of the Upper Slope Type"	by H. D. Foster
Deschutes	"First General Descriptive Report"	by R. R. Chaffee
Fremont	"First General Descriptive Report"	by N. G. Jacobson
Malheur	"First General Descriptive Report"	by H. J. Miles
Oregon	"A Study of the Effect of Ground Fires on Mature Stands of the Lower Slope Type"	by W. B. Osborne
Siskiyou	"Chaparral Areas on the Siskiyou National Forest"	by E. E. Haefner
Siuslaw	"First General Descriptive Report"	by R. E. Dickson
Umatilla	"Western Yellow Pine Reproduction"	by G. A. Bright
Umpqua	"Burns Along the Middle Fork of the Willamette River"	(not yet received)
Whitman	"Lodgepole Pine in the Whitman National Forest"	by M. L. Merritt
Chelan	"Lodgepole Pine in its Relations to Yellow Pine"	by H. M. Coan
Columbia	"Resources of the Columbia National Forest"	by A. R. Wilcox (substituted for silvical report)
Colville	"First General Descriptive Report"	by E. W. Headsten
Olympic	"First General Descriptive Report"	by W. H. Gibbons
Snoqualmie	(Excused in lieu of Forest Assistant Jackson being assigned to red cedar study)	
Washington	"An Investigation of Burned-Over Areas on the Washington National Forest"	by H. M. Johnson
Wenatchee	"Deforested Burns on the Wenatchee National Forest"	by C. P. Willis

Chugach	"Cedar on Prince William Sound"	by L. Wernsted
Tongass	"Future Reproduction and Timber Growth of the Forests of Southeastern Alaska"	by B. E. Hoffman

Special Reports:

In addition to the reports prepared in connection with the studies mentioned above and the annual silvical reports, there have been a number of special studies made by the local Forest officers which deserve mention: –

"Silvical Advantages of Fall Brush Burning on Clean-Cut Areas of Douglas Fir on the Washington National Forest," by H.M. Johnson

"Silvicultural Aspects of Cutting in Open Yellow Pine Forests, Crater National Forest" (with tables showing increased growth after a selection cutting 22 years ago), by H.D. Foster

"An Effective Biltmore Stick" (showing the result of a comparative test of a Biltmore stick and a pair of calipers in measuring the diameter of trees), by A.G. Jackson

Standardization of Tree Measurements

An effort has been made to standardize the tree measurements taken in this District, particularly volume table measurements, by furnishing Forest officers who are to take measurements with an outline and instructions. The advantage of doing this is to make it possible to correlate data taken in various places, and to add at a later date to any data, as it would not be possible to do unless a uniform system were adopted.

Summary

Now that the District organization has been in operation nearly two years and a half, the field of the Section of Silvics has been well defined by actual experience, and the lines of work toward which the Section should devote its attention can be seen clearly in their proper prospective.

The work which falls to this Section may be grouped into four classes:

1. Correspondence, not connected with the administration of the National Forests, with the general public in answer to requests for information on technical matters, and the preparation of memoranda and special reports not related to National Forest work.
2. Routine work in connection with the administration of the National Forests. Under this heading is included work which in the division of the District office work falls naturally to the Section of Silvics, – such as the acknowledgment of regular reports like the annual silvical reports, reports on cut-over areas, experimental areas, and the like, and the necessary correspondence therewith; correspondence with Forest officers relative to the collection of dendrological information, the identification of

specimens, insect infestation and tree diseases, and the direction of operations in connection with insect control; the supervision of the District Office Library, together with the photograph collection and the distribution of publications, and correspondence with the Supervisors relative to their libraries; the handling of matters pertaining to Weather Bureau cooperative stations, phenological observations, etc.

3. The preparation of special reports for use by the District Office, such as articles for publication, lectures, outlines, and memoranda on various subjects which naturally come within the province of the Section.
4. Special studies and experiments, initiated with the purpose of collecting data for publication, of obtaining information which will be helpful and instructive in forest management, or of solving some particular forest problem.

It seems logical that the field of this Section should be broadened so as to include besides the **collection** of data, the **application** of the data to the management of the National Forests; e.g., the Section which gathers data in regard to the growth in a forest type, is naturally in a good position to apply this growth data in deciding upon the sustained annual yield, or, as another illustration, the Section which makes field studies leading to conclusions in regard to methods of marking, is naturally in a good position to advise in regard to methods of silviculture on timber sales. It is a natural tendency of this Section, therefore, to assist in applying to the National Forests the conclusions which the field investigations made by this Section have taught. This close cooperation between the investigative Section, Silvics, and the administrative section, Timber Sales, is advantageous, since it will work toward a direct and sure application of the results of the silvical studies to the practical silvicultural work on the National Forests.

It has been suggested sometimes that the conduct of silvical studies now in charge of the District office, i.e., the major silvical studies of the District, be placed wholly in charge of the local Forest Assistants on the National Forests. Such a procedure, in this District at least, does not seem to be advisable. Studies of local forest problems and experiments may, of course, be successfully carried on by the local force, but the major studies, such as the Douglas fir and yellow pine studies already made, almost demand the direction and supervision of the District office. There are many reasons for favoring the concentration of the responsibility for investigative work in the District office:

1. Many of the studies embrace two or more National Forests and cannot, therefore, properly and economically be conducted by the force of one Forest or by several forces each on their own Forest.
2. The local force of a Forest are primarily administrative officers; it is well that they should do some research work to supplement this administrative work, but it is not to be expected that they would push investigative work with the vigor or conduct silvical studies as easily and efficiently as those whose sole work it is. Should all investigative work be left to the local Forest officers to conduct, it is probable that, being incidental to other work, it would receive less attention than where it is in the hands of specially organized crews under the supervision of the District office.

3. Much of the investigative work carried on in the District has no real connection with National Forest work, some of it is for educational or purely scientific purposes, and it is, therefore, not properly chargeable to the National Forests.
4. The District office has the best facilities for working up the data collected in silvical studies, better than are possible in a Supervisor's office – trained computing clerk, adding machine, etc.
5. The efficient handling of important investigative work necessitates that it be conducted by a central office, which is in touch with the conditions and needs of all parts of the District, both inside and outside the National Forest, so that plans may be drawn up which are broad in their scope, and so that studies and experiments conducted in various parts of the District may be correlated one with another.

These, therefore, are some of the reasons why it seems wise to continue the present system of District Office direction and supervision of the important investigative and experimental work. But for the District Office to carry on the studies, keep track of the experiments already initiated and handle effectively the regular routine work of this Section, an adequate force is necessary. An increase in the present force, i.e., to have two men instead of one permanently assigned to this Section of the District Office would very materially add to the usefulness of the Section. To have two men in this Section would make it possible to keep the routine, – the records of experiments, the library, the dendrological notes, – up to a high degree of perfection, it would make advisable the initiation of a larger number of experiments than it is now thought can be kept up in good shape, it would make it possible to keep up a larger correspondence with the general public and thereby stimulate a greater interest in technical forestry in this District than is now possible with the present force which is in the office but a portion of the year.

One of the chief advantages of an increase in the permanent force of this office would be that it would be possible for one person to concentrate on some one study and throw all his thought and energy into that study until it is completed, while the other member of the force attends to the routine work and minor studies. An ideal organization would be such that one man who is particularly qualified could devote his whole time and thought to a study, like that now in progress on western yellow pine in Oregon, and thoroughly master the subject before his results are published or his recommendations and conclusions are circulated. This arrangement would result in reports of a higher scientific value and should make possible the quicker completion of reports. In order to accomplish this result, the temporary detailing for Forest Assistants from a Forest to the Section of Silvics for the study of some particular topic, and the preparation of the report is possible, but is not apt to be as effective as permanent assignment to the District Office.

Even were the force of this Section increased, it is not thought to be advisable to conduct many important studies at a time, but to concentrate on a very few and do those thoroughly. With the present small force, this procedure seems much the wiser course. In the same way in regard to experiments, – they are valueless unless they can

be efficiently cared for, watched, and recorded, and, therefore, no more should be initiated than the force, either local or District Office, is capable of keeping up.

Forecast for Coming Fiscal Year 1912

The reconnaissance of the National Forests has progressed so far, and there is so much demand for timber from the National Forests that it is imperative that more data regarding the growth and yield of our important species be obtained, in order that we may have a basis from which to estimate what the sustained annual yield will be, and with which we can prepare working plans for certain parts of the National Forests. Attention during the coming season, therefore, is to be directed toward getting yield and growth data for the two most important species of the District, – Douglas fir and western yellow pine, which data will be directly applicable in conservatively handling the timber resources of the most important forest types of the National Forests in this District.

In the summer of 1909 a study of the growth and yield of Douglas fir on the better quality of soils in the western foothills of the Cascade Mountains was made, and the results of this study are to be issued in Circular 175. In this study, all necessary volume tables were made so that during the coming season attention will be concentrated upon the collection of yield data, by the measurement of a great number of sample plots in all kinds of situations and soils, and in various aged stands on the National Forests of western Oregon and Washington. Normal stands representing every type of locality in the Douglas fir region will be selected, so that after the data is compiled we will have definite information as to the productive capacity of all sites within National Forests on the western slopes of the Cascades Mountains.

The second major silvical study to be conducted this coming field seasons is a continuation of the study of western yellow pine in Oregon which was begun last summer. Sufficient volume table data had already been secured, so that the work this coming season will be concentrated upon the collection of growth measurements from which yields can be predicted. Especial emphasis will be laid upon getting the data in localities in which selection cutting has already been done, and to get it in such a way that the figures will be applicable in determining the growth and future yield of stands which are now being cut over by the selection system. In the course of the study every effort will be made to get data bearing on the silvicultural aspects of yellow pine selection cuttings, such as the effect of the density of the stand on growth, on the frequency of windfalls, on the recovery of suppressed trees after selection cuttings, etc. The results of these two years study of yellow pine in Oregon should give us, in conjunction with the extensive reconnaissance now being made of the National Forests of the region, a close estimate of the amount of the sustained annual yield of the yellow pine type (**the** commercial type of the forests east of the Cascades), and definite conclusions as to the methods of silviculturally handling this type of forest to get the best results.

Not until the study of these two principal species has been carried to a thorough conclusion is it proposed to undertake, except in a general way, the study of the various

secondary species. There is less haste about studying in detail such species as noble fir, amabilis fir, white pine, larch, for those species are either incidental to the major species, Douglas fir and yellow pine, or they are in localities in which no cutting is in progress and, therefore, where they cannot be put under silvicultural management for several years.

During the past winter one study was made of a very important secondary species in Washington, western red cedar. One of the chief objects of this study was the collecting of figures for volume tables which would be useful in measuring and estimating logs and cords of shingle bolts of this wood. Valuable silvical and growth data were also obtained, which will show what length of time is required to grow cedar poles and posts, and what methods of forest management will be the most successful in producing succeeding crops of cedar. This report on this subject will be worked up during the coming fall.

One of the most interesting lines of silvicultural work now in progress in this District is the attempt, in cooperation with the Bureau of Entomology, to suppress the infestation of bark beetles in the Blue Mountains of Eastern Oregon. Since 1906, when they were first discovered, the areas of seriously insect-infested timber on the Whitman and Wallowa National Forests have been growing in size, but until the last year or two the bark beetles have been largely in lodgepole pine. During the last year they have been spreading into the much more valuable yellow pine forests and killing a great deal of timber. Last fall experiments in falling and barking infested trees, as a means of lessening the number of the insects, were begun, and those experiments have been continued on a very much larger scale this spring. It is still too soon to judge whether these methods are helpful or not. It is possible that the infestation may die out of its own accord, as similar infestations have done in other localities.

During the last field season much interesting data was obtained relative to the actual amount of damage done by surface fires to merchantable timber. The information secured shows that even the lightest fires do a decided amount of harm, which is usually not conspicuous, but very real, and that the damage done by repeated light fires is, in the aggregate, enormous. In the average yellow pine forest of eastern Oregon which has been subjected to repeated light surface fires, 45% of the trees over 12" in diameter are fire scarred, and the ordinary surface fire, no matter how light it may be, kills from 2% to 5% of the yellow pine trees, particularly those which have been previously fire scarred.

This coming field season it is proposed to start to gather more information as to the damage from surface fires, by having a few local technical forest officers lay off plots in representative fresh burns, which they can watch through a series of years and report on the immediate effects and the after effects of the fire. This actual detailed observation of an experimental plot should yield interesting results.

While no central experiment station has been established in this District, experiments of several kinds are now under observation in a number of localities, and it is proposed to

establish more as rapidly as the problems of management arises and areas for conducting them, where all the factors favorable to a clear demonstration, are found.

The experiments consisting of artificial reforestation are considered as a part of the work of the Section of Planting. Aside from these experiments, the problems of particular importance which it is hoped may be solved by experimentation on sample plots, are the following: (The first four have already been initiated):

1. Brush burning vs. brush scattering in yellow pine forests.
2. The effect of the density of selection cuttings in yellow pine forests on the subsequent development of the stand.
3. The rate of growth of young Douglas fir stands of various densities.
4. The natural reproduction of Douglas fir forests by the method of single seed trees,
5. The behavior of second-growth stands of Douglas fir after a thinning.
6. The effect of sheep grazing on yellow pine reproduction, both on the germination of the seed and on the seedlings.

With the increase in the number of technical men on the National Forests, and their increased experience, it is hoped that much more investigative work may be done by the Forest Assistants on the National Forests, and that many of the local problems may be studied and solved by them. The chief medium of securing this is the Annual Silvical Report of Forest Assistants. Subjects for these reports are to be assigned by this office, after correspondence with the Forest officers; a thorough study and treatment of the assigned subject is expected. The reports will be of the nature of a monograph on some special vital topic of local interest, the study and discussion of which is going to lead toward the practice of better forestry on the National Forests. Among the subjects to be assigned for next year's report are the following:

1. The relation between the forest and the sage brush desert, with particular reference to the extension of the present limits of the forest by artificial afforestation, in the region of the Fremont National Forest.
2. A study of soil moisture in relation to the forest in the Walker Basin of the Deschutes National Forest, with particular reference to the amount of soil moisture in the forest and without, and with various types of surface cover.
3. Amabilis fir, its quantity, characteristics, adaptability for commercial use, and management on the Wenatchee National Forest.
4. The relation of sheep grazing to yellow pine seedlings.
5. Fall vs. spring broadcast burning of brush after logging in the Douglas fir region.

Planting

During the fiscal year 1911, planting work in this District was extended greatly. Approximately 10,000 acres were seeded and planted (the exact area will be given in the statistical report), which is an increase over the area covered in the preceding fiscal

year of about 107 percent. Of the area reforested, approximately three-fourths is situated on Forests west of the Cascade Mountains, and the remaining one-fourth on Forests in Eastern Oregon and Washington.

The general conduct of the work during the year was largely influenced by three considerations. It was evident early in the year that the seed crop of native species would be a failure, and since practically no seed had been held over from the year previous except what was needed for sowing in the nurseries, it became necessary to obtain large quantities of seed of exotic species with which to conduct seeding operations. Accordingly large quantities of seed of such European species as Norway spruce, European larch, Austrian pine and Scotch pine, and of eastern hardwoods such as black walnut, red oak, pignut and shagbark hickory were purchased for testing. Of these species, Scotch and Austrian pine were considered particularly adapted to conditions prevailing on the Forests of the east side, and rather extensive experiments were conducted on several Forests there. The remaining species were sown largely on the west side.

The second consideration which had important bearing upon the work was the decision to concentrate operations as much as possible during the fall and winter seasons, and omit spring seeding almost entirely. This decision was based largely upon the results of the previous year's operations in which both fall and spring seeding were tested, and in which fall seeding showed to so much greater advantage. In addition to the information gained from these experiments, however, the character of the climate both east and west of the mountains was considered presumptive evidence that sowing in the fall and winter would give better results than spring sowing. The climate throughout the whole district is characterized by more or less heavy precipitation in the fall and winter, with a corresponding period of drought in the summer. The dry season in many localities follows within a short time after the disappearance of the snow, so that seed sown in the spring frequently has unfavorable conditions under which to germinate, or if it succeeds in germinating, the young seedlings are killed by drought before they become well established. On the other hand, seed sown in the fall undergoes, during the winter, the preliminary steps in the progress of germination, such as absorption of water and softening the seed coat, and as soon as temperature conditions become favorable in the spring, it germinates readily. The advance in time thus gained by the seedlings from seed sown in the fall over that of seedlings from seed sown in the fall over that of seedlings arising from spring sown seed, increases their opportunity to become well established before the dry season sets in.

Apparently, also, there is less danger of the seed being eaten in those regions where rodents are abundant when the seed is sown in the fall or winter, than when sown later in the spring. The majority of the rodents withdraw into their holes at about the time or soon after the seed is sown in the fall and do not appear again until spring, when the seed is germinating. Moreover, the covering of snow aids in the protection of the seed.

There is still another advantage arising from fall seeding in that the seed is brought into closer contact with the mineral soil through the action of snow and rain. Where the

seed is merely broadcasted upon the surface, this action of the elements is often sufficient to bury the seed, thereby making conditions for germination increasingly favorable.

The third point emphasized in the conduct of the work during the year concerned the selection of areas and the need for more careful supervision of field operations. Most of the Forests on which seeding work had not been conducted previously and on which extensive operations were contemplated, were visited by members of the District office and the proposed areas looked over and plans formulated on the ground with members of the local force. In addition more careful supervision of the work was insisted upon, and many projects were inspected by the District office while operations were in progress. As a result, it is believed that more careful attention was given to essential details, and that the care and thought put into the work will be reflected in the results obtained.

The details of the planting work on each Forest during the first half of the fiscal year are given in Mr. Kummel's planting report on March 1, and will not be repeated here. On the Crater, Olympic and Siuslaw Forests, however, operations were not completed at the time of preparing this report, and since the projects on these Forests are among the most important in the District, a brief discussion of each is given below.

On the Crater a total of 2,555 acres was seeded with Norway spruce, European larch, Scotch pine, and western yellow pine on areas burned over in the summer of 1910. Operations were commenced early in November and continued throughout the winter until February 24. The seed spot method was employed until snow caused a change to broadcasting. The following is the average cost per acre for the various methods employed: Seedspots, $4.65; spots on top of snow, $1.15; broadcast over whole area, $1.34; broadcast in strips, $1.17.

On the Olympic, 780 acres were broadcasted with Norway spruce in February and March, bringing the total for the fiscal year for that Forest up to 2,000 acres. The area seeded is a part of what is called the Solduck burn, and adjoins the area sown earlier in the winter. Deep snow interfered greatly with the dispatch of the work. The average cost was $2.10 per acre.

On the Siuslaw, a total of 2,639 acres was seeded, of which 1,989 acres were with the coniferous species Norway spruce, Sitka spruce, and a small quantity of Bigtree, and 650 acres to hardwoods such as red oak, black walnut and shagbark hickory. A small part of the area sown with coniferous species was sown by the seedspot method, the remainder being broadcasted. The hardwood area was sown by "dibbling in" the nuts and acorns. The average cost per acre for coniferous seedspotting was $2.63, for broadcasting $0.91, and for "dibbling in" hardwoods $2.74.

It is too early yet to determine what the results of last year's operations will be, for at the time this is written germination is just about commencing. Later in the season, however, I hope to be able to report results fully. I have strong hopes that the results from our

direct seeding will be largely satisfactory, for the reason that the work on the whole was performed under conditions which are favorable to success. Moreover, weather conditions this spring have been more favorable than last year and the late rains will prove of additional benefit.

Even should the results prove satisfactory this year, there is still much to be learned regarding treatment of seed, methods of sowing, and requirements of site before we can hope to obtain uniformly successful results from direct seeding. Whether we will ever be able to predict results with any degree of accuracy, I somewhat doubt, because of the variability of climatic factors from year to year; but whether we do or not, there are certain problems which require immediate solution and which when solved will go a long way toward achieving this result. These I shall mention briefly below.

The first essential requirement before we can undertake extensive operations satisfactorily, is an adequate supply of native seed. As I have explained above, the large area sown during the past year was made possible only through the purchase of European seed, and had we been limited to the use of native seed only, the area reseeded would have been exceedingly small. For extensive operations, very large quantities of seed will be required, and since there is little likelihood of our being able to purchase anywhere near an adequate supply, the only alternative is for the Service to undertake its own collecting. You are already acquainted with our plans for erecting fully equipped dry kilns near Portland and in the Puget Sound region, and concentrating the collecting of Douglas fir seed and associated species in these regions. With the aid of these dry kilns, and by working the surrounding territory thoroughly, it is expected that sufficient seed will be obtained to satisfy our requirements.

The advantage of this method, however, does not lie merely in our ability to obtain the necessary quantity of seed. By drying the cones and extracting the seed ourselves, we will be able to improve the quality of the seed materially. The germination tests made of Douglas fir seed purchased two years ago showed that the seed required an abnormally long time to germinate, even when the final germination was satisfactory. This, I believe, is directly due to faulty treatment in the process of drying. It follows that should we be able to provide seed which not only has a high germination percent, but which also germinates rapidly, the chances for successful results from our direct seeding work will be greatly increased. Particularly will this be true of spring seeding, for then it may be possible for the seed to germinate and the seedlings become established before the dry period sets in. For these reasons it is believed that the improvement in the quality of the seed is of fundamental importance, and that it is one of the most urgent problems requiring solution in connection with the reforestation by direct seeding.

In close relation to the question of quality of the seed is the problem of its storage without deterioration. While this problem is by no means peculiar to this District, it is of particular importance here because of the season of the year in which we contemplate conducting seeding operations. Better results are expected from fall sowing than from seeding in the spring, but since it will probably be impossible to collect and extract large quantities of seed in time for use the same fall, it will be necessary to hold the greater

part of the seed over for one year at least, and a part of it for a longer time for use during years of crop failure. Unless the seed can be stored without material loss in germinative power, both in respect to the rapidity of germination and in respect to the germinative percent, the results obtained from seeding with old seed cannot fail to be very uncertain and often unsatisfactory. A knowledge of correct methods of storage, therefore, is of the greatest importance, and it is gratifying to know that the Forester has experiments under way which are calculated to give the desired information.

In addition to the question of the quality of the seed and methods of storage, there are many other problems pertaining to actual field operations about which we can still learn much. In respect to direct seeding, these concern such questions as methods of soil preparation, quantities of seed, protection of seed from birds and rodents, choice between direct seeding and planting, and the like. It is hoped that the results of this year's work will add considerably to our knowledge along these lines, since in the conduct of the work this year special attention was given to their determination.

I wish now to discuss briefly the general conduct of planting work in this District, and the policy I think we ought to pursue. You are already acquainted with the general nature of forest conditions here, and it is unnecessary to go into details in respect to the difference between the region west of the Cascades and the region to the east. Prior to this fiscal year, extensive seeding had been tried only on Forests west of the mountains. Owing to the failure of the native seed crop and the purchase of exotic seed, part of which was more adapted to the yellow pine type than to the Douglas fir forest, several more or less extensive areas were seeded on Forests in Eastern Oregon and Washington. While a variety of methods of seeding were tested on each area, and in this report the projects may well be classified as experimental, I believe that small areas would be more satisfactory since the ultimate success of direct seeding in that region is rather doubtful. Moreover, the growth of timber on the east side is so slow that artificial reforestation is impracticable financially, and I do not think we are justified at present in undertaking extensive projects. The exigencies of the situation last fall made it advisable to sow extensive areas in that region, but in the future I believe we should confine the work there strictly upon an experimental basis until we are more certain of results.

There is, however, both need and opportunity for extensive artificial reforestation on the west side of the Cascade Mountains, and I strongly believe we should concentrate the work there, enlarging the scope of our operations from year to year as conditions will permit. Our experience last season shows that in extensive operations we can reseed at a cost which is sufficiently low to make it financially profitable. Moreover, in the near future, probably in the coming year, there will be portions of timber sale areas which have been conducted under a system of clean cutting which will be ready for reforesting either by seeding or planting. That we will continue to have some failures I have no doubt, for as I have stated above, the factors which influence the results of direct seeding are so multitudinous that we can hardly expect to achieve success in every operation. As the quality of our seed improves, however, and as our knowledge of

essential requirements increases, we will continue to obtain results more and more satisfactory.

Much as I believe that we should continue extensive artificial reforestation upon the west side, I am exceedingly averse to the further use of large quantities of exotic species except where their superiority is demonstrated by actual test in plantations. The areas sown with these species last year are sufficiently extensive to afford thorough tests of their adaptability to this region, and further experiment is unnecessary. Even should we again experience a shortage in the supply of native seed, I would be very much averse to sowing large quantities of European seed. Under such conditions it would be a far better policy, I believe, to postpone seeding until the year following when native seed is abundant.

Neither do I advise additional planting of eastern hardwoods on a large scale until the results of the plantations already established are known. These already cover several hundred acres, and are sufficiently extensive, I believe, to afford the test desired. Should no results be obtained from the red oak, black walnut and hickory "dibbled in" on the Siuslaw this winter because of the seed being eaten or for other reasons, I should be in favor of raising enough hardwood stock in a temporary nursery to replant the areas already seeded or other areas in a suitable location, but beyond that I do not think we are justified in going for the present.

In the conduct of extensive seeding and planting projects, there is need for more careful examination of areas and the preparation of plans for the work in advance of field operation. In the past this has not always been possible because of the rapidity with which the planting work has extended. As I have explained above, proposed areas were looked over last year prior to seeding, but there is need for a still more careful and detailed examination than we were able to have done at that time. We already know, in a general way, on what Forests the need for artificial reforestation is greatest and what the general nature of the areas is. The next step will be to have definite areas carefully gone over, mapped, and plans prepared in advance. On the map will be shown the topography, the distribution of soil and cover types, and the division of the area into compartments based upon species and methods used. The plans will contain directions for carrying on the work, what species and the amount of seed or plants required, the method to be used, the estimated cost, etc.

Sufficient areas will be examined each year to provide for that year's operations, and a certain amount additional in case it is found possible when the work is underway to cover a larger area than at first proposed. By this method no useless examinations of areas will be made years in advance of the actual seeding and planting operations, but complete and accurate information will be at hand for use in each year's work. The examination of these areas will be made by the Forest Assistants on the Forests concerned.

For the coming year our most important work will be the collection of seed. Two dry houses will be built, one near Portland and the other at Puget Sound, and the regions

surrounding these localities will be canvassed thoroughly for cones. Prospects are good for an abundant crop of Douglas fir seed in particular this year, and it is our plan to obtain 23,000 lbs. of seed of all species if possible.

The next important part of the work will be the planting-out of a million or so of trees which will be ready for planting next fall and spring. Following this, as large an area should be seeded as funds will allow. In my allotment estimate I have requested funds sufficient for seeding and planting approximately 13,000 acres. Should the whole amount asked for not be allowed, the cut should be made first in the allotment for seeding. Seed collecting cannot be curtailed without seriously limiting the work in the following year, for enough seed must be collected to last two years at least. Our nurseries also must be maintained for the reason that the amount of money invested in them is too great to consider for a moment decreasing their allotment below the minimum required for their maintenance. If absolutely necessary, field planting can be postponed for one year, the trees being left for an additional year in the transplant beds. This, however, would seriously interrupt the scheme of rotation under which the nurseries are managed, and should be avoided if possible. Any decrease, however, in the area seeded can readily be made up the year following when there is no seed crop to harvest, and all funds can be expended on planting and seeding.

Reasons for National Rather than State Control of The Present National Forests

The oft-suggested proposition that the areas now embraced in the National Forests and administered by the federal Forest Service be transferred to the several States and administered by a Board of Forestry to be established in each State has recently come to a head in the Bill presented in Congress by Representative Lafferty of Oregon (H.R.2980), which would make this transfer effective.

There are a number of reasons why the transfer of the administration of these public forests from the federal to the State – for several years at least – is not desirable. That this transfer would not be desirable is not susceptible of absolute proof, since it has never been tried, and therefore the reasons for opposing it which are given in the following pages are merely arguments, no one of which purports to be a sufficient ground for disproving the desirability of State control of public forests, but which, taken altogether, establish a convincing and almost irrefutable basis for upholding federal control.

The discussion in the following pages is adapted to conditions which prevail in the States of Oregon and Washington, but no doubt the arguments which are of weight in these States are equally applicable elsewhere.

1. **The federal government has the undoubted constitutional right to hold and administer these National Forests.** This right has been well established and still further strengthened by the recent decision of the Supreme Court in the cases of the United States vs. Light, and the United States vs. Grimaud et al. Not only has the

United States the **right** to hold and administer the public forests, which are now the property of the federal government, although being within the several States, but it still further has the **duty** to properly administer them for the welfare of the public, when they are not properly regulated by other agencies. This was stated by Mr. Justice Holmes in the Supreme Court when he said: "The state, as a quasi sovereign, and representative of the public, has a standing in court to protect the atmosphere, the water and the forests within its territory, irrespective of the assent or dissent of the private owner of the land most immediately concerned." Therefore, no individual has the right to use these natural resources to the detriment of the public, and if the state does not give supervision so as to protect the public, the federal government must.

2. **The timber resources of a few States are a national necessity.** Practically 25% of all the standing timber in continental United States today lies within Oregon and Washington, and of this 25% lies within the National Forests of these States. Within a few years, with the exhaustion of the timber of the other states, the whole nation will depend on the timber of Oregon, Washington and two or three other states, and to a very large extent upon the timber within the present National Forests of these states.

Lumber is so essentially an every day necessity to every one in every walk of life throughout the country, that the early exhaustion of the supply in these few states which the whole country is looking to as its reserve supply for future decades, would be a blow to the welfare of the people throughout the whole country. Whether the reserve supply lay all in one state or several states, or was evenly distributed in all the states, the effect of its exhaustion would be felt by the people over the whole United States. The care of what little reserve supply there is left should be administered with a view to the welfare of the people of the whole country and not solely with a view to the welfare of the people in the two or three states in which that reserve supply chances to lie. "Trade itself has wiped out in many ways the state lines. The use of our natural resources and their preservation must necessarily wipe out for some purposes the state lines." (Ex-Sec. J.R. Garfield). State lines are but arbitrary lines, and the timber resources of no one state should be administered solely with a view to the welfare of that particular state. As Ex-Secretary Elihu Root says – "Now the States, in the exercise of their sovereignty, in the exercise of the power reserved to them, rest under the same kind of duty, a duty that forbids any State to live unto itself alone." The State, however, cannot be expected to administer its timber supply with a view to the welfare of the whole country, for its administration is naturally guided by selfish motives which are apt to run contra to the principles which would work for the good of the people of the whole United States. The management of forests is such an exceedingly complicated problem, requiring exceptional foresight and providence, that the principles applicable to the production of such annual crops as wheat or corn, which are centered in a few states entirely under state and private control without danger to the welfare of the people of the whole United States, do not apply to the growing crops of timber. The probability of a timber shortage in the next half century is so great that it is imperative that a part of the remaining supply of timber be administered with a view to the welfare of the people of the whole United States, – the prairie States and the Eastern States, as well as for the benefit of the few heavily timbered States.

3. **The conservative management of the present National Forests of Oregon and Washington by the States would be a drain on the taxpayers of the States.**

The federal government at present pays about $850,000 for the protection and administration of the 28,000,000 acres of National Forests in Oregon and Washington. Proper care could not be given them for less, and the care such that they should have to be commensurate with their great value and to insure their perfect safety and fullest development and use by the people should cost $1,000,000 annually. The gross receipts from the National Forests of these two States amounted to $257,000 in 1910. The returns are growing larger each year, but they could not be immediately increased to a much larger figure without either (1) increasing materially the charge for permits for grazing privilege or special-uses, or (2) lowering the stumpage price so that the timber on the National Forests would be placed on the market to the detriment of the owners of private stumpage, or (3) abandoning the principles of conservative use of these resources, allow unregulated grazing and timber cutting to the ultimate detriment and exhaustion of these natural resources.

At the present time each State is given a quarter of the gross receipts derived from the National Forests within its borders. Therefore, each States makes a net gain because the federal government manages the National Forests; but would suffer a net loss did the State Government administer these Forests, as shown by the following table:

State	Net Gain to State when federal government administers Forests	Net Loss to State when State government administers Forests
Oregon	$40,000.	$545,000.
Washington	$24,000.	$305,000.

At present the money appropriated by Congress for the administration of the National Forests comes from the U.S. Treasury, most of the revenue of which is raised east of the Mississippi River, so that the States of Oregon and Washington get free the management of 28,000,000 acres within their borders, which costs $850,000 per year, and in addition 25% of the gross receipts, worth $64,000, which means that $914,000 is brought to these States each year by the federal government's administration. Should the States administer these areas, the cost of administration, $850,000, would have to come out of the people of the States themselves, either by special appropriation or direct tax. Until, therefore, the receipts exceed the expenses by over 25%, it is more profitable financially for the States to have the Federal Government administer the National Forests than for they themselves to do it.

4. **One of the principal functions of the present National Forests is the protection of watersheds of rivers of interstate importance.** On the upper slopes of the mountains rise most of the rivers which are of value for navigation, irrigation, and power purposes in their lower course. The regular and sustained flow of these streams is maintained by the protecting forest cover on the mountains. Much of the mountain

forest is of no commercial value and probably will not be for centuries. Its sole value is as protection forest; but it costs money to protect it from fire and to reforest the denuded areas. Many of the streams which rise in these protection forests are not used in the States within which they rise, but it is essential to the prosperity of the States which do use them that their headwaters be protected. If the administration of the forest on these mountains was in charge of the State government, the latter would naturally not be inclined to spend money for the care of noncommercial protection forests which resulted in no benefit to that State, even though their protection was of importance to neighboring States. To the people of Oregon and Washington to hold and protect non-profitable forest land for the benefit of other States would seem a direct tax for which they were getting no benefit. The benefit of protection forests is not always clear to the voting and taxpaying public, and even though their motives were altruistic toward sister States, it is not likely that they would vote to spend money solely for a probable and evident benefit to the prosperity of an adjoining State.

Oregon and Washington each use most of the streams that rise within their borders, and would, therefore, be inclined to protect these watersheds, but both States are dependent to a great extent for their water for irrigation on streams arising in other States, particularly in Idaho and Montana, such as the Snake, Pend Oreille, and other tributaries of the Columbia River.

Not only do inter-State complications, coming from the use for irrigation and water power development of streams which rise in States other than those in which they are used, point to the wisdom of federal control of the protection forests as the headwaters of these streams, but also the maintenance of navigability of these streams is a federal function because it depends on the care of their headwaters.

This principle of the inter-dependence of the States on each other's natural resources was well stated by Ex-Secretary J.R. Garfield at the Second Annual Conservation Congress: "In the progress of our country, we have found that the power given the federal government must be used to develop these natural resources for the greatest good of the greatest number, which do not lie simply within one State but extend into several States, and which, as in the case of water, must be considered as for the use of all the States within the given watershed rather than for the special States through which the water runs or in which the water rises."

As Theodore Roosevelt says: "Each river system, from its headwaters in the forest to its mouth on the coast, is a single unit and must be treated as such." It is as consistent, therefore, that the federal government should control the administration of the forests at the sources of inter-State rivers as that they should control the navigable portions of these rivers, since the navigability depends to a large degree on the care that is given the forests at their headwaters.

The prosperity of Portland, Oregon, depends in a large way on the regularity of flow and freedom from sediment of the Columbia River and Willamette River, but these factors

cannot be regulated by the State of Oregon alone, but depend on how the forests of Washington, Idaho, and Montana are cared for.

At the Second Annual Conservation Congress a resolution was adopted, after long discussion, flatly favoring federal control of water power development, because of the inter-State interests in the use of water. The resolution was as follows: "Recognizing the vast economic benefit to the people of water derived largely from inter-State and source streams no less than from navigable rivers, we favor federal control of water power development; we deny the right of State or federal governments to continue alienating or conveying water by granting franchises for the use thereof in perpetuity, and we demand that the use of water rights be permitted only for limited periods with just compensation in the interests of the people."

At this conference a minority report favoring State control of all natural resources received but two votes.

President Taft at the Joint Conservation Conference explained the responsibility of the federal government for the protection of rivers – "If it is true, as doubtless it is , that the forests and their continuance have a very direct effect upon the uniform navigability of streams, then the right of the National Government to go into reforestation is not very far removed from a constitutional demonstration. Another reason why the Constitution should be construed, without straining it, to give the National Government as large power as possible in this direction, is that the plan to meet the emergency must be a comprehensive plan. It must be a plan covering the entire country, and the financial resources of no State are sufficient to carry out the plan as it ought to be carried out."

5. **Regulation by the States of the natural resources within their borders will tend to prevent the fullest impartial use of these resources.** The point has already been made that the disposal of the timber and of the water resources which is best for all the States, can be made under the direction of the federal government rather than under state government. With other uses of the National Forests the same proposition holds true. It frequently happens that the residents of one State have occasion to take up grazing privileges or free-use of timber privileges on the National Forests in an adjoining State. This is naturally the case when a large town or ranch community is close to a National Forest in another State. The fullest use of the natural resources of the National Forest can be obtained when state boundary lines are ignored in distributing the privileges for the use of these resources. But under State control it is not likely that there would be this cooperation between the States, but there would be a tendency to prevent non-residents of the State from the use and enjoyment of the resources of that State; even though the non-residents were better situated geographically to use these resources than any one else.

There are frequent examples of legislation aimed to discriminate against non-residents of the State. It is probable that in the future many Oregon sheepmen will want to use the summer range in northern Washington, and it would be unfortunate for them to be discriminated against, should the State of Washington get control of this summer range.

In Oregon and Washington there is probably less inter-State use of the National Forests than elsewhere, since the Columbia River forms a sharp natural boundary line between those States. But where the people of one State depend largely on the use of the range and free timber in another State, there is certainly a much greater probability that they will not get the full enjoyment of those resources under State administration that they would under federal control.

6. **The management of these public Forest under State control, which would be most financially profitable to the people of the State for the next century or so, would not be the form of management which would be most profitable to the people of the State for all time.** Yet the voters and taxpayers would attempt to force upon the State authorities in charge of these public forests the management which would seem to be the most profitable for the next half century or so and disregard the more distant future. In order to increase the receipts from these Forests, to stimulate settlement, to increase wood using industries, and to relieve the local burden of taxation, it would be the natural tendency of the State authorities, to unduly exploit and over-cut the Forests, and thereby satisfy the clamor of the public who do not understand the principles of forest regulation, or fully appreciate the extreme slowness of the growth of forests. This overcutting is difficult of detection, easy of concealment, and the motives for increasing the cut are so pressing upon the administrative officer in comparison to the motives for keeping the forests on a sustained annual yield basis for the benefit of far distant generations, that there is grave danger of it when the administrative officers are under the pressure of local taxpayers and politics where there is popular government.

This fact is well recognized in Germany where the communes are not allowed to have a free hand in the cutting of the timber on the communal forests, but are supervised by state officers in order to guard against possible overcutting. This same principle holds true with the present National Forests; under federal control, which feels less strongly the ill-advised and selfish demand of the local public for revenue, there is the least danger of overcutting.

In Washington and Oregon there would be under State administration a particular danger of the undue exploitation of the timber resources of the present National Forests, since it is probable that large areas in the eastern part of this State could never be managed with as great financial profit to the States as other forms of investment, owing to the extreme slow growth of the timber. This is true not alone of the protection forests on the high mountains above referred to, but to the commercial forests of yellow pine on the plateaus and foothills. An administration then, of the best intentions and eager to produce the greatest revenue to the State, and looking ahead only the next half century or so, might advocate the stripping off of these yellow pine forests, the sale of the timber, and the sale of the land to individuals for grazing purposes. It could doubtless be demonstrated on paper that the money so gained from the sale of all the timber and the land would produce, if elsewhere invested, a greater revenue to the people of the State than if it were left invested in slow growing yellow pine forests.

There is more than a probable likelihood that just this method of disposing of some of the forest lands would be advocated by well intentioned State administrative officers and agreed to by the public. Yet the policy of disposing of the less productive forest lands on the part of the State because they are not productive, would be poor State economics in the long run; it would expose that region to the far-reaching after effects of acreage of forest denudation and it would result in the lessening in the acreage of forest land, every acre of which should be kept in productive condition to forestall the timber shortage which will come perhaps a half century hence. The government should not look at the management of forest lands as an individual owner must, considering only the financial profit during the next few years; yet the State governments are so close to the taxpayers and local politics, that it is difficult for them to ignore this local influence and to sacrifice present financial profits for the sake of the far distant community welfare. The federal government feels these responsibilities much more keenly, and is, therefore, much more ready to assume the expense of managing the non-profitable forest areas along with the profitable areas.

7. **In the States which have an enormous superabundance of timber there is little incentive for them to use conservative forest management.** Such is the case in Oregon and Washington. Oregon has about 19,000,000 acres of forest land, yet 1,000,000 west of the Cascades would be enough to furnish all the timber consumed within the State. Similarly, Washington would require only about 1,700,000 acres out of its total 22,000,000 acres of forest land to supply its home demand. Neither of these states have, therefore, any reason to conserve or carefully manage and protect the forests within their borders for their local use. There is a vastly greater forest area than the people of these States need. Oregon and Washington need never fear a timber famine.

A State government, therefore, which had the care of the present National Forests, would in Oregon and Washington lack the motives for conservatively caring for the forests in order to perpetuate the supply for the States' own use, and they would not be prompted by any altruistic desire to conserve their supply for the benefit of sister States.

But both these States are great lumber manufacturing States, and much money is brought into the States by the export of lumber to other States and foreign countries. The desire of the people of Washington and Oregon is naturally to increase the magnitude of their profitable lumber-manufacturing industry, and of secondary consideration to perpetuate it forever. But measures which will tend to increase the present size of the industry are somewhat at conflict with those which will tend to perpetuate it. Private administration of forests is almost driven to a course of rapid exploitation of the timber, for the sake of getting present day revenue. State administration tends in the same direction, for the State is governed by individuals, each of whom will derive direct benefit by the rapid exploitation of the timber, and but few of whom will look at the future of the State with a large enough vision to see that conservative exploitation now will be better for the State in the long run, than rapid exploitation. Supervision by the federal government takes a broad view of both the present and future welfare of the commonwealth, such as only a disinterested authority

can, and therefore it is less liable than the State to countenance any policy of forest exploitation which may be temporarily profitable but ultimately prodigal.

8. **Under State control of the public forests there is not the assurance of honest administration that there is under federal supervision.** As a general proposition, federal administration is freer from corruption, favoritism and underhanded methods than are the State governments, and there is reason for this. The federal government is farther removed from local "interests," and the conflicting and various influences of several States tend to counteract the corrupting influence of any one powerful corporation in one State.

With property, such as vast areas of forests, the danger of corrupt administration is particularly great, for in the measurement, estimating and valuation of timber, there is abundant opportunity for dishonesty by state officials, which would not be easy of detection by the public. Even if the laws for the administration of the public forests by the State were good, there is great danger that they would not be honestly administered.

At the Second Annual Conservation Congress Theodore Roosevelt stated this argument against state control very clearly:

"Who can best regulate the special interests for the public good? Most of the predatory corporations are interstate, or have interstate affiliations. Therefore, they are largely out of reach of effective state control, and fall of necessity within federal jurisdiction. One of the prime objects of those among them that are grasping and greedy is to avoid any effective control by either state or nation. And they advocate at this time state control simply because they believe it to be the least effective. In the great fight of the people to drive the special interests from the domination of the government, the nation is stronger and its jurisdiction is more effective than that of any state. The most effective weapon against these great corporations, most of which are financed and owned on the Atlantic coast, will be federal laws and federal executive. That is why I so strongly oppose the demand to turn these matters over to the states. It is fundamentally a demand against the interests of the plain people, the people of small means; against the interests of our children and our children's children. And it is primarily in the interest of the great corporations which desire to escape all government control."

Gov. Noel, of Mississippi, at the same conference, gave his testimony in favor of federal control from the experience of his state: "We have suffered from state control. Years ago the National government gave us every 36th section out of every township in our state. We thought our people would be zealous in guarding these lands for the benefit of the school children. But now today, alas, we come to realize the mistake we have made. How best can the natural resources of the country be preserved? We believe by keeping them under federal supervision, and we have had our own sad experience as the grounds for this belief?"

In the states of Oregon and Washington where the railroad and other large companies are immensely influential, there is danger that the state's administration of these public forests would be dictated and dominated over by these great interests, to the detriment of the public, in whose interest the forests should be administered. The present condition of the administration in neither of these states gives any indication that as good and honest administration could be given these National Forests by the state government as is now given by the federal government.

9. **It is by no means the general desire of the people of these states to throw off federal control,** though many appeals have been made by members of these states for state control of the present National Forests (at the Salt Lake Conference particularly). The feeling of those that do desire to substitute state for federal control is a feeling of impatience at restraint, a youthful fear of paternalism and an offended pride at the interference of outside authority. This attitude is bound to wear off, if the federal government places no unjust burden of restraint upon the state. Within a few years it is probable that those who clamor against federal supervision of some of the natural resources of the state will accept it, as much as they do federal control of the mails, lighthouses, stock inspection and other functions which are now taken as a matter of course.

The following quotations from a few representative prominent men of Oregon and Washington will serve to show that there is by no means an unanimous desire for state control:

"As showing the need of federal control, I wish to tell you of the way the water power sites, the greatest of them, have passed out of the hands of the people; two corporations have filed on most of the water power of the Columbia River, and now Governor Hay wants to give away the rest of it. Water rights worth millions were sold by Governor Hay and Land Commissioner Ross for $10,000. One hundred and twenty-five thousand horse-power sites were sold to James J. Hill. No wonder J.J. Hill favors state control!

If the forest preserves were turned over to Washington and the tender mercies of Ross, they would be turned into the hands of speculators and not bona fide settlers."

W. D. Johns, of Seattle, at the Second Annual Conservation Congress

Ex-Senator F. W. Mulkey, of Oregon, says, referring to his appointment as delegate to the Second Annual Conservation Congress:

"He knew (Acting Governor Jay Bowerman) I would go to the congress opposed to state rather than federal control of National forests and water power sites, because I believe the state incompetent. He knew I would be opposed to throwing open our forest lands so that the railroads could scrip it all. ..... Consequently my appointment was made by

the Oregon Conservation association, because the real conservationists of this state believe in the things for which I stand and want such representation there.

The railroad will try to manipulate the St. Paul conservation congress. It is to their interest to forward the plan proposed by Ballinger while in Portland, namely that the states should be allowed to control and to reap the benefits of the forest lands within their borders. It is to the interest of the railroads and the Ballinger crowd to secure such a change of control. I will say why: The national government is now expending about $250,000 in protecting the forests of Oregon. The state is appropriating the niggardly sum of $250 a year for the same purpose. The graft and corruption formerly used in the administration of our school lands is sufficient proof that the state has no business trying to control our national forest lands.

The money expended for protection of Oregon forests by the government comes from revenues paid by the people east of the Mississippi. There is a creed long and well established that the national resources belong to the people of the whole nation. For this reason the people of the whole nation have been paying for their upkeep; now they should reap their benefits. The people of Oregon will not lose but gain by keeping the control of the forests in the national government.

For these reasons I am opposed to the Ballinger plan for transfer of control from the federal to the state government. Neither do I want to see the railroads and the corporations gobble up our remaining timber land. We have about 400,000,000,000 feet of standing timber in Oregon. Without national protection we soon should have no timber."

Senator (then Governor) Chamberlain, of Oregon, at the Joint Conservation Conference, said: "But it may be asked – why may not the states exercise the power herein suggested as likely to be better performed by the National Government? To this I answer: First, the states, as a rule, do not seem disposed to act for the preservation of their natural resources, either with respect to the land owned by them or by the exercise of their police power. There are, however, some notable exceptions to this rule.

Second, even in cases where the states have legislated with reference to the subject of the distribution of waters, whether from interstate or intrastate streams, there is such a lack of uniformity in legislation, as well as in judicial interpretation, that it is difficult, if not impossible, to determine the rights of individual citizens."

10. **The history of the state's disposal of the lands entrusted to it in neither Oregon or Washington gives any indication that the people of these states are ready to enact laws, and support their enforcement, which will protect and conservatively administer the state's heritage of national resources.**

In the state of Oregon, by Act of Congress, Section 16 and 36 in every township, or their equivalent, were given it for schools, 72 sections for the support of a State University and ten sections for public buildings. Much of this enormous amount of state land was

forest land, to which the state should have given protection and wise forestal administration. But practically nothing has been done for its care, but instead the state, supported by the laws made by the people, has gone on a policy of the rapid disposal of this land, regardless of its future welfare, receiving in return for it, but a fraction of its real value. Not only has the rapid disposal of these timbered lands been contrary to the policy which should characterize government management of essential natural resources, but the administration of this mistaken policy has been characterized by corruption. The lands have been sold so cheaply that the people of the state have been cheated out of a large portion of the value which should have been derived from them. At the present time but 47,000 acres of state selection indemnity lands remain unsold. All of the land disposed of prior to 1909 was disposed of at a flat rate of $5 per acre, a figure far below its real value. The price has gradually been advanced and now is $15 per acre.

In Washington the law for the disposal of the state lands in better conceived to bring to the people what the land is worth, but yet the policy has been to dispose of the land or timber without thought for conserving the natural resources for the benefit of the people of the whole state, or of keeping in productive condition the state's forested lands. The administration of these laws by the state officials has been moreover not conducted with an eye singe to the best welfare of the commonwealth.

"Congress through its liberality, granted to the state of Washington, for educational and other public institutions about 3,000,000 acres of land. The state has sold approximately 1,300,000 acres, realizing therefrom nearly $7,000,000 (about $5.40 per acre), and still retains 1,700,000 acres. Of these lands about 800,000 acres are adapted primarily for forest growing, or else is covered by virgin timber." (F. H. Lamb, of Washington). The state land in Washington is now sold by competitive bid with a set of minimum price, $10 per acre. Where there is more than 1,000,000 feet of timber on a quarter section the timber is sold by bid separately from the land.

"Of the lands from which the timber has been sold since the state adopted the policy of selling the timber separate from the land, a great part of it is still in the ownership of the state, as the majority has but little agricultural value. These lands are in the worse possible condition as regards their future productiveness."

"At the present rate of selling, it will be only a few years before the major portion of the timber in the state lands will have been sold."

At its last session the Washington legislature moreover refused to enact a proposed measure which would have placed the remaining state forests on a sound basis of conservative management and protection.

Similarly the administration of the lands entrusted to the states under the Carey Act has not been characterized by effective or scrupulous care for the public welfare on the part of the state officials, nor have the people of these states shown intelligence in making laws for the proper disposal of these lands.

The fact that these states have failed in the past to properly care for the lands entrusted to their care, is of course no sure argument that they are unfitted to administer in the future the present National Forests, should the latter be transferred to their care. It does indicate, however, two conditions which make it seem probable that state control would not secure effectively the best use for all time all of the natural resources, which is the object of the federal government's administration.

1. State administration of the natural resources has not been up to the present time sufficient or trustworthy.
2. The people of the states have not up to the present time legislated so as to protect and conserve the natural resources, but rather have tried to get from them the greatest returns in the shortest time.

11. **The management of a resource like forests is so complicated a problem and so many conflicting interests are concerned, that it is perhaps better that the remaining great bodies of timber in the far western states, the future supply of the whole country, should be divided among several different forms of management – some under private management, some under state control and some under federal control.** That under private management will be managed chiefly with a view to developing a great lumber manufacturing industry, that in state control will be administered with a view toward the financial prosperity of that state, while that under federal control will be administered with an eye to the welfare for all time of the whole country. Were all the forests under one control there is a probability that the administration would not take into consideration all the various conflicting interests concerned. In Germany the several forms of forest ownership together make an excellent use of the forests. Already the private owners and the states have large areas; it is well that the remaining portions remain under federal control, so that the objects, for which the federal administrative stands, will be secured in the management of at least a portion of each state.

Lands – Claims

The present condition of the claims work in this office is as follows: There are approximately 1000 open cases, including about 415 cases which have been referred to the office of the Assistant to the Solicitor. In this latter class the work of investigating and reporting has practically been completed.

On July 1, 1910, there were about 1300 cases pending and therefore the number of claims cases in this district has decreased by 300. This does not mean that only 300 cases were closed, as a considerable number of new cases have been added. It does, however, indicate the rate at which the claims work is decreasing, so that we can predict that in three or four years this class of work will be current. Of course mining claims will continue as long as minerals continue to be discovered within the National Forests. While the end of homestead and timber and stone claims will be reached in a few years in this district, it is uncertain just when the respective rights to school lands,

Indian allotments, lieu selections, railroad lands, etc., will be finally adjusted. In this District final decisions in a number of cases now pending in the U.S. courts are likely to change the present situations. For instance, on April 24, in the U.S. Circuit Court for the District of Oregon, in the case of the U.S. vs. Oregon & California R. R. Co., et al, the Court decided the first step in this important case in favor of the Government by overruling the defendant's demurrer to the bill of complaint. This suit was instituted in 1908 for the purpose of securing the forfeiture of 2,373,000 acres of land situated along the line of the Southern Pacific Railroad in Western Oregon and valued at approximately 75 million. A large amount of this land is within the boundaries of a number of the National Forests in Oregon so that a final decision in favor of the Government will probably result in the addition of a large amount of heavily timbered lands to the National Forests. However it is probable that the final result of this case will not be known for several years.

The opinion of the Solicitor to the effect that lands listed with the Secretary of the Interior to be opened to entry under the Act of June 11, 1906, are practically eliminated from the National Forests and that no authority exists for allowing the examination and reporting on such claims by the Forest Service, will help to terminate the claims work much sooner than was anticipated. It is possible that legislation may be passed which will again give authority to the Forest Service to examine and report on claims initiated under this Act.

It is impractical in a general resume of the work for the past year to set forth in detail the different cases which have arisen. It is to be regretted that the procedure in claims cases has been subjected to such frequent changes in the past, as it has seriously impaired the efficiency of this branch of the work. The constant changes in procedure has resulted in much work in correcting mistakes arising from unfamiliarity with existing regulations. The present system seems to be working out very satisfactorily and I hope that no more radical changes be considered for some time.

The importance of thorough and efficient work in claims is too often underestimated. It has been referred to as the least important of any of the branches of the work. Its lack of importance lies only in the fact that it is rapidly decreasing, but as a present condition it looms high in its importance to the Service. A claim containing from 3 to 10 million feet of good timber, which is not extraordinary in this district, will have a present value of from $6,000 to $20,000 and a future value much in excess of these figures. It can readily be seen how important it is that all the work in examining, reporting and determining the proper action on the report, should be thorough and performed only by those well qualified and experienced. In passing I would like to call attention to a certain feature connected with our claims work, and that is the spirit in which it should always be conducted. There is a temptation to lose sight of the duty we owe not only to the Government, but to the claimant, especially in dealing with claims the cancellation of which would be of much value to the Service. As a matter of principle we should not discriminate between claims of small value and those of large. In all cases we must be mindful of the fact that we are the servants of the people in a duel capacity, as representing the individual, interested as one of the Government and representing the

people collectively or the Government. However, as a matter of fact the cases are rare where to my knowledge the claimant has not been given a square deal. The tendency has always been to construe any doubt in favor of the claimant. I cannot recall a single case in which a final decision was made against a claimant who made a substantial compliance with the law. On the other hand, many cases can be cited in which either from lack of evidence, or a laxity in enforcing the requirements of the law, or other reasons difficult to explain, claimants have been granted patents to land to which under the most liberal interpretation of the law, they were not entitled. In such cases I am glad to be able to state the fault has very rarely been with the Forest Service, which in general has administered our public land laws, so far as fell within the scope of its authority, in a fair and impartial manner, in spite of many discouraging results.

In this district during the past year the work of examining and reporting on claims has been handled principally by the local force on each Forest. One expert miner has been employed during the past year with the exception of two winter months, when, owing to weather conditions in this district, he was temporarily transferred to another district. The practical application of the agreement entered into between the Forest Service and the Mining Congress at Denver in August, 1909, has general been satisfactory. It has lightened the work of the expert miner and I believe it has met with general approval by the claimants interested. The policy is not favored by the Interior Department for the reason that it is believed that a preliminary report is not conclusive in that the question of a valid discovery of mineral is not covered. It seems a sufficient answer to this contention that mineral claims outside the National Forests are not as a general thing examined and reported by the Field Service unless a protest against the claim is made. It will thus be seen that as all mining claims within the Forests are subjected to at least a preliminary examination, the Government's interests in mining claims within the National Forests are guarded more closely than on the open public domain.

Two coal experts were employed during the summer of 1910, one in Alaska and one on the Washington, Rainier and Wenatchee Forests. During the field season two special agricultural claims examiners detailed from Forests in this district were employed. One examiner from the District office was in the field during part of the field season. About 50 squatter claims on the Oregon Forests were examined last summer by a special examiner. Practically all of these claims were found to be fraudulent in that settlement was not made until after the withdrawal. These lands are very heavily timbered. I might mention that it was in connection with this group of squatter claims that the present procedure in squatter claims, as found in the April Field Program, was first suggested. In August of last year a joint examination was made by a Special Agent of the Interior Department and the Law Examiner from this office. This case involved about 15 squatter claims on the Siuslaw, all very heavily timbered upon which the Northern Pacific Railway Co. had filed lieu selections. The joint report disclosed the fact that the Railway Co. had purchased relinquishments from most of the settlers, paying from $500 to $4500 each. It also recommended that action be taken to secure the cancellation of the lieu selections on the ground that they were filed on lands occupied by bona fide settlers. The settlers having relinquished if the lieu selections are rejected the land will revert to the National Forest. The Commissioner of the General Land Office has

decided five of these cases only one of which was against the Railway Co. I have recommended that all these cases be appealed to the Secretary, but the Solicitor has not considered an appeal warranted.

An interesting class of cases have developed on the Snoqualmie and Washington Forests in which 160 acre claims have been initiated as associated placer claims for land alleged to be valuable chiefly for cement and building stone. There are five of these cases, two on the Snoqualmie and three on the Washington Forests, the two on the former Forest being very heavily timbered, one containing an accurate cruise of approximately 10 million feet and the other 5 million feet of good merchantable timber. the claims on the Washington are not so heavily timbered but are undoubtedly chiefly valuable for their timber. Owing to the importance of these cases in themselves and also for the dangerous precedent that would be established were they allowed to proceed to patent unprotested, the services of a cement expert were engaged. His examination and reports show that the value of these lands for building, limestone, and cement was small, partly on account of the intrinsic value of the deposits of these materials on this particular land and on account of the prevalence of these materials in large quantities throughout this section of the country. The reports of the cement expert considered with the report by an expert cruiser of the timber contained on these claims, indicate conclusively that the lands are not chiefly valuable for building stone and cement, and should, therefore, be canceled. Hearings on these cases have been ordered and the outcome is awaited with much interest.

In the State of Oregon there are approximately 4500 acres of vacant school lands belonging to the State which could be used as base for lieu selections. The Governor of the State has advanced a plan to exchange these lands within National Forests for an equal area of timber lands outside in a compact body, this land to be set aside as a State Forest Reserve. I believe the plan suggested is good and that the Service should lend all possible assistance in furtherance of this measure.

Settlement

The application for and listing of National Forest lands for homestead entry under the Act of June 11, 1906, are compared with those of 1909 and 1910 in the following table:

Applications and listings for Forest Homestead entry, District 6

Fiscal Year	Number of applications during year	Awaiting final action at close of year	Number of tracts listed during year	Acreage listed during year
1911				
1910	764	267	166	18,444
1909	724	312	265	25,058.28

Practically all of the areas were listed as the result of applications by persons desiring to make homes thereon, very few tracts having been examined or listed in advance of application. The character of lands listed are those areas which taken as homestead units area chiefly valuable for agriculture and not needed for public purposes. The total area listed since the passage of the Act was at the end of the fiscal year 1910, 92,205.53 acres.

The number of applications shown in the table as awaiting action would be misleading as to the work accomplished without some comment as to the exact status of these cases. It may be said that in at least 25% of the cases recorded as awaiting action the examination has been made by the Forest Service and action is suspended for some reason beyond its control, as, for instance, at the request of the applicant who does not care to file immediately, awaiting a reply from applicants who have been written for information relative to filing; also applicants frequently amend their applications after all field work is completed which necessitates delay for a reinspection; and other causes. The number of applications upon which no examinations have been made is augmented by the number brought forward from the fall of 1910 on account of the intense fire situation, which prevented examinations at the time, and which accumulated during the winter months when examination was impracticable. At the close of the present field season it is expected that the work will be current.

The following table shows the approximate status of the lands (in District 6) which had been listed and restored to entry under the Forest Homestead Act at the close of the calendar year 1910, and the practical effectiveness of the Act in its primary purpose of home-building throughout the Forests:

	Number of claimants who have maintained continuous residence since settlement and shown good faith by residence and cultivation	Number of claimants residing on claim but not showing by cultivation and improvements intention to establish a permanent home	Number of claimants failing to reside upon the land but making a reasonable showing of improvements and cultivation	Number of claims abandoned	Number of claims opened to entry but not filed upon	Number of claims relinquished by original entry men to others
	273	26	111	38	101	52
Percentage of total =	45.4+	4.3+	18.4+	6.3+	16.6+	8.6+

This list is not absolutely complete, since information was not available in approximately 50 cases (in District 6).

The principal causes for abandonment, failure to file, and failure to cultivate the listed lands were found to be as follows: impracticability of successful agriculture on account of climate, soil, etc.; conflict with mineral ground; securing more favorable situations; limited area; speculative purposes not realized; residence; indifference of claimants; illness; financial embarrassment; lack of qualification to make homestead entry, etc.

Accurate information regarding those cases in which the status is not available would increase the percentage of each class as above shown in about equal proportion.

On December 20, 1910, the Secretary of Agriculture upon recommendation of the Forest Service, approved the classification of the remaining public area of the Siuslaw National Forest on the west coast of Oregon as chiefly valuable for Forest purposes. This Forest is heavily alienated and the vacant lands consist of less than 50 per cent of the total area within the boundaries. The more desirable agricultural lands were settled upon and entered before the establishment of the National Forest and those of less desirable character have been listed and opened to entry under the Forest Homestead Act. The remaining lands therein under the Government ownership are very rough and broken, consisting of high mountain ridges, and steep slopes and hills either covered with timber, or rapidly reforesting, and of irregular, narrow valleys, cut into innumerable patches by the winding course of the mountain streams. Those tracts now covered by unperfected entries by the Interior Department revert to the Forest area, and it is probable that when examined small portions of them will be found to be chiefly valuable for agriculture and may be listed and opened to entry by persons desiring to make homes thereon.

November 4, 1908, the First Assistant Secretary of the Interior, expressed his opinion that the terms of the Act of June 11, 1906 authorized crediting at final proof, residence and cultivation under agriculture special-use permits issued by the Forest Service in case the land should subsequently be listed and opened to entry and filed upon by the permittee. In frequent instances it is found difficult to determine whether a particular tract of land can be successfully utilized for agricultural purposes or not on account of altitude, slope and other apparently unfavorable local conditions and the lack of previous attempts at agriculture upon land similarly situated for comparison. To afford the benefit of every doubt to intending homesteaders and yet to enable them to save their homestead rights in case agriculture was impracticable, numerous permits were granted under the decision referred to, not to exceed 5 years duration, with the understanding that if the permittee and applicant should demonstrate the agricultural character of the land, it would be listed and opened to entry. This method of procedure proved to be a safeguard of National Forest interests in the class of cases to which it was properly applicable and at the same time insured the applicant an opportunity to demonstrate in his own way his good faith in his desire to establish a home. In a majority of cases listing followed the efforts at cultivation; in others there was a failure to

cultivate and abandonment, and in still others where perhaps exclusive control of the land was desired only for grazing headquarters, the applicants declined to make the experiment. In 1910 the Secretary of the Interior reversed the former decision of the Department and this class of special-use permits has consequently fallen into disuse and has been discontinued. The present policy is to classify the lands as agricultural or Forest lands immediately at the time of examination, from the best information obtainable.

As the available supply of agricultural land becomes more diminished, the demand for that of less desirable quality and location becomes correspondingly keener. To determine the relative values of many such areas of land requires the cooperative examination of a trained Forester and a farm expert, because often every indication points to the non-agricultural character of the land and there is no basis of comparison in the cultivation of similar lands under the same conditions. Preparations are being made for an immediate cooperative examination of an area approximately 200,000 acres of lands of the lodgepole pumice soil type in Central Oregon, and the resulting report which will be made by a member of the Forest Service and two members of the Oregon Agricultural College will be the basis for eliminating the lands from the Forest or permanently retaining them therein. A report of this nature will be authoritative, as well with respect to the agricultural value of the land as to the Forest value, which is necessary not only to protect National Forest interests but as a precaution against unwarranted restriction of agricultural pursuits. A similar system of examination has been tried upon the Arkansas National Forests and found to be of the greatest value in establishing a practicable and satisfactory homestead settlement policy.

Until recently a frequent and serious obstacle to listing lands under the Act of June 11, 1906 and opening them to entry and alienation was the absence of an adequate means for reserving public highways across such lands. Frequently areas listed under this Act, especially by metes and bounds, follow along the edges of narrow valleys in rugged, and heavily timbered sections. In such cases these valleys control the only feasible outlet, present and future, and form the key to all transportation in the vicinity. Since the passage of these areas to private ownership without provision for transportation would often handicap Forest administration, materially reduce the stumpage value of the timber thus bottled up and make it more difficult to interest prospective users in its purchase as well as greatly inconvenience the traveling public, it has been felt in many instances that it would be a serious error to open them to entry, even though chiefly valuable for agriculture without this provision. Consequently the homestead units were greatly reduced, if not necessarily rejected in full, since there was no legal provision for reserving easement rights of way and to reserve a strip through the land would render it noncontiguous and so not ordinarily subject to entry by one person. However, the Secretary of the Interior January 20, expressed his opinion that the "rule of contiguity" of homestead entries was not inflexible and that he considered that the contingencies of the situation in question were such as to warrant an exception and that applicants would be permitted to enter lands on each side of such strips where it was found to be of public necessity to except the strips from the areas listed. This suggestion is obviously of the greatest value both to the homesteader and the public.

Another obstacle to the practical working of the Forest Homestead Act is the irregularity in which the agricultural areas are often sharply defined against mountainous and timbered lands. Narrow, winding valleys and draws and scattered fragments of agricultural lands situated on small benches make it frequently difficult, if not impossible, especially in the mountainous regions of the West, to get practicable, well-balanced homestead units. The purpose of this law, was, of course, to segregate the lands which are chiefly valuable for agriculture from those more valuable for National Forest purposes. In practice this is found to militate against the well-established principle and public policy that homestead entries must embrace lands in as compact form as possible. In order that all available agricultural lands may be utilized and the sparsely populated regions be more thickly settled it is the policy of the Forest Service to draw the lines as straight as practicable and make the areas as compact as possible even though portions of the land are not strictly agricultural, where to do so would not embrace heavy timber or jeopardize National Forest interests.

During the past year great activity has been shown in seeking the use of National Forest land for recreative purposes. This is particularly true of the Columbia and Crater National Forests. On the Columbia National Forest in the vicinity of Spirit Lake it was found necessary to lay out a village of residence sites to supply the wants of applicants for permits. Over a hundred applications for permits of this character were received and owing to the limited amount of National Forest land adjoining the lake shore many permits were issued for sites situated from 400 to 500 feet from the lake. While this large number of permits was applied for, it is evident that few, if any applications were made in good faith from the fact that but 2 of the permits still remain in force. This lake, however, owing to its accessibility and the natural beauty of the scenery surrounding, is destined to become a prominent place for summer resort purposes. It has been used as a permanent camping place by the Portland YMCA for its summer outing trips for boys.

On the Crater National Forest while the number of applications received has not been so great as on the Columbia, there is evidence of much better faith and greater stability on the part of the applicants. Up to the middle of May, 51 applications were received. As in the instanced of the Columbia it has been necessary to survey lots on areas most in demand for the use of these applicants. These applications are all for areas on the shores of Klamath Lake near the junction of Recreation Creek and Pelican Bay in the vicinity of which latter the estate of E.H. Harriman owns a summer lodge. It has been the policy on the Crater to reserve from all use, under permit or otherwise, public camping areas at intervals along the lake shore. Besides these reservations others have been made for general administrative purposes. One lot has been assigned to the Crater Lake Company for the erection of a warehouse and wharf to provide for tourist travel to Crater Lake. This company operates passenger steamboats on the lakes and carriages and automobiles from this point to Crater Lake. As a location for summer resorts and summer residences this place is well established. A survey of the Oregon Trunk Railway runs close to this site which will even increase the present demand. An effort which failed has been made to establish a post office at this point. The effort will

probably be repeated when the summer camp becomes more completely established. In a year or two it is thought there will be a colony of at least 60 or 75 families in this vicinity.

There is also an area adjacent to Quiniault Lake in the Olympic National Forest which will ultimately be valued highly for summer residences. A large section adjacent to the shore of the lake has been platted into lots, but owing to the inaccessibility of the neighborhood, the present demand for them is not great.

The National Forests

Area

Two matters coming up in connection with the Umpqua and Wallowa National Forests seems to indicate the necessity of some system of cooperation between the Forest Service and the General Land Office in the classification of lands. In the cases referred to applications were made by companies desiring to obtain the benefits of the Carey Act for a segregation involving National Forest land. The lands being under withdrawal for National Forest purposes, could not, of course, be segregated on the applications. In making applications of this character certain expensive preliminary work is required by State law before an application can be made to the Department of Interior for a segregation. On the public lands the company does not feel a hesitancy in performing this preliminary work because a definite and clear policy and system of regulation is published by the Interior Department under which the company can foretell the probable action that will be taken. There necessarily are some areas within National Forests which might be made more productive under irrigation than under Forest management, but which should not be eliminated from the Forest for various reasons, until it is comparatively certain that they will be extensively developed agriculturally. Some system of regulations and some definite policy covering applications for all National Forest areas that might be segregated as Carey lands, I believe would prove of much benefit. It is possible that as a result of one of the applications above mentioned there will be an extensive elimination made from the Forest.

The difficulty which has been experienced in securing as a part of the National Forests lands which manifestly should be within them suggests the almost imperative necessity for authority to withdraw lands in the "six prohibited states." In one instance in this District because of the inability to do this 5 sections of very valuable timbered land have passed into private ownership which should have become a part of the Forest they adjoined. I believe effort should be made to secure Congressional authority to make temporary withdrawals when in the judgment of this department they are advisable. As a part of such authority there might be included a provision that much withdrawals shall become ineffective and remain so unless the question of an addition is submitted to Congress for consideration at its next regular session following the withdrawal. Such a provision should not meet with opposition from earnest legislators having at hear the interest of the whole people since even should Congress disapprove of any given

addition the entry of the land by the public will only be postponed. This should not prove a serious obstacle.

The Bull Run National Forest which by proclamation has been made a part of the Oregon National Forest is reserved from all kinds of use excepting for the benefit of the Portland Water Board, by an Act of Congress which prevents the sale of timber from the area or its use for grazing. It is found that the area thus protected by Congressional legislation includes a large area which is not within the watershed from which Portland obtains its water supply and which is thus protected by Congress, and the protected area should be reduced to conform to the actual limits of the watershed of the Bull Run River. If necessary, legislative sanction should be obtained for this action.

The withdrawal of the Mount Olympus National Monument has caused some dissatisfaction among persons who have occasion to use its resources. This monument was withdrawn upon the recommendation of the Biological Survey. In order to protect elk and other game running therein it would seem that the proper method of doing this would be to create either a State or Federal Game Preserve, permitting the resources of the District, particularly mineral, to be exploited. Under the present withdrawal, development of this character is prohibited.

Enforcement of the Law

Four aggravated instances of Special-Use Trespass upon the National Forest have occurred. In one case it was necessary that ejectment proceedings be brought which terminated successfully for the Government. Two of the cases were the trespass of disappointed applicants under the Act of June 11, 1906 (known as the Forest Homestead Act), whose applications had been rejected. Another was the maintenance by a commercial power company of a transmission line on an unimproved railroad right of way controlled by an affiliated railway company within the National Forest. This was a plain and obvious attempt of the company's to avoid compliance with the regulations of this Department. After pressure, the company has been prevailed upon, however, to obtain the requisite authority to continue its occupancy of National Forest land. The fourth case is that of a Telephone Company which has refused to comply with the regulations and the requirements of the free permit for a right of way which was tendered. This case has not yet been settled.

Cost and Use

An important practice has been initiated in granting the use of National Forest lands under the Act of February 28, 1899 (30 Stat. 908). Authority was given by Congress to lease lands adjacent to mineral springs within National Forests. The benefits of this Act seem never to have been sought and with the suggestion of the District Forester at Portland, Oregon, an application was made for a lease under it. The question of the authority of the Secretary of Agriculture to make the lease was passed upon favorably by the Solicitor for the Department. It is believed a lease will be a strong inducement to capital to adequately provide for a growing public necessity for health and recreation

resorts within the National Forests. A feature of these leases which makes them very desirable is that with the consent of the Secretary of Agriculture they may be assigned.

Forest Management

Losses by Fire

In its proper place I have mentioned the success which has attended the effort to secure cooperation between the great railway systems and the Forest Service in the prevention of fire. At this point I desire to call attention to the value of a clause in stipulations which are executed for the protection of the Forest by companies seeking new rights of way, permitting officials of the Forest Service to operate speeders on their rights of way when the proposed road is completed. This clause is contained in the cooperative agreements which have been executed by the Great Northern and Northern Pacific Railway Companies, both transcontinental lines. The benefits to be derived from constant patrol along railways by this convenient method are manifest. Many incipient fires which might prove of vast danger to the surrounding Forest could be quickly and successfully combatted by a patrol with a speeder as a means of transportation.

Needed Legislation

In an opinion recently rendered by the Solicitor for the Department of Agriculture it is held that the Forest and recreation resorts within the National Forests. A feature of these leases which makes them very desirable is that with the consent of the Secretary of Agriculture they may be assigned.

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Needed Legislation

In an opinion recently rendered by the Solicitor for the Department of Agriculture it is held that the Forest Service can not permit the use of areas which have been withdrawn as National Monuments by individuals so as to insure their best development. The case in which this opinion was rendered was that of the Oregon Caves where it was desired by private capital to supply accommodations at the Monument for visiting tourists and to adequately light the Caves for convenient visitations. This instance indicated the advisability of legislation which will authorize leases of land within National Monuments which are often of great interest, for such purposes. Such legislation it is considered should provide for the making of leases upon such condition as the Secretary administering the Monument might prescribe.

I have referred above to the proposed leases which have been requested of areas adjacent to mineral springs. In one of these cases since the application for a lease was received a mineral location has been made on the land, and in the other the lease applicant who had negotiated to purchase an existing mineral location from the only claimant has been approached by others claiming an interest therein, with a request to be bought off for $5,000. These, and all other mineral springs of known medicinal value form a valuable asset for the use of all the people as long as they are owned by the Government and not subject to the ownership and greed of private individuals who might acquire them. I have spoken above of the lease Act of February 28, 1899. This Act, I believe, should be amended by the insertion of a provision expressly reserving to the United States title to all unappropriated lands situated within a radius of 80 rods from such springs. It should further be amended so as to authorize the improvement of the springs and use of all surplus waters by lessees.

One of the mineral springs for which a lease has been asked has been withdrawn for administrative purposes. In spite of this withdrawal a mineral location has been made on the land. In view of the ruling of former Secretary of the Interior that such withdrawals are unauthorized some method of permanent withdrawal of areas required for administrative purposes but not at present actively used, should receive legislative sanction.

The growing demand which has been made for locations within National Forests on which to locate permanent structures for summer residences and recreation purposes and the desire of the public for some permanent authority for the occupation of such sites, I believe, indicates the wisdom of legislation amending the Act of June 4, 1897, authorizing either the making of leases or the issuing of permits for a definite term of years.

I have hitherto called your attention to the proposed extension of the Forests of Alaska of the provisions in Section 10 of the Act of May 14, 1898, providing for the sale of lands for Trade and Manufacturers sites. As an assistance to the development of the vast north country this legislation is almost imperatively needed.

Office of Products
Introduction

The work of the Office of Products during this year has increased greatly over that of the previous year. It is significant that this office is serving as a medium of distribution of general information along all of the lines of work which it represents. The demands for such information on the part of the public have increased many fold during this fiscal year.

Laboratory Report

Timber Tests

The timber testing laboratory operated in cooperation with the University of Washington at Seattle, Washington, has been testing timber continuously during the year.

Western Hemlock

An elaborate series of strength tests on Western hemlock as completed at this laboratory late in the year. These tests have extended over a period of three years and are now being analyzed and incorporated in final form in a publication on the properties and uses of this wood. The data obtained from the strength tests will serve to establish Western hemlock as an excellent structural wood.

Western Larch

A complete series of strength tests on green and air-dried Western larch is under way at this laboratory. Practically all of the tests have been completed with the exception of a few tests on air-dried material. The data of completed tests has been analyzed and place in final form and a publication covering the properties and uses of this wood is in course of preparation.

Treated Douglas Fir

Tests to determine the effect of commercial creosoting process on the strength of Douglas fir in bridge stringer sizes have been practically completed at this laboratory. There remains to be tested a few air-seasoning treated and untreated stringers. In the meantime, however, sufficient data has been obtained on treated timber tested green and air-seasoned treated timber to indicate the deteriorating effect of the commercial process involved in the treatment of this wood.

Fire-Killed Douglas Fir

All of the tests involved in a study of the comparative strength of green logged and fire-killed Douglas fir were completed early in the year. A project report was prepared and the data was given publicity through reports to cooperators. This was an important series of tests and was accomplished with despatch and satisfaction.

Impact Machine

A large impact machine designed by the Forest Service and constructed and erected by the University of Washington, was put in operation at this laboratory late in the year. This machine is unique in design and operation and is the only machine of its kind known for testing large size wood specimens under impact.

Wood Preservation
National Forests

A set of instructions for increasing the durability of improvement timbers used on National Forests was prepared in this office. These instructions were forwarded to all Supervisors along with a blank to be filled out covering each improvement project on the National Forests. These blanks, when received, will be used in determining what steps shall be taken to improve the durability of the timbers used. No definite projects have developed as a result of these instructions. However, they have succeeded in stimulating an interest in wood preservation among the Supervisors and other wood users in the district.

Cooperation

The Forest Service in cooperation with the University of Washington, has erected an open tank treating plant on the campus of the University. This plant was operated during the year in the preliminary investigation of problems involving the treatment of poles, paving blocks and cross ties. As a result of these preliminary experiments a working plan for the experimental treatment of paving blocks has been prepared and was put in effect late in the year.

From designs submitted through this office the Oregon Agricultural College at Corvallis, Oregon, and the Washington State College at Pullman, Washington, have constructed and installed open tank post treating plants for treating farm timbers used at these institutions and for demonstrating the application of the open tank process among farmers and students of the two colleges.

Wood Distillation

During the past year members of the office have visited each of the commercial wood distillation plants now operating in the Northwest, and by correspondence the office has kept in close touch with these institutions. By reason of this association we have been able to disseminate considerable information on the subject of wood distillation as to applied to species occurring within the district.

Pulp and Paper

General data and information on the pulp and paper industry have been collected and close touch has been kept with the operations of the pulp mills located in Oregon and Washington. The office has been able to advise numerous prospective pulp manufacturers of locations suitable for the establishment of pulp mills by reason of their location and the proximity of a supply of suitable raw material. During the year one new pulp mill has been established in the district. This now being erected near Spokane, Washington.

Test Tracks

During the year a second inspection of the test tracks laid by the Northern Pacific Railroad Company in cooperation with the Forest Service in 1906 and 1907, was accomplished. The inspections were made in cooperation with District 1 and the Division Engineers of the above named company. An inspection report was prepared covering two seasons of observation.

Kiln Drying

A working plan for studying the commercial processes used in kiln-drying Douglas fir and other Northwest woods was prepared. This plan was put into execution late in the year. As a result of this study the office expects to determine the best methods of kiln-drying local woods and to promote the adoption of these methods in substitution of the present unsatisfactory methods of many mill operators.

Utilization Report

Wood-Using Industries

During the year a complete statistical study of the secondary wood-using industries of the states of Oregon and Washington was inaugurated and carried to completion. Reports covering the industries of both of these states have been prepared. The report for the state of Oregon was printed and distributed by cooperative agreement with the Oregon Conservation Association. Two thousand copies of this publication were given circulation. The report for the state of Washington will shortly be issued either as a Forest Service publication or in cooperation with some responsible state organization.

Fire-Killed Timber

A second season of investigation of the rate of deterioration and usability of fire-killed timber resulted in the compilation of very satisfactory data covering the species found west of the Cascade Mountains in the states of Oregon and Washington. A popular paper covering the data already obtained and including the timber test data obtained at the Seattle laboratory, was mimeographed and two hundred copies were distributed among timberland owners and loggers in the area embraced in the study. This is a continuous study and it is intended to take observations of burned areas from year to

year until authentic data is available regarding the rate of deterioration of the burned timber of all species occurring within the district.

Market Studies

During the year two distinct market studies have been completed. One of these covered an investigation of the timber stands, logging and milling operations and secondary utilization of forest products in the Olympic Peninsula in the State of Washington. The other involved a like study in the territory in Eastern Washington and Northern Idaho commonly known as the Inland Empire. Complete data on every logging and milling operation within these two areas was obtained and detailed office reports on each have been prepared and submitted to Supervisors for their guidance and information. These studies have made available to the office a class of information which is serving a very popular public use and have served to show the Supervisors the extent of the local manufacture and consumption of lumber, and indicate to them the prospective demands for National Forest stumpage by operators now logging private land.

Freight Rates

A paper on the railroad and cargo rates on lumber and other forest products from the Pacific Northwest to the large inland and water markets, was compiled and distributed among Supervisors. The information contained in this paper will serve to show the range and cost of distribution of forest products manufactured from species within the district, and the control of the distribution of local species by shipping rates.

Shingle Mills

A study of the shingle mills of the state of Washington was inaugurated late in the year. This state now produces about 65% of all the shingles manufactured in the United States, and the study will embrace an investigation of the source and form of raw material, its conversion into shingles and the conditions governing their distribution. In connection with this study it is intended to obtain general information on the manufacture of cedar products, all of the data later being combined with silvical data to form a publication of Western red cedar,

Miscellaneous Report

During the year the office has acted as a medium in the collection of the various logs and flitches for experimental use at the Madison laboratory. It has also selected several species for conversion into hand samples for distribution by the Forester. In addition, samples of local species have been forwarded to eastern pencil and shuttle manufacturers for determining their suitability for these uses.

Outline of Work, Office of Products

Fiscal Year 1912

Introduction

The work of the Office of Products during the fiscal year 1912 will be larger in scope and more varied in character than that undertaken during any previous year since its establishment, and will include practically all lines of endeavor represented by the Branch of Products.

Laboratory Reports

Timber Tests

The Timber Testing Laboratory at Seattle will be in continuous operation during the year, engaged on various timber test projects, and in addition will carry on the operation of the open tank treating plant erected by the University of Washington.

Western Hemlock

The compilation of data obtained from the series of strength tests completed in the fiscal year 1911 will be finished and a complete publication on the properties and uses of Western hemlock will undoubtedly be issued before the expiration of the year.

Western Larch

The remaining tests on air-dried Western larch will be completed in the fall of 1911. This will finish the entire project of tests on this species and the results will be summarized and a publication covering the properties and uses of this species will be compiled and issued before the close of the fiscal year 1912.

Treated Douglas Fir

The tests on treated Douglas fir will be brought to a conclusion early in the calendar year 1912. They will then be analyzed and combined with tests on treated timber made at other laboratories and will result in a publication on the effect of commercial creosoting processes on the strength of various species, which will be compiled at the Madison Laboratory.

Western Yellow Pine

A complete series of tests of Western yellow pine in the form of floor joists and car sills, both green and air-dried, will be inaugurated early in the fiscal year. All of the green tests will be accomplished before the close of the year. These will be analyzed and

ready for use in the contemplated publication on the structural timbers of the United States.

The air drying specimens of this species will be stored and measured from time to time during the year, and observed for shrinkage and loss in weight. Later these will be tested to be included in the publications of the Forest Service.

General Tests

General tests on all the commercial species of timber found in the District will be undertaken at the Seattle Laboratory during the fiscal year. These tests will involve the collection of representative trees of each species throughout the range of the species, the conversion of these trees sections into test specimens and uniform tests on all species, affording direct comparative data. The activities of the laboratory along other lines will probably prohibit complete tests on more than two species during the year.

Impact Machine

The impact machine of the Seattle Laboratory put in operation in the fiscal year 1911, will be operated continuously for determining the relationship between impact and static loading on timber and solving some of the fundamental problems of impact loading previously impossible for lack of a machine of this type. Considerable experimenting in establishing the theory of impact loading will also be accomplished with the use of this machine.

Wood Preservation
National Forests

The office during the year will act in a consulting capacity with the various National Forests in introducing the preservative treatment of improvement timbers on National Forests. Present prospects indicate that several treating plants may be established on distinct Forests during the year.

Cooperation

University of Washington. The office will continue its cooperation with the University of Washington in the operation of the open tank treating plant now erected there. Experiments on the open tank treatment of Douglas fir paving blocks will be under way during the forepart of the year. Later, preliminary investigations of the adaptability of this process to the treatment of Douglas fir and hemlock ties will be taken up. It is expected before the year expires to conduct some experiments on the treatment of posts and trellis poles.

Oregon Agricultural College. The Oregon Agricultural College has constructed a post treating plant from designs submitted by the Forest Service. This office will probably

operate the plant for demonstration purposes at times during the year. It will continuously act in a consulting capacity for directing the endeavors of the college in its instruction work and in the treatment of farm timbers used by the college.

Washington State College. The Washington State College has constructed a post treating plant from designs submitted by the Forest Service. This office will probably operate the plant for demonstration purposes at times during the year. It will continuously act in a consulting capacity for directing the endeavors of the college in its instruction work and in the treatment of farm timbers used by the college.

General

The past season's publicity of the economy of wood preservation has brought forth considerable dissemination of information on the subject of wood preservation. During the coming year it is anticipated greater demands will be made upon the office for information along this line. Several commercial concerns are considering the establishment of wood preserving plants, and past established plants are constantly modifying their treatments and promoting the use of treated timber. This office will continue to keep in touch with present plants and assist in the encouragement of the establishment of new plants.

Wood Distillation

During the year it is anticipated that considerable progress will be made in the methods and processes of distillation as applied to Douglas fir wood. This will be brought about through the cooperative operation of the wood distillation laboratory of the University of Washington. In connection with this work the office will collect material for distillation tests and distillates from commercial concerns for determining their practical application and value.

Test Tracks

Late in the fiscal year the fourth annual inspection of the test tracks laid by the Northern Pacific Railway in cooperation with the Forest Service at Plains, Montana, and Maywood, Washington, will be made. Since these tracks were laid in the years 1906 and 1907, it is anticipated that this inspection will show fairly well the relative durability of the various species and processes used in treating them; also the efficiency of the different forms of rail fastenings used.

Kiln Drying

Early in the year the office will inaugurate a study of the commercial methods now used for kiln drying Douglas fir and other Northwest species. This study will embrace personal observations of the operation of the more efficient kilns now used, and will undoubtedly result in modifications of present processes which will increase the

efficiency of the kilns and be conducive to a better economy and success in the manufacture of finish lumber.

Milling Methods

The methods of milling lumber in this District will be investigated with a view to determining the most modern form of equipment and its satisfaction and efficiency in the manufacture of lumber. It is probable that this study will develop a closer utilization by reason of improved methods of manufacture and economy in operation by the substitution of electric drive mill equipment and other means of closer utilization of power.

Utilization Report

While the work of the office was confined very largely to the collection and compilation of general statistical and utilization data during the fiscal year 1911, such endeavors during the next fiscal year will be in the minimum.

Fire-Killed Timber

During the open season of the year a continuation of the study of the deterioration and usability of fire-killed timber will be actively under way. The result of this year's work in combination with that previously accomplished will probably afford information sufficient for present use.

The field studies on burned areas privately owned will be augmented by the establishment of investigative areas on various National Forests, where annual inspections will be made of the burned timbers on the areas, with a view to determining at first hand when the deterioration attacks fire-killed timber, its nature and development. These studies on distinct areas will be conducted directly by one of the permanent officers on each of the selected Forests. They will continue indefinitely or until the data obtained is final and conclusive.

Market Studies

Market studies will be continued as heretofore. The first of these will be confined to the area of Washington bordering on the west shore of Puget Sound. This work will be accomplished during the winter months and will include statistical data on the timber stand, milling and logging operations, secondary utilization and the distribution of forest products from the region studied. Special market studies may be taken up as the occasion demands.

Utilization of Inferior Species

A special effort will be made in connection with all field investigations of this office to obtain the best authentic data on the utilization of inferior woods throughout the District.

Many National Forest timber sales are now encumbered because of the large amount of so-called inferior species, such as white fir, grand fir, lodgepole pine, etc. The determination of present and possible uses of these species will aid materially in promoting the sales of timber from areas on which such species occur.

Shingle Industry

The shingle industry in the state of Washington represents approximately 65% of the shingle output of the United States. These are all manufactured from Western red cedar, for which purpose most of the other cedar logged in the state of Washington is used. In addition, many other cedar products are manufactured by mills of that state. The office will conduct a complete study of the manufacture, utilization and distribution of cedar products in the State of Washington, with a view to augmenting silvical data already obtained for the purpose of compiling a publication on western red cedar.

Forest Fires

The fire season of 1910 was without doubt the most disastrous in Washington and Oregon of any since the establishment of the National Forests in these two states. Not only were there many destructive fires occurring on the National Forest but privately owned timber lands suffered as well, and the loss of improvements such as sawmills, houses, etc., reached a total of $1,913, 502. It must be said, however, that the timber land owners were better organized than ever before in the history of the Northwest. The Washington Forest Fire Association composes the large timber owners of that State, and following the example of the Forest Service has for several years patrolled the holdings of its members for the prevention and suppression of fire. Indeed this organization has already out-done the Government in the intensity of its patrol, spending directly last year about two cents per acre. Its constituent members spent about six to eight cents additional, making a total of from eight to ten cents per acre as against an average of seven mills per acre spent by the Forest Service in Washington and Oregon. Many of the guards of the association are furnished with motorcycles, thus greatly facilitating the work of patrol. In Oregon the private interests while not as well organized at the beginning of last season spent probably as much per acre as individuals, in the patrol of forest fires and in the suppression of fires, as the timbermen of Washington.

With these allied interests engaged in patrol and working together with the State, the Oregon Conservation Association in a campaign of publicity, and the awakening interest of the people in the protection of this, the greatest resource of the Northwest, it would be supposed that the damage done by fire in 1910 would have been reduced to a minimum. That this was not the case is primarily changeable to climatic conditions. Without the work done by the Forest Service and the timbermen it would be hard to estimate what the damage would have been, for the summer of 1910 was one of the driest in the history of the Northwest. It is safe to assume that had the attitude of the people and the Government been the same as it was twenty years ago the damage

would have been many times as great and a vast area covered with charred stubs would have been the result.

In reviewing the conditions which led up to the exceptionally dangerous fire season of last summer the east and west slopes of the Cascade Mountains in the two states should be considered separately. The east slope is characterized at the lower elevations by open pine forests which gradually give way to dense stands of red fir and lodgepole pine on the upper slopes. The ground cover consisting largely of herbaceous growth on this side of the mountains, particularly in Oregon, furnishes feed to thousands of head of sheep, cattle and horses.

In Washington, especially in the Okanogan and Colville Forests, grazing conditions are not so intensive and the ground in many localities during the hot summer is covered by a heavy debris of dried grasses and other herbage, offering an excellent opportunity for the ignition and spread of fires. It was here that the danger first became intense.

Climatic conditions during a period of some months prior to the fire season were exceptionally conducive to dangerous fire conditions. There was very little moisture present when the ground froze at the approach of winter in 1909, and when the snow melted in the spring of 1910 the greater portion of the water flooded instead of permeating the soil. As soon as the snow disappeared the season became exceptionally dry; the precipitation for the spring months was low, and there was practically no rainfall during July, August and September. In shaded woodland, where ordinarily in other seasons one would hunt for dry wood for camp, even the decayed logs were absolutely dry, so that a burning ember falling upon a decayed fir or pine root would cause the fire to smolder along the root for several feet into the absolutely dry ground.

The high winds added to the difficulty of the situation. Very few more fires actually started in 1910 than the year before, but in 1910 the conditions were such that fires gained headway in a short time and were correspondingly difficult to control. Fire following a root would burn to the surface after ten and even fifteen days and start beyond the trench again, so that trenches had to be patrolled for days after the fire was checked. The dropping of a live coal from a match along almost any road would start a fire which if not found would become serious within a very short time.

If a fire was reached before it covered a very few square feet of surface it could be easily checked where trenching could be done without cutting through fallen trees. However, in down timber, after the fire covered one or two acres, only a large crew of men could trench fast enough to surround the fire. If impossible to surround the burning area the method of attack was to go some distance in advance of the fire, trench from a road, trail, or natural barrier, and then back fire, for the trench alone was useless after the fire got a good start because of the rapid development of crown fires. Crown fires would result from a very small ground fire, in spruce and larch species, for the larch often carried the fire up the dry bark of the trunk where flying pieces of burning bark would ignite the spruce needles. This ignition of the spruce needles can best be

described as an explosion. It was found practically impossible during the heat of the day to control even a small ground fire unless it was reached immediately or surrounded by natural barriers when it could be controlled by back-firing.

The first fires of the season were reported from the Colville National Forest in northwest Washington in April, 1910. Two small fires occurred at this time but were easily controlled. In May two fires were reported and two more in June. Beginning early in July the situation grew serious and more and more so until on July 29 thirteen large fires were burning at the same time, with many small ones springing up. The seriousness of the situation increased to such an extent that patrol had to be abandoned in order that the rangers could take charge of the work of control, since they were the only men experienced in fire-fighting available. Not only on the Colville, but in other places during the summer of 1910, this weakness of the Forest Service organization was demonstrated for it was impossible to keep up the patrol and at the same time find experienced men for the direction of the control work.

In the emergency thus created the Forester called on the War Department for assistance and on August 16, 1910, one company of Infantry reported at Republic, Washington, for duty. Fortunately a heavy rain fell for eight hours on August 16, and while not all of the fires were extinguished, those still burning were placed under control immediately.

Of the total of 62 fires (burning over more than 160,000 acres), reported on the Colville, 48 originated outside the Forest and burned over the boundaries, and 8 originated on private lands inside, leaving only 6 large fires which started on National Forest land. Of the first mentioned class, two fires burning over from the Colville Indian Reservation were the largest on the Forest, while one crossing the international boundary from the north did considerable damage. 155,200 acres, or .0187% of the Forest was burned over but because of the open character of the timber the damage done was not as heavy as might be supposed.

In eastern Oregon the most serious fires occurred in the Blue Mountains region notably on the Whitman and Wallowa National Forests, although nearly every Forest suffered more or less.

The situation on the Whitman did not become dangerous until the first of August when there were ten fires burning. From then until the last of the month there were eight fires burning almost continuously, new ones starting as the old ones were placed under control. As many as 150 men were employed at one time but it was not found necessary to call for troops.

On the Wallowa fires became serious early in August, with many large ones burning and beyond control. About the 10th, a call for troops was made and as a result two companies of fifty men each were detailed for the work. These men rendered most efficient service and with their assistance the fires were brought under control by the end of the first week in September.

Of the fires occurring on the west slope of the Cascades those on the Crater National Forest were by far the most severe. This Forest lies in the extreme southern portion of the State of Oregon and extends over into California for a short distance. The climate is similar in many respects to northern California and is characterized by long dry summers. In the southern and eastern portions of the Forest the timber varies from almost pure open pine forests to a mixture of white and Douglas fir with scattering yellow pine. North and west the type changes and the stand grows denser until in the northwestern part we reach the typical Douglas fir of the west slope, comprising a dense stand of Douglas fir with a mixture of hemlock, white fir, yew or other associated species. It was in this type that the fires of the greatest severity occurred.

Warm weather set in exceedingly early in southern Oregon, and there was a period lasting through February and March during which no rain fell and the sun shone brightly. During this time the snow melted in the mountains leaving them bare from about April 1. Again, during April warm weather occurred which resulted in drying out the forest floor. On April 12, a forest fire was reported in Ashland Canyon, and a few days later, another one in the same vicinity occurred. Both of these fires, on account of the early dry weather, burned rapidly and covered 100 acres each before they were successfully controlled. A few showers occurred during the month of May and early June. During the period from June 15 to September 12 no rain fell, and nearly every day was sunny. This made ideal conditions for forest fires during the middle of the summer.

The game season opened August 1, and it is quite a noticeable coincidence that all of the serious fires in the Crater Forest started during the month of August. The first ones after the opening of the game season, occurred on about the 4th or 5th of August. From this time on there was a series of fires throughout the Forest so distributed that no district escaped and by August 15, every Forest officer had been engaged in fighting fire.

The headwaters of the Rogue River in the Crater National Forest is a noted game region, and many hunters and campers come from all parts of the State and from California to hunt and fish. This immense amount of outside patronage is partly due to the attractions of Crater Lake and it is conservatively estimated that during the past season there were 7,375 hunters and campers in the Crater National Forest.

Obviously, with the limited patrol force at present, the problem of keeping close watch on so many people is impossible. It can be readily understood how easy it is for forest fires to start without the Service being able to place the responsibility upon anyone. Since last season was a dry one, the hunters penetrated the high mountains and scoured the country far and wide for deer. It was doubly hard to get close enough to the wild game on account of the extremely dry conditions. One could not travel through the woods without making considerable noise, scaring away the game. In very bushy country the hunter could get no where near the game, and many of the native hunters feel that if the brush is burned out, hunting would be much easier. Even though the hunters do not maliciously set out fires they are inclined toward carelessness with

matches, tobacco, cigarettes, and camp fires. It is a noticeable fact that many fires started on the dry, brushy mountain sides.

Aside from the fires occurring early in the spring which were small in comparison with those later in the season only ten fires were reported prior to August first. From that date on they increased in number and extent until August 17, when the numerous fires, fanned by heavy winds, could not be controlled by the local Forest officers and settlers. The army was called upon for assistance and on August 19 two companies, consisting of one hundred men and four officers, equipped with four wagons and twelve animals arrived at Medford and were sent forward at once to the points of greatest danger. This force was further augmented by three additional companies of 80 men each, together with wagons and pack equipment. The members of the army, together with the Forest officers and help obtained locally, made a force of almost 1,000 men.

The situation was deemed so serious that on August 19, Assistant District Forester Buck was sent to Medford to take general charge, allowing the Supervisor and Deputy to devote their time to the actual direction of work on the ground. On August 21, Mr. Knapp, Assistant District Forester, was sent to Medford to take charge of the forwarding of supplies to the large force in the field and to arrange a system of reports from the front which would keep the District office in constant touch with conditions on the ground.

The soldiers rendered valuable service, particularly in the vicinity of Ashland, a town of 5,000 population, situated near the southwest portion of the Forest and separated from the main body by the famous Rogue River Valley. This town was threatened with destruction to such a degree that for several days the stores and every available man was on the fire line. With the assistance of the troops and the dying down of the wind, which at times carried the fire along faster than a horse could run, the fire was controlled without damage to the town. Several of the fires in this region are supposed to be of incendiary origin although careful investigation by several agents of the Department of Justice failed to secure sufficient evidence to secure indictments.

The most severe fire in this section in point of timber destroyed occurred in the heavy stands on the south fork of Rogue River.

As a whole, the Forests on the west slope of the Cascades suffered from fires to a much less degree than those on the east. The season while usually dry, with the exception of about ten days was not marked by the high winds which characterized the season in the south and east.

The effect of but a short period of east wind on the west slope is clearly shown by the last season. While many small fires were burning throughout the summer it took the high east wind of August to fan them into dangerous conflagrations. The wind, while lasting but little over a day, was common on the whole west slope and every incipient and smoldering fire leaped into a blaze. The resulting loss of improved property for one day was greater than the loss of the entire summer prior to and after this date.

A fire that threatened the Bull Run watershed, the source of water supply for Portland, Oregon, illustrated the effect a drying east wind and also shows the advantage of effective means of communication. The Supervisor of the Oregon Forest writes: "The most striking example of the value of quick communication by telephone in the control of last season's forest fires was in connection with seven large fires some 50 miles east of Portland. The Deputy Supervisor, who was in this district when the fires broke out gathered the few men available from the neighborhood and fought fire all that day and night, successfully holding the fires from spreading at certain points where the Forest was most threatened. The greatest danger from forest fires in this particular locality is to the watershed of the Bull Run River from which Portland derives its supply of water. The Supervisor was promptly notified by telephone of the need of immediate assistance. Forty-five men were sent in automobiles from Portland and reached the fires 50 miles distant the day after the fire broke out."

"The Adjutant General of the Oregon National Guard was appealed to by the City authorities for assistance and two days later two companies of militia were also on the ground. With this large force it was possible to prevent a general conflagration and great loss of property. As a general thing a forest fire can be controlled if it is discovered within a day or two after it is started. The few days beginning August 12 was one of those comparatively rare periods when it is practically impossible to put out a forest fire after it gets a few moments headway. Conditions were right for these separate fires to run together into a great conflagration. A strong dry east wind coming after nearly three months of absolutely dry weather spread fire with incredible speed. A fire started on the Huckleberry Mountain by berry pickers at about 11 o'clock in the morning, by the middle of the afternoon was scattered over four sections in T.3 S., R. 6 E. The homesteaders in this section left their places without attempting to save anything, glad to get out alive. Several settlers lost their homes and crops and their timber in this fire. Another fire in this same group burned a store, house, two large barns with about 90 tons of hay, out-buildings, and fences on the King ranch."

"At first it was impossible to do more than save life and property and head off the fire at natural breaks like streams and clearings where the danger of the fires spreading was greatest or where improved property or timber was especially valuable. At night and especially in the early morning when the fire was lowest considerable headway was made toward checking its spread. After the wind changed progress was constant and rapid. The Deputy Supervisor and Forest Assistant were in general charge of the fire fighting force on the ground. Foremen for separate crews were selected from the rangers and men hired in the neighborhood. The men sent out in automobiles carried fire-fighting tools with them and the Militia went fully equipped. Supplies were purchased from stores near the fires and some of the crews were boarded at ranches."

"The Federal Government, the State of Oregon, and the City of Portland cooperated in fighting this group of fires. The Forest Service furnished men, tools and supplies. The Oregon National Guard went fully equipped with tools and supplies and made up in willingness and discipline what they lacked in experience in fighting fire. The Water

Board of Portland furnished the automobiles for the contingent of 45 men sent out in a hurry when news of the fires was first received."

The season of 1910 taught many lessons that will be valued in coming years. By far the most important and far-reaching effect was the awakened public interest. During the danger season the papers printed the latest fire news under leaded headlines and the offices of the District Forester and local Supervisors were besieged by representatives of the press early for the latest news from the fire-line. Particular attention was paid to any fires supposed to be of incendiary origin.

The Western Forestry and Conservation Association, through its Forester, Mr. E. T. Allen, carried on a campaign of publicity calling attention particularly to the fact that for every dollar the timber owner lost through forest fires the community lost four in wages urging the cooperation of the people of the Northwest in the prevention and control of fires. This public interest brought fruit in the passage by the State Legislatures of Oregon and Washington of the most effective and far-reaching forest fire law appearing on the statute books of any state. The following is a digest of the main points contained therein:

Oregon Forest Fire Law

1. The Act filed in the office of the Secretary of State, February 24, 1911, provides for the protection of the forests of the State of Oregon, especially against forest fires, for the dissemination of information regarding methods of reforestation, the handling of timber lands, and other matters affecting the timber resources of the State.

2. The carrying out of the provisions of the law is placed upon a State Board of Forestry, consisting of seven members and made up as follows: The Governor, the acting head of the Forest School of the Oregon Agricultural College, and five electors of the State to be appointed by the Governor upon the recommendation of the Oregon State Grange, the Oregon Forest Fire Association, the Oregon and Washington Lumber Manufacturers' Association, the United States Forest Service and the Oregon Wool Growers' Association. The members of the Board receive no compensation, but are allowed actual traveling expenses connected with attendance at board meetings.

3. The Board appoints a State Forester who shall be a practical Forester familiar with western conditions and experienced in organization for the prevention of fire. His salary shall not exceed $3000 per annum and he may appoint a Deputy at a salary not to exceed $1800 per annum. Both State Forester and Deputy are allowed necessary traveling and office expenses.

The State Forester under the supervision of the State Board of Forestry, is charged with the execution of all matters pertaining to forestry within the jurisdiction of the State. He will appoint and instruct fire wardens, direct the

improvement and protection of State forest lands, enforce all laws pertaining to forest and brush covered lands, prosecute for violations of the law, cooperate with land owners, counties or others in forest protection, encourage reforestation and publish information on forestry.

The State Forester will act as Secretary of the State Board of Forestry. During his absence or disability all his authority will be exercised by his Deputy.

4. The State Forester, under such general policies as to qualifications and members as he deems wise may appoint citizens fire wardens, who shall have all the power given to fire wardens under the Act, but shall serve voluntarily or under compensation from property owners or counties. State and County officials whose duties make their services particularly valuable, shall accept appointment when requested by the State Board of Forestry.

Resident officers of the Federal Forest Service may be appointed ex-officio fire wardens.

5. In times and localities of particular fire danger, or to enforce the law or apprehend violators, the State Forester may appoint independently or jointly with other agencies additional fire wardens, and unless contributed by other sources the cost shall be paid from funds appropriated by this Act. Each county, however, in which service is rendered being responsible for one-third of the expense incurred in the county.

The State Forester shall with the advice of property owners, agents or counties desiring to cooperate, designate suitable areas official fire districts, and may appoint for each district one or more district fire wardens to be paid as are other fire wardens under this Act.

6. Any inadequately protected forest or cutover land covered wholly or partially with inflammable debris and likely to further the spread of fire and which because of its location endangers life or property, is declared a public nuisance, and on learning of the existence of such areas, the State Forester will take proper steps to remedy the situation.

7. All fire wardens appointed under this Act shall take proper steps for the extinguishment and prevention of fires in their localities, assist in apprehending and convicting offenders against fire laws, control the use of fire for clearing land in the closed season and make such reports to the State Forester as he may require. They shall have the power of peace officers to make arrests for violations of forest laws and may enter upon the land of any person in the discharge of their duties, but must use due care to avoid damaging property through this right.

Failure on the part of any fire warden receiving compensation to comply with his prescribed duties shall be a misdemeanor and punishable by fine or imprisonment or both.

8. During the period between June 1 to October 1, which is designated the closed season, it shall be unlawful for any person to set on fire or cause to be set on fire any slashings, chopping-wood, or brush lands whether it be on his own or the property of another, without written or printed permission from a fire warden.

This restriction does not apply to burning of log piles, stumps or brush heaps in small quantities under adequate precautions and in accordance with the regulations of the State Board of Forestry. When burning without a permit, escape of fire and injury to property of another shall be prima facie evidence that burning was not safe and was a violation of the law.

Violation of provisions regarding burning shall be punished by a fine from $25 to $500 or by imprisonment for 10 days to 3 months.

Permits to burn may be issued by any fire warden and any fire warden may also refuse, postpone or revoke permits.

Any permit obtained through willful misrepresentation shall be invalid and give no exemption from liability of any kind. In time or localities of unusual fire danger the Governor may suspend any or all permits or privileges should it appear that on account of drought, the use of fire arms is liable to cause fires, the Governor may by proclamation suspend the open season and make it a closed season for the shooting of wild birds and animals of any kind for such time as he may designate.

10. It is unlawful to build a camp fire without clearing the land around it free from inflammable material or to leave a camp fire burning unattended or to use in any fire arms discharged other than combustible gunwadding. A fine of $25 to $500 or imprisonment for one day for every $2 of the fine imposed is provided for violation of this provision.

11. From June 1 to October 1, for each year, it shall be unlawful for any person, firm or corporation or any employee thereof to use or operate in or near brush or forest lands any locomotive or engine burning fuel other than oil which is not provided with an adequate spark arrester kept in constant repair.

Escape of fire from any engine shall be prima facie evidence that such appliance has not been adequately maintained and upon institution of prosecution, the further use of the enginer may be enjoined until equipped as provided by law. A fine of $25 to $100 is provided for violation of these provisions.

12. All persons, firms, or corporations engaged in logging shall each year burn their annual slashings and if such burning is done between June 1 and October 1, all dead trees or snags over 25 feet high shall be cut down.

Builders of trails, roads, or railroads shall immediately destroy or remove all inflammable material resulting from construction unless prevented by the closed season. Any person, firm, or corporation operating a railroad in the state burning fuel other than oil shall annually or when called upon to do so by the State Board of Forestry, remove all inflammable material from their right of way. Refusal or neglect to comply with these provisions is punishable by a fine of $100 to $1000 for each offense.

13. Any person who shall unlawfully or maliciously set fire to any woods, forest, timber, brush or vegetable matter with the intent that the property of another shall be injured shall be guilty of a felony and subject to imprisonment in the State Penitentiary for not less than one (1) nor more than ten (10) years.

14. In addition to penalties provided under this Act recovery by civil action of double the amount of damages suffered may be obtained if the fire occurred throughout willfulness, malice, or negligence, or if the fire escaped unavoidably, then actual damages are recoverable.

15. Any person not employed and compensated as a fire warden who shall furnish information leading to the arrest and conviction of any person violating the provisions of this law shall upon conviction receive one-half the fine paid.

16. It is a misdemeanor punishable by fine for any district attorney to fail to prosecute with diligence offenders against the forest laws, when proper complaint has been lodged with him or for any Justice of the Peace, with proper authority, who refuses to issue warrant for the arrest of persons violating this Act and when complaint under oath has been filed.

17. Any persons who shall willfully destroy or injure any notice posted in compliance with this Act shall be punished by a fine of from $10 to $50, or refusing to pay the fine imposed, be subject to one (1) day's imprisonment for each $2 of the fine imposed.

18. County Board of Commissioners may appropriate money for forest protection under the provisions of this Act.

19. For the purpose of carrying out the provisions of this Act sixty thousand dollars ($60,000), or so much thereof as may be necessary, is hereby appropriated to be paid out of any funds in the treasury not otherwise appropriated.

Washington Forest Fire Law

While different somewhat in provision for administration and organization of forces, the Washington fire laws are substantially like those of Oregon in prohibitory respects. The important variations and additions are as follows:

In each county in which the State maintains any fire organization, the latter is under a county fire warden who has headquarters at the county court house.

Any fire warden may impress help to stop conflagrations and refusal to obey such summons is punishable.

Slashings may not be burned at any time until all snags and dead trees over 25 feet high have been cut down.

Within one-fourth mile of any forest, slashing, woodland or brushland, it is unlawful to burn wood waste from the manufacture of any forest product without confining the place of burning; or to operate a plant for such manufacture without equipping stacks or chimneys with spark arresters.

In addition to requiring spark arresters on engines of all kinds used within one-fourth mile of wood or brush lands during the closed season, June 1 to September 30, the law requires the guarding of ashpans and fire-boxes and prohibits deposit of fire or live coals.

Trees may not be felled into green timber belonging to another without permission.

Operators of logging donkeys not using oil fuel during the closed season must cut down all dead trees over 25 feet high within a radius of 50 feet of every engine and keep a watchman on the ground two hours after the engine ceases operation. A patrolman must be provided to follow each logging locomotive.

The opening of the fire season of 1911 finds the various agencies engaged in the prevention and suppression of forest fires in Washington and Oregon in better condition than ever before. Not only have the people of the two states reorganized with need for adequate fire laws but the lumbermen themselves are closer organized than in any preceding year. This is particularly true of Oregon where the lumbermen have formed an association known as the Oregon Forest Fire Association representing 1,800,000 acres of timber land, and have employed Mr. C. S. Chapman as Secretary and Manager.

The Washington timber owners have had a strong association representing 2,800,000 acres for several years and have done excellent work the past three seasons. The Conservation Association of the two states are active and are doing everything possible to interest the public in the case of fire.

The Western Forestry and Conservation Association, of which Mr. E. T. Allen is Forester, and which represents almost one-third of the standing in the United States, has taken the lead in the work of publicity and education of the people. In addition to education through the press this association issues from time to time pamphlets and folders giving short crisp statements of the relation of the public to the forest fire menace. Its most recent publication is a pamphlet which, with the assistance of the state authorities, will go into the hands of every school child in the Northwest.

As stated previously, several of the fires of last summer were incendiary in origin and many were caused by carelessness in the handling of camp and brush fires. The work of collecting evidence in cases of this sort has been pushed and several convictions have been secured both in the State and Federal courts. The following cases have been brought to trial so far:

Adams, Downing & King, camp fire near Medford, Oregon, indicted by Grand Jury at Portland, Oregon, on November 2, 1910. (Crater National Forest).

Frank Kirre, alleged malicious fire near Medford, Oregon, indicted by Grand Jury at Portland, Oregon, March 23, 1911. (Crater National Forest). Trial May 9.

E. G. Gardner (Continued) Trial June 8, 1911. (Siskiyou National Forest).

S. B. Fisher, fire caused by burning timber on claim of trespasser and running on to National Forest land near Ferry, Washington. Indicted by Grand Jury at Spokane Washington, October 11, 1910. Found guilty and fined $250. (Colville Forest).

W. S. Dennis, fire on homestead of trespasser, spread to adjoining National Forest land. Indicted by Grand Jury at Portland, Oregon, on March 21, 1911, plead guilty and fined $25.

Orley Kellow, fire caused by setting fire to log piles by trespasser on land owned by him near Hobo, Oregon. Indicted by Grand Jury at Tillamook, Oregon, April 18, 1911, plead guilty and fined $25, which fine was remitted by the court because of circumstances of the fire and the good reputation of defendant. (Siuslaw National Forest).

J. D. Lyda, fire caused by spreading from homestead of trespasser on to National Forest land near Twisp, Washington. Indictment returned by Grand Jury at Spokane, Washington, on April 5, 1911, plead guilty and fined $58.50 and costs. (Okanogan National Forest).

J. B. Gardner, fire caused by spreading from trespasser's land, where he was burning brush on to National Forest land, near Ranfle, Washington. Case settled by payment of $38.25, cost of temporary labor employed by Forest Service in extinguishing fire. (Rainier National Forest).

Dan Bush, fire caused by spreading from land of trespasser on to Government land near Ferry, Washington. Was arrested, taken before Justice of Peace, plead guilty, and fine $25 and costs, amounting to $6.40. (Colville National Forest).

Andrew Erickson, fire caused by spreading from land of trespasser on to Government land near Curlew, Washington. Was arrested, taken before Justice of the Peace, plead guilty and was fine $25 and costs. (Colville National Forest).

These convictions have had a very wholesome effect on the community and with the enforcement of the new state laws, careless handling of fire should be reduced to a minimum.

The increased appropriation made available by Congress will be spent entirely in increasing the number and efficiency of the protective force on the Forests. The force which was cut down to a minimum of 201 men during the winter season because of the deep snow in the mountains, has been increased between May 1 and June 1 to 353 men in order to clean out the trails and put everything in shape for the field season, and by July 1 the full summer force will be employed.

Accounts of several typical fires as told by the men on the ground follow:

A typical Fire on the West Slope of the Cascades, in Washington: Snoqualmie National Forest. Just before 4 o'clock in the afternoon of August 24, 1910, I stepped out of the house at Sunday Creek Ranger Station to speak to Forest Guard P. M. Williams, who was working in the yard. There was no sign of a cloud in the sky and as a result of the east wind which had been blowing for two or three days, there was hardly a trace of smoke in the valley. As we stood talking, Mr. Williams and I, congratulating ourselves that the fire season was drawing to a close without any Government timber in our district having been destroyed, a dark brown shadow spread over the whole of Sunday Creek valley and turning quickly to the westward we saw an enormous column of dense grayish white smoke arising in gigantic rolls from the canyon of Friday Creek, as if the power of a terrific gale were blowing it upward, and we knew that a worse fire than any we had to contend with was under way.

Sunday Creek and Friday Creek are tributaries of the Green River which rises on the west side of the summit of the Cascades and whose waters empty into the southern part of Puget Sound. Both these creeks flow into the Green River from a northerly direction. The Northern Pacific Railway crosses the Cascade Mountains through Stampede Tunnel at the head of one fork of Sunday Creek, and follows the valley of that creek and the Green River until it leaves the Cascade range. Friday Creek flows into Green River about six and one-half miles below Stampede Pass and two and one-half miles farther west is the little railroad town of Lester. The bottom land along Green River in the vicinity of Lester is about a mile wide with mountains rising steeply on the north and south to a height of 2,000 feet or more above the river. The tributary valleys are so narrow and their sides so steep that they are really canyons.

Nearly every day through the spring and summer, beginning about 10 o'clock in the morning, and lasting until sundown, the wind blows a gale up this valley from the west. The rays of the sun reflect back and forth from the mountains on either side until in July and August the valley gets so hot that it seems the inflammable debris would almost take fire without a spark to start it off. Before the building of the Northern Pacific Railway this region was covered by a mature or decadent stand of fir and hemlock timber, but logging operations and repeated forest fires have since cleared out most of the timber along the railroad tracks.

In 1910 there was little rain in the Green River Valley from the latter part of March until about the first of September, and when the fire broke out on August 24 every natural condition was favorable for a disastrous conflagration except one – the wind was from the east instead of from the west.

This fire apparently started about 3:45 p.m. from a spark from a donkey engine belonging to the Morgan Lumber Co. which was logging in Friday Creek Canyon. It spread rapidly over the logged off area which was covered with bark, deadwood and the usual debris resulting from logging operations. According to the statement of the loggers who saw the fire start, it went up the sides of the canyon "a thousand feet at a jump."

When the Forest officers got into the canyon about 4:30 the fire was burning as a crown fire and had gone to the tops of the ridges on both sides of the creek. No human effort would have had any effect towards stopping the fire at this time. The total area burned over was a little more than 1100 acres, and of this area probably 900 acres took fire within two hours from the time the fire started. By seven o'clock in the evening spots of burning timber were seen nearly two miles west of the point where the fire originated and charred embers were found six miles from Friday Creek.

The Morgan Lumber Company tried to stop the fire just as it started but it got beyond control almost immediately and the company's efforts were then directed towards getting logging equipment out of the way, or keeping the fire from it and from the logging railroad. Part of the company's crew worked all night, but their efforts were directed towards saving the Company's property and were of no value in checking the spread of the flames.

The upper portion of the Green River Valley is practically unsettled, the only residents there being railroad employees and the employees of the Morgan Lumber Co. It was therefore necessary to secure help from Seattle. About seven o'clock in the evening the Deputy Supervisor in Seattle was reached over the long distance 'phone and asked to send 100 men with blankets, tools, etc. It was too late, however, to secure men in time for work next day.

As usual, the fire died down during the night and the next day, since the outer edges of the burning area were pretty well beyond the effects of the draught in the canyon, it did not spread rapidly.

It was decided to begin work on the east side of the burning area for the reason that the wind was expected to change at any time and drive the fire in that direction, and for the reason that there was more valuable timber likely to be destroyed if the fire ran towards the east. On the morning of the 25th, 15 or 20 employees of the Morgan Lumber Co. in charge of two of their best fire fighters, started to work around the east side of the burning tract. Forest Guards Williams and Escher set out to go around the fire and ascertain the extent and condition of it and gather information necessary for successfully fighting it.

The outer edge of the fire area was found to consist of thousands of burning spots which had been set fire by the showers of sparks from the fire in the canyon. These spots ranged from the size of a hat to an acre in extent. The fire in these spots was confined mostly to the humus and the dead wood on the ground with an occasional snag or dead tree blazing at the top.

On the evening of the 25th, 87 men arrived in a special car from Seattle with a supply of shovels, mattocks and other tools and a supply of provisions.

On the morning of the 26th, the work of putting out the fire began in earnest. The men were divided into two divisions of about 50 men each in charge of Forest Guards Williams and Escher respectively. A number of experienced fire fighters having been secured from the employees of the Morgan Lumber Company to act as foremen. Each division was divided into squads of eight or ten men each and placed in the charge of one of these foremen. One division was started in on the southeasterly portion of the burning area with instructions to work towards the north, and the other division was sent through the burning area to the northeasterly portion and instructed to work towards the south, the object being to extinguish the fire along the eastern edge and prevent further spread in that direction.

On account of the steepness of the hillside and the difficulty of getting to the top of the ridges where the fire had gone, it was impracticable for the men to take more than one tool each. Tools were therefore distributed to the men in about the proportion of six shovels, three mattocks and one ax to every ten men.

On the arrival at the points assigned for beginning work the squads were scattered out over the area and the men in the squads distributed as much as possible without separating them from their foreman. Small burning spots were extinguished by covering them with earth. Trenches were put around some of the larger spots of fire or the edges were extinguished by covering them with earth so that they could not spread and the interiors of the burning spots were allowed to burn out. Burning logs if in a position where they were likely to scatter fire were buried with earth. Trenches were put around some of the burning snags and stumps to keep fire from spreading from them.

The most effective implement in fighting a fire of this kind is a long-handled, round-pointed shovel, if plenty of earth can be found. When earth is scarce, or mixed with

rock, mattocks are of great assistance in breaking up the ground, so that the earth can be handled with shovels. Mattocks are also handy in digging trenches. An ax is quite useful occasionally for chopping fire out of a burning log or stump which is difficult to bury and for clearing away down timber when trenching. The work of extinguishing the fire was greatly facilitated in this instance by reason of the wind blowing contrary to its usual direction and the work being done on the windward side of the fire. The fire fighters were hampered very little by smoke, whereas under ordinary circumstances the smoke would have made the work difficult if not impossible.

Work was continued in this manner on the 26th, 27th, and 28th, with a crew of from 100 to 110 men. By the time the fire on the east edge of the burned area was under control. On the night of the 28th sufficient rain fell to practically extinguish what fire had been left on the east side.

On the 29th field work was practically suspended, since more rain was expected and the crew was reduced to about 20 men.

On the 30th and 31st work was continued along the north side of the burned tract and about 5 o'clock in the evening of the 31st rain began to fall again. This rain practically ended the work of fire fighting, although it was necessary to patrol the area and put out occasional small fires which broke out until September 21.

While the rain on the night of the 28th and the evening of the 31st was of very great assistance and materially lessened the cost of extinguishing the fire, it was well enough under control by the evening of the 28th so that it could have been handled by the employees of the Forest Service, even under the most unfavorable weather conditions.

In the connection I might call attention to some of the difficulties in handling this fire which may not appear from the foregoing narrative.

In the first place it is no small task to hire 100 men on short notice, purchase tools for them to use and arrange for their shipment. Arrangements had to be made with the railroad company for a special car and orders for tools had to be rushed through with unusual haste. It was necessary for forest officers to keep close watch on all transactions to see that they went through on time without a hitch:

Special arrangements had to be made at Lester for boarding and lodging the men. The nearest place to the fire where men could be accommodated was at the Morgan Lumber Company's mill. The Company had nearly a full crew of its own, however, and to handle the extra employees it was necessary to more than double the cook house and dining room crew. This extra help and an extra supply of provisions had to be arranged for by the Forest Service on short notice. The bunk houses of the Morgan Lumber Company were nearly full and arrangements were made with the railroad company to set box cars on the siding at Morgan's mill for the men to sleep in. Although the men were ordered to bring their own blankets many came without them and some of these were provided for in the attic of the hotel at Lester.

When the actual work of fighting fires begins one of the greatest difficulties is the lack of experienced and trustworthy men who can be used as foremen. Workmen picked up at the employment offices on short notice, as done in this case, are, as a rule, inefficient and unreliable and cannot be depended upon to work unless a foremen is watching them. During the work on the Friday Creek fire one whole squad with the foreman were found sitting on a log a long distance from any burning ground telling stories. While positive proof is not at hand there can be little doubt that some of the men employed as fire fighters have purposely scattered fire in order to make the job last longer. I do not mean to say that all the fire fighters picked up in Seattle or elsewhere are unreliable and inefficient, but the competent and reliable men constitute only a small portion, and, of course, the forest officers at the beginning of operations cannot tell them from the rest.

The region where most of the work was done on this fire was so rough and so thickly covered with huckleberry bushes and reproduction that in many places a man could not see more than 100 or 200 feet. The scattered spots of fire made it necessary to distribute the workmen in order to accomplish results, and four or five inexperienced or unreliable men were all that one foreman could handle to advantage, although on this fire it was necessary to give each foreman about 100 men. The tendency of the men to shirk was increased because most of them were not accustomed to climbing around in such rough and inaccessible localities as it was necessary to take them, and by the time they reached the places where they were to begin work many of them were nearly exhausted. In fact, some were not able to get to the top of the ridges at all, and, of course, were useless on this fire. There were no streams on tops of the ridges and it was impracticable to carry drinking water to the men. Before the day was half over they were suffering from thirst which they tried to quench by eating huckleberries.

The men employed as foremen were also more or less deficient. Some of them did not have the ability to handle men and others realizing that they were only working on a temporary job did not care whether they got results from their crews or not. Only two Forest officers, Forest Guards Williams and Escher were able to spend their whole time in the field with the laborers and it was, of course, impossible for them to exercise more than a general oversight over the men under them.

The total cost of fighting this fire was $2,115.14, distributed as follows: Forest officers' labor, $125, cost of tools, supplies, transportation, etc. $879.56, cost of temporary labor $1110.58. About $100 worth of labor was performed by employees of the Morgan Lumber Company under the direction of Forest officers. The balance of the work done by the employees of this concern was spent in protecting their logging works and was of no value in checking the spread of the flames through the standing timber.

Sleepy Ridge Fire, in the Blue Mountain Region of Eastern Oregon. Wallowa National Forest. August 17, Supervisor Harris returned to the offices from the Minam River, where he had been in the field a week with a crew of men fighting the first fire of the season on the Wallowa, and had succeeded in getting it under control. The weather had been dry and hot for two months. Not a drop of rain had fallen to moisten the earth

or the then immense amount of inflammable material throughout all the wooded country. The debris and the outer surface of all trees was tinder-dry and scorched by the excessive heat of the sun. The grass was brown and dry, and many springs and streams had ceased to flow. To the eye, the hills and woodlands both near and far, danced and swam, as it were, in the superheated air. Almost anything furnished material for the rapid spread of fire. Even a dusty road or cow-trail was a bed of punk.

Occasionally at the close of day, flashes of lightning could be seen, and near and distant peals of thunder heard, but no rain fell. Matches were still lighted and thoughtlessly thrown to the winds, cigarettes smoked, and camp-fires left burning. Of course, in many cases attempts had been made to extinguish them, but campers and herders were still careless, and occasionally left a fire yet smoldering, which needed only a little time and wind to develop into a hurricane of fire. The dry northwest wind continued, and almost simultaneously dozens of fires sprang up throughout and around the Forest.

At 9:00 o'clock p.m., August 18, 1910, Deputy Forest Supervisor Brown was called to the telephone and advised by L. C. Johnson of Imnaha, Oregon, that a fire had started on Sleepy Ridge, 20 miles east of that place, and had gained great headway, threatening to destroy, not only a large amount of timber, but hundreds of sheep and cattle, together with the season's forage for thousands more. Great excitement prevailed throughout all that settlement, the people fearing greatly for the safety of their stock. Everybody was up and doing, ready to lend a helping hand.

Brown instructed Johnson to procure 20 men and proceed at once to the fire and take charge of all operations until he could reach there or send a Forest officer. Brown procured his saddle and pack horses and started for Sleepy Ridge, a distance of 80 miles.

The summit between Imnaha and Wallowa Valleys, which was crossed in reaching the scene of the fire, affords a commanding view of many distant parts of the Forest. From this point, on August 19, the smoke could be seen rolling up in great clouds from five fires just started, afterwards known as the Sleepy Ridge, Devil's Run, Big Creek, South Fork Imnaha, and the Upper Minam fires. Until this time very little smoke clouded the atmosphere, and these fires could be distinctly seen. The smoke boiling up in huge clear-cut clouds from these distant fires, afforded a spectacle seldom witnessed by man. The Sleepy Ridge fire, especially, presented a phenomenon strange and awe-inspiring. The immense clouds of white smoke, like puffs resulting from the ignition of gigantic piles of black gunpowder, against a clear background, and reflecting the brilliant sunshine, rolled thousands of feet into the sky. Now and then great jets of black smoke and flame could be seen, at a distance of nearly 20 miles, darting up into the white clouds above. Riding from sunset toward the fire which was fanned by a light west wind, driving the smoke eastward into Idaho, a magnificent view of the fire was had. Immediately above the vast volume of smoke, and there only, as the sky elsewhere to the horizon was clear, hovered a great cumulus cloud.

At Imnaha one settler was found who had just returned from the fire. He reported that numerous cattle had already burned and that the fire was traveling as fast as a horse could go through that country. This man brought with him a pack-train. Other horses were procured at Imnaha and the surrounding settlement, to complete the packing outfit necessary to transport the much-needed tools and provisions to the men, who by this time had increased in numbers to fifty-three. This pack-train reached the scene of action August 21, by way of a steep rough trail over a circuitous route of about 30 miles. The men had been working day and night. Johnson had then worked three days and nights without sleep, and with very little rest.

Notwithstanding the fact that the men had worked hard and long, no real headway had been made toward stopping the progress of the conflagration. It has swept over every fire line made up to August 21. On one occasion, when part of the crew were engaged in making a dead-line through a neck of dense green timber, while desperately endeavoring to allay the progress of the fire, the wind changed and quickly swept the flames down upon them. A portion of this group, working under the supervision of guard J. F. Winniford, had barely time to reach a small natural clearing upon the ground, with their faces covered with their hats. The fire passed over and all about them, burning every dead and living thing in the timber. The heat was fearful, but they all came through without harm save being badly frightened. Their tools, however, which represented a most valuable asset in fire-fighting, were burned.

That same evening, Brown, with more assistance, reached the scene of the conflagration. In company with guard Winniford, he at once rode around a part of the fire and through where it had swept that day, the day it burned the fiercest, to size up the situation, then in conference with Johnson and Winniford, planned the work of control. Returning to the front that night, he reorganized and directed all the work. The crew was divided into three main parties, with scouts for each. There were there 65 men ready for work. A foreman was appointed for each part, and each furnished with a camp and a cook. The men were so divided that those at work could be relieved every six hours. Sub-camps were established so that food and blankets would be handy to the men at work. Food and water were supplied day and night, at proper intervals. The supply camps were located on the south, the west and the north sides of the fire. The general direction of the wind was to the east, now and then switching in every direction.

The work was quickly and carefully planned, and everybody fell to with a new courage. By dividing the men in this way, each man was equipped with a shovel, an ax, a mattock, or a saw.

Advantage was taken of an opportunity offered by nature. A forest fire like a grass fire, burns fiercest during the afternoon, and is dampened more or less during the night, and especially in the early hours of the morning. The wind did not die down that night, but the dew assisted the determined efforts of the men to check the fire. That night, work was carried on directly in front of the fire, and sufficiently far in advance to work with a fair degree of safety to the men, and to save what had been accomplished by their labor during the day. A dead-line was built, from which a back-fire was started. This plan

was successful across the east and northeast sides of the fire. The total fireline was carefully patrolled to see that the work was not lost by fire crossing by means of falling timber, or otherwise. All night, and until noon the following day, was thus spent. The wind swept down from the west upon the men, driving smoke and cinders into their eyes, and often a tenacious cinder would alight across the line, and soon a blaze would appear. Many times the fire loosened large boulders or logs, and allowed them to roll down the hill, scattering fire and cinders for a quarter of a mile. At midnight, the cook brought water and lunch. While working his way down the mountain, he was nearly run over by a large black bear that the fire had routed from his retreat.

Operations on the flank of the fire were deferred until noon the following day, because it was it was known that if the wind did not change before noon or 1 o'clock p.m., there was but little danger of a change that day. The back-fire meeting the main fire on the east and north; at one o'clock p.m., August 22, all available forces were concentrated on the flanks of the fire, beginning at the west edges. The line was located, blazed, cut through and cleared out by the axemen. Horses were used in snaking away logs to prepare the way for the men digging the trenches with mattocks and shovels. A sufficient number of men were reserved to patrol with shovels, the trenches already dug. All refuse was thrown from the fire, and all soil not used in extinguishing the flames as they reached the trenches, was thrown outward, thereby widening the effective fire-stopping line a width equal to what surface the excavated material would cover; whereas, if the dirt were thrown toward the fire, the fire would burn beneath and smoulder for hours, endangering the whole works. The trenches were constructed as straight and as near the fire as possible, then all irregularities inside were back-fired. Not a particle of inflammable material was left in the trenches to act as a bridge for the fire. Three miles of trench were thus quickly dug, and the fire practically burned out behind. Every rod of fireline was patrolled day and night. The plan was a success. The north end was handled in the same way, and by August 25, the fire was under control. Patrol was effected both on foot and horseback. All fire-ways were cut sufficiently wide to permit of rapid transit in this way. Approximately 23 miles were thus patrolled. In all about 9 miles of trench, 6 inches to a foot in depth, and one to two and a half feet in width were dug. The material removed widened the effective deadline 3 to 5 feet more, making a total width of 4 to 7½ feet.

The origin of the Sleepy Ridge fire is not definitely known, but it is believed to have resulted from the neglected camp fire of a careless cook. When first discovered it covered a total area of not more than 5 acres. At that time, eight or ten stockmen succeeded in getting it under control. It was then given little attention by them, as evinced by their continuing the stock roundup in which they had been engaged, before the fire was totally extinguished. In the meantime a heavy wind sprang up and fanned the burning embers into a raging fire whose roar could be heard for five miles. After the fire broke out over the stockmen's trenches and reached startling dimensions, a messenger was sent to Forest Guard Winniford, then on patrol about fifteen miles away, advising him that a big fire was raging on Sleepy Ridge, and that many head of cattle were in danger. Winniford at once went to the scene and commenced work. He was

there at the time L. C. Johnson with his crew arrived. Mr. Winniford and Mr. Brown were the only Forest officers present during the progress of control.

All provisions and equipment, except the fresh meat used, which was killed on the ground, were brought in by means of pack horses. Two beeves, afterward paid for by the Government, were driven into camp and killed.

The stockmen using the range lying between Imnaha and Snake River all assisted in suppressing this fire. They also furnished many necessary tools. After the fire was taken in charge by Mr. Brown, the stockmen rendered very valuable assistance and were extremely loyal.

The Sleepy Ridge fire represents the three types, viz.: soil, ground, and crown. Every inflammable substance in its path was consumed. Fir and pine timber standing thick and green before the fire is now charred and limbless snags. The soil was burned deep, and not a living shrub or tree was left. Many birds and animals of various kinds were destroyed.

The accompanying photographs will give an idea of the fierceness with which this fire swept everything in its path.

The weather turned slightly cooler on August 23, and thereby assisted in control, which was thoroughly in hand on August 25. Arrangements were then perfected for thorough patrol of the lines, and all but five temporary employees were discharged. On August 29, the weather changed. This was followed by a heavy local rain and snow storm, which completely extinguished the fire within the lines.

Dead-Wood Fire on Crater National Forest, in Southern Oregon. It is reported, but not proven, that a couple of campers left their camp fire which spread into the dry, inflammable material and started the fire. At about 6:30 p.m. a local settler traveling along the road saw this fire when it was only about one acre in extent. He promptly notified the nearest ranch house, and by the time he had done this the fire had caught the high wind and began spreading rapidly. The news was telephoned from this ranch house to the Supervisor's office at Medford. In turn, the Supervisor telephoned to the ranger who was then busy fighting a very large forest fire in the northern part of his district. This fire was only 7 miles from where he was at the time. He received the message about 10 o'clock in the evening, and leaving a trustworthy man in charge of his fire, which was by this time practically under control, he started out that same night with 7 men. This was all he could spare from the other fire. That night together with 4 settlers secured from the vicinity, making 11 men in all, work was begun on the fire, but the wind had driven it into an old deadening where it was burning fiercely. It had covered 200 acres by this time and was still spreading rapidly. Early next morning the ranger telephoned to the Supervisor's office for additional assistance, explaining that the fire was a large and dangerous one. That day 50 men were started from Ashland and some of them arrived in the evening. In the meantime the ranger had collected 6 or 8 additional settlers and they were making good progress with their fire line around the

fire. One company of the State National Guard turned out and comprised the greater part of the fire fighters on this fire. Of course, they were paid regular wages the same as other fire fighters, but it was noticed that their usefulness was more effective than the labor of an ordinary transient for fire fighting purposes. In 2 days after the crew arrived the fire was completely under control, although threatening conditions prevailed at various times. Just at a point when the ranger in charge had let 20 men go, a wind blew up strong and destroyed about a couple of miles of fire line he had already constructed and thought was under safe control. This necessitated very hard and energetic work for the remaining crew for about a half day. The fire had not burned over more than about 30 or 40 acres additional when they had it under safe control.

But it was not always unfavorable wind conditions that started these fires across the fire line. In this fire it was discovered that some of the men were complaining of the fact that their job lasted so short a time, and the fire line patrolled by these persons always escaped over the fire line while they were on duty. One of the fires which was discovered about a quarter of a mile beyond the fire line during a day when the wind had been quiet all day is reasonably certain was set by some of the irresponsible men employed for fighting fire. One of these fires gained considerable headway but it was possible to check it, but almost necessitated the call for additional men. The ranger in charge immediately upon learning the unreliability of some of his men dismissed them, and on their way back to town a fire near the road was discovered, and it is reasonably certain that some of these dismissed men set the fire on their way to town. A small detachment was sent out from the main camp to extinguish this fire and it was done effectively, and consequently did very little damage. To look at the map of the Deadwood Fire one sees numerous small burns outside the main fire line. This shows the difficulty the Forest officer in charge had in keeping the fire under control after it had once been entirely surrounded by a fire line and safely back-fired. Some of these new fires outside the fire line are attributable to the shifting winds, while most of them are pretty largely traceable to the work of the irresponsible hobo element that it was necessary to hire in rushing a large crew of men to the scene of the fire. The one great fault in connection with gathering a large crew of men quickly is the fact that the necessary, reliable men cannot be immediately picked up. About the only thing that a Forest officer can do is to immediately dismiss those men which prove to be worthless, and while sending them back to town should place a reliable man in charge to take them and see that they spread no fires. Of course, diligent effort was made by the Forest officer to apprehend some of these untrustworthy citizens. But nothing definite could be determined. The ranger was necessarily so exceedingly busy with the administration of the fire, the conduct of 50 or 60 men, keeping up camp equipment, etc., that it was utterly impossible for him to give such matters the time and attention they deserve. There should be other Forest officers available for that work, but during the fire fighting season there never are.

Upon instruction from the Supervisor the Forest officer in charge of this district while confining his attention to control of the fires hired a couple of local settlers to patrol his district. There was so much smoke that it was impossible to see more than a mile or two in any direction, and the risk of other fires starting within the district was great. One

of these men discovered a small fire in a patch of down timber and brush, which if allowed to get a good start, would have swept over many hundreds of acres before it would have been possible to check it. This patrolman reached the fire when it was very small, and alone, succeeded in putting it out. In this instance it is seen that many times the cost of his hire was saved. If a large crew were necessary to control this fire after it had gained considerable headway, not only a big sum of money would be expended in the employment of fire fighters, provisions, etc., but the value of the timber killed would be an added loss. From this experiment, and from numerous others during the season, it is only natural to conclude that thousands of dollars would be saved by the employment of many such temporary patrolmen during the extremely dangerous period. It is truly believed that if the sum of $2000 had been expended for additional patrolmen, the total cost of fighting all fires on the Crater Forest would have been reduced 90 to 95 per cent. As it was, the total cost amounted to over $40,000.

There is a wagon road on one edge of this burn and it therefore was easy and cheap to secure provisions, men and equipment. The distance of haul, however, from the nearest market was 27 miles. One great difficulty found was the fact that the public conveyance hired from livery stables, etc., were very costly. The owners of teams charged at least a dollar a day more for hauling supplies and equipment for the government than they did for private owners. Realizing the fact that their equipment was needed immediately, no additional time was allowed Forest officers to search for competitors. It cost $6.00 per day for a team of 2 horses, and some of the teams secured were small and only insignificant loads could be hauled.

The total cost of this fire was $1,254.00. The total number of miles of fire line constructed were 15, making a cost of $83.00 per mile, or 25 cents per rod.

In this fire, as well as in all others, it was found that the only way to effectively check it was to back-fire. Back-firing was resorted to on every foot of the fire line. It was not a dangerous practice, and in no instance did the fire jump over the line from the operation of back-firing. It was the burning snags of old logs inside of the fire line which could not be extinguished that carried fire across the fire line. Of course, this only happened when the wind was fairly strong, but unfortunately last summer the winds were of exceptionally high velocity.

In constructing a fire line hastily it is found impossible to secure enough crosscut saws and enough men to cut down all the standing snags inside the fire line. These standing snags are the greatest spreaders of forest fire when a strong wind is blowing than any other agency except perhaps malicious fire setters. Just as important as a big supply of shovels and axes is a full outfit of crosscut saws for 8 or 10 crews.

There was one instance in connection with this fire where poor judgment and needless expense at the headquarters office occurred. Another fire about 15 miles distant from this one was under control and the ranger in charge of that fire was instructed to take about 30 men out of his crew to the Deadwood Fire. When this crew reached the fire it was found that the fire was completely under control and most of the men had already

been dismissed. There were remaining only enough reliable men to safely patrol it. These additional men, of course, had to return and were entitled to pay for their time traveling.

The total acreage burned over in the fire was 2,330, and 4,260,000 feet of timber were destroyed. It was such a severe crown fire that almost every foot of standing timber within the fire-burned area was killed. The estimated damage was $5,000. Fortunately, within this area there was a large, old burn, which did not contain much merchantable timber. Fortunately again, only about 10 per cent of the total area within the fire line was National Forest land, so the government lost a small percentage of the total.

Cat Hill Fire on Crater National Forest, in Southern Oregon. The Cat Hill Fire burned over a little more than 29,000 acres and destroyed about 25 million feet of merchantable timber. Fortunately, within the area there were only isolated patches of dense timber and the stand was not very heavy. Besides directly killing out standing timber there were great areas of reproduction completely burned over. Of course, the young trees were entirely killed. The greatest loss in this fire was to the young timber which covered an area of 5,400 acres. The average age of this young timber was 20 years, and it is estimated that 75 per cent of it was entirely killed. This calculated in costs amounts to $38,270. Compared with the value of the standing timber killed, which was $34,200, it is noted that the value of the reproduction destroyed exceeds it.

On the map the burned area shows up egg-shaped with the pointed end toward the north. It extends from the plateau of Butte Creek to steep, westerly slopes and the summit of the Cascade Mountains. The watershed is Rancheria Creek and Four Bit Creek which form to make Big Butte Creek. Some difference in slope and aspect is caused by these streams cutting their way back into the mountains, but in general it is westerly. At the southwest edge of the burn there is a ranger station equipped with a telephone which was very largely used during the time of fighting fire. The nearest supply point is Butte Falls, a distance of 12 miles from the nearest boundary of the fire, while on the east side of the fire the nearest available market point was Klamath Falls, a distance of 50 miles. It will thus be seen that one supply point and one means of communication were not sufficient to commend all sides of the fire.

This fire originated on August 17 at a time when the ranger was making a trip with fire-fighting tools to a ranger station about 15 miles distant. En route to this station the origin of the fire could not be seen and the ranger was not informed of it until the next day on his return. During this time the fire, aided by strong winds, had gained such headway, that a fairly large crew of men was necessary to control it. The ranger promptly secured 8 or 10 men together with the necessary provisions and after the second day had the fire nearly under control when he discovered two other fires about a mile and a mile and a half respectively from him. This was toward evening. Leaving a man in charge to handle the first fire, he went up the trail to get a closer view of the two fires and found that both of them were burning fiercely and had already covered from 40 to 100 acres each. These fires were above the belt of timber in which he was working and were raging fiercely in dead chaparral. The wind was constantly rising and causing

these fires to spread rapidly. There was nothing for him to do except return to the nearest telephone and request additional help. He then came back to camp and brought his few men to these fires, but they were so large and dangerous at that time practically nothing could be done. The wind was driving the fires onward up the mountain and it was impracticable and impossible for him to cut out a wide fire line and trench through the dead chaparral with the hope of stopping the fire. It was impossible to back-fire because the wind would drive the fire back over the fire line. When his crew of men and additional supplies came he also received notice of another fire in another part of his district. But a few hours after that he received still another notice of another fire in another part of his district. This made 5 distinct fires that he was compelled to handle at the same time. The second day after the new fires developed a ranger from another district was on his way to assist him. Also the Supervisor, who was on the east side of the mountains, received telephone information of the fire. The additional ranger that arrived was sent to take care of the two other fires within the district, and at about this time the federal troops were available.

The Supervisor, who was on the east side of the mountains, immediately upon hearing of the fires in this district, proceeded to the construction camp at Four Mile Lake where he knew a force of about 20 men could be engaged for fire fighting purposes. This camp was about 6 miles from the fire and directly in front of it. With this crew of men the front of the fire was attacked the next day and considerable progress was made for the two following days, both on the front and the sides of the fire. The ranger's crew of men below had now shifted their point of attack to the south and were working on one side of the fire. The wind had come up and was driving the fire up the mountain in a westerly direction at a rapid pace. The wind finally became so strong that it carried burning embers at times at least one-half mile up the mountain. This scattered fire in all directions and the 20 men at the front of the fire were forced to retreat. Seven of them were cut off by a point of fire passing in between them and their camp. They were forced to retreat and spend the night in the burned area. All that night the wind kept up its velocity and the fire spread through the burn-over chaparral area, traveling a distance of about 3 miles, and reached in many places the edge of the green timber near the summit of the mountains. The Supervisor that night when the wind came up rode down to a ranger station, which was the nearest telephone, and instructed his ranger to engage 50 men together with the necessary supplies and camp equipment from Klamath Falls and to bring them up in all possible haste. He secured 15 men from a logging camp in the near vicinity, who came up the next day. In addition to these, 40 men from Klamath Falls reached the fire camp on the second day. This made a crew of about 80 men at the front of the fire. During this same time the force at the lower side of the fire had not increased, because of the necessity of putting all available men on the new fires constantly springing up. The federal troops were stationed at other fires and did not get to assist in controlling this one until several days later. The wind still kept up its velocity, but instead of coming from a westerly direction it shifted from the south and changed the course of the fire northerly. The fire by this time was 6 miles long in an easterly and westerly direction and about 7 miles long in a north and south direction. The crew of approximately 80 men, which was in a few days dwindled to 60, at the head of the fire were extending their fire line at right angles in both directions from their camp.

The men were handicapped in fighting the fire on account of lack of water for personal use and lack of trails for transporting supplies. A packer with 7 pack horses was secured, and a trail 4 miles long was constructed and the men were soon provided with lunches and with plenty of drinking water, which was packed to them during the day. At one point near the summit was a long, narrow burn about 1 mile wide. It was necessary to cross this old burn with the fire line in order to save the unnecessary cost of constructing a detour around the old burn, keeping within the green timber where it would be much easier to check the fire. Much difficulty was encountered in checking the fire through this old burn. Down logs, standing snags, and debris of all kind were on the ground. The fire jumped the fire line many times in spite of the most strenuous efforts of the fire fighters. After 2 days with a crew of from 20 to 25 men the fire line crossed this deadening and the fire was checked. The other men had been extending the fire line beyond this burn in both directions. In this old burn the many standing snags would catch afire and the heavy wind would carry burning embers for one-quarter to one-half mile ahead of the advancing flames. It was necessary to cut down all standing snags with a cross-cut saw for a distance of nearly a quarter of a mile in front of the fire line. This meant that the fire line had to be started at least a mile in front of the fire. In many instances it was found sufficiently effective to merely rake away the debris in the vicinity of the standing snag in order to keep it from catching afire. But the safest plan was to cut them down. Then the wind could not carry the fire so far. After the fire line was constructed back-firing was the only effective method of checking the front of the fire. This was done during the night when the wind had quieted down to considerable extent. The construction of fire lines through the green timber was rendered much easier because of the fact that very few dead snags would carry the fire over the fire line, but even here it was necessary to back-fire in every instance. As stated above, back-firing was done at night, but often it was difficult to get a good back-fire started during the night and steady work of feeding dead limbs and debris on the back-fire was necessary to make it burn a sufficient distance to be effective. In the green timber with a crew of 60 working men working in alternate shifts of 6 to 8 hours each, both night and day, progress at the rate of 3 to 4 miles every day was made. Of course, as the fire line progressed it was necessary to diminish the trench construction crew in order to leave sufficient men for back-firing and patrolling the fire line already constructed. There were men at intervals of 10 to 20 rods in back-firing, and after the back-firing was completed the patrol men were usually about a quarter of a mile apart and they were strung for a distance of 10 miles all along the fire front. It soon became necessary to move from the main camp, and in so doing it also was necessary to build additional trails. For a part of the distance the fire line served as a trail. In all, there were four new camps established. At no time was the whole crew established at a new camp because of the necessity of having some part of the old camp remain in convenient reach of patrol men who were constantly needed to watch the fire line already completed.

Progress at the rate of 3 or 4 miles was made for 5 days after the full crew had arrived. At this time there were about 25 miles of fire front already controlled. In the meantime, additional federal troops were secured and two companies were stationed on the south

and north. One of the companies was placed in charge of an experienced Forest Guard, while the other it was necessary to place in charge of a civilian. The soldiers had difficulty in getting started effectively at first, but after they were well started, good progress was made. In a week the civilians at the front of the fire had connected with one company of soldiers on the north side and the fire was then practically under control.

Fighting fire when properly conducted is the most strenuous work imaginable. And the men are often required to put in longer hours at this work than any other kind of work. To secure the best results it is very necessary to feed the men well. One great problem usually confronted in handling a big crew is to secure the necessary cooks. Usually two or three fairly good cooks can be picked from a crew of 40 to 50 men, while very often it falls to the lot of the Forest officer to help very materially in the cooking. With this in view, several men were secured, who were known to have had some experience in cooking, and since a night cook and a day cook are necessary in each camp, with a crew of about 80 men strung along in four different camps, it was necessary to have 8 cooks. In this instance, luckily a sufficient number of those experienced in cooking were found among the crew. The judgment and executive ability in handling large crews in fire fighting work are taxed to the utmost, and for efficient results it is necessary to plan in detail how to distribute the camps and how to distribute the work. Provisions had to be ordered sufficiently in advance to keep the crews going and the equipment had to be secured before the crews reached the camp, and without exercising good judgment it is often possible that some of the most essential articles of cooking equipment are forgotten.

The main camp at Four Mile Lake was never abandoned since this was the farthest point that supplies could be hauled in by wagon, and a crew of 10 men were needed to work out from this camp in patrolling the fire line already completed. It was found necessary to patrol all fire lines a week after the fire was under control because of the prevailing high wind which would from time to time blow live sparks or burning embers from the old, partly decayed snags which would retain fire for several weeks. The fire in these snags was so hot that it was impossible to cut them down.

The use of dynamite or other explosives was not practiced. It was thought to be equally as effective to saw the snags down with a crosscut saw as to fell them with explosives. Neither was dynamite used in trench building for it was found inadvisable as well as unnecessary to construct deep trenches, since the fire would jump any ordinary fire line and even jump a fire line 50 feet wide. The only practicable method was to back-fire so as to develop a fire line 400 to 500 feet wide. Back-firing was very effectively conducted from a fire line cut out 4 feet wide with a fire trail in which the mineral soil was exposed for a width of 2 feet. Merely scraping the ground so as to expose the mineral soil was just as efficient as digging a deep trench. Even, when there was a fair wind blowing against one it was found feasible to back-fire. In back-firing against a slight wind, small fires were started on the edge of the fire line and allowed to burn toward the main fire. As soon as the fire had progressed a few inches it was put out with the exception of the fringe of fire directly ahead. The point kept in mind in back-firing against the wind was

to keep the fire as small as possible until it had burned far back from the fire line. This method was found to work very satisfactorily against reasonably strong wind. As a usual thing, the wind dies down to a considerable extent during the night and before morning it may often blow slightly in the opposite direction. Advantage of a favorable wind was always taken in back-firing and most effective results were secured when the wind was favorable. In the mountains within the Crater Forest it is usually true that the wind blows up the canyons during the day and at night dies down and blows in the opposite direction. Therefore, it is readily seen that night back-firing is the most effective way to handle nearly all our fires. It is not always true that the wind dies down and changes at night, but it can, as a general rule, be counted on. On this fire, for instance, the first two days the wind did not change during the night, and one day about a week afterwards the wind blew in an unfavorable direction during the night.

On September 3, just 16 days after the fire was discovered, it was completely controlled. The crew of civilians, consisting of 60 available fire fighters, constructed 49 miles of fire line in 11 days of actual work. During this time there was considerable fire line which had to be abandoned on account of heavy winds carrying the fire across it. Toward the last when more effective work was being secured, the men were running from 4 to 7 miles of fire line per day.

The tools used were shovel, mattock, ax, and saw. Various other kinds of tools were tried out none other proved satisfactory. The shovel is by all means the most useful tool, the next useful is the ax, third, the crosscut saw, and fourth, the mattock. In this fire there was all kind of soil conditions and ground cover to encounter. The ax was used in cutting out a fire line from 6 to 10 feet wide and in cutting all logs which lay at right angles to the trail. The large logs, however, were cut by a crosscut saw. In dense chaparral the fire line was cut out 20 feet wide but the ground was not exposed for a greater width than 2 feet. This trail was located near the inner edge of the cleared strip, and when a heavy, favorable wind was blowing, the chaparral would back-fire nicely. It was found absolutely impossible to back-fire in chaparral unless a fairly strong wind were in one's favor. In building fire lines through green timber it sometimes happened that there was very little dead material or other inflammable refuse on the ground. This would make back-firing impossible, while it was necessary to back-fire because the main fire was largely a crew fire. Such places were avoided as much as possible in constructing the fire line, but where it was necessary to pass through them back-firing was accomplished by carrying inflammable material to the inner edge of the fire line. It was also found economical to build fires in front of a fire line through such green material so that most of the inflammable material would be burned out by the time the main fire reached it. This, however, might become a dangerous practice, and many men were needed to guard the fire line.

In one instant the front of the fire had reached the fire line but it was impossible to back-fire against it. It was merely an advance point of the main fire but it was partly a crown fire driven on by a strong wind, probably not more than 150 yards wide. In this instance the men were ordered to attack this part of the fire directly. The flames were crossing the fire line and the men could not get closer than 30 feet to it, yet every one of them

were busy shoveling loose earth onto the flames and on the boles of the trees as the fire was advancing to them. The fury of the flames was somewhat checked in a few moments and then additional men came on, and after a few minutes of diligent work the fire was controlled. This is a rare instance of where it is possible to check a forest fire by directly fighting the flames, and in no other cases was it practiced successfully.

Toward the last days of the work on this fire the advance camp was 30 miles from the nearest telephone line and it was impossible to get messages at all regularly. The Supervisor's office was kept fairly well informed, but it was little they could do to help out the situation, even with the best of information. All the men that could be secured were already engaged in fire fighting, and supplies were being hauled and packed in, so that at no time did the men lack for food. Messages were usually delivered by hired messengers, but a great many reports were received from unauthorized persons, and generally proved to be unreliable.

To completely surround this fire of 29,000 acres, a fire line 75 miles long was necessary. This was permanent fire line, and owing to the fierce velocity of the wind and other conditions, much fire line had to be abandoned. It was calculated that fully 95 miles of fire line were constructed by all the men working on this fire. Transportation was distant and the cost of hauling and packing very great. The total cost of the fire amounted to $12,909. The cost of controlling the fire reckoned on a fire line basis was $136 per mile. Under ordinary conditions of going a fire can be controlled at much less expense than this. Fire lines are usually figured on a basis of 20 cents per rod, but this does not include the cost of supplies and equipment.

Fire Cooperation

In Oregon and Washington the Forest Service has written cooperative agreements with but two companies – the Northern Pacific and the Great Northern. The absence of similar agreements with timber companies is due to the fact that but few large solid bodies of privately owned timber lie within the Forest.

The agreement with the two railroad companies is the general one in effect wherever their rights of way cross National Forest land. The terms of the agreement are well devised but since there has been only one season's test of them their real efficiency is not known. However the very fact that the railway companies are sufficiently interested to enter the agreement is of great value and tends to influence smaller companies and individuals in our greatest problem – fire prevention.

The Chicago, Milwaukee and Puget Sound railroad which crosses the Wenatchee and Snoqualmie National Forests in Washington was constructed under stipulation which provided for a reasonable amount of fire protection and therefore made a formal cooperation agreement less necessary. Although not called cooperation the additional means reported by the Washington Conservation Association as having been taken by this company for fire prevention and supervision within the State of Washington are of the most practical kind. Besides using but few locomotives other than oil burners,

several tank cars, one of them having an engine and pump, and several hundred feet of hose attached, were kept in readiness at convenient points where a locomotive was always available to move them to any fire along the right of way. In extremely dry weather special men were employed at the most exposed places to look out for and extinguish fire. Enginemen and trainmen were required to watch for fires along the line and to stop their trains and try to control any fires that threatened damage. If unable to extinguish any fires they were under orders to report it to the first section crew and also to notify the division superintendent.

As stated before there are no formal cooperative agreements in effect in this District between the Forest Service and owners of timber or operators, yet there is an excellent relation existing which in many respects to a more formal agreement. No instance has been reported where a management refused to detail its men for fire fighting and there is no instance where any difficulty was experienced in making amicable settlement of expense.

A still bigger and more valuable factor in fire cooperation is favorable public opinion which has been developed very rapidly during the last two years by the Forest Service and allied agencies. During the calendar years 1908, 1909 and 1910 there were on National Forest lands in District 6, a total of 1823 fires of which 15 per cent were known to have been caused by lightning, leaving 85 per cent, as caused by some form of human thoughtlessness, carelessness or maliciousness. Having in mind the general cause or 85 per cent of the fires a campaign of education was started and the results though not measurable in a concrete way are felt to be large. In this campaign the Forest Service had and still has splendid cooperators in the Western Forestry and Conservation Association, the Washington State Board of Forestry, the Washington Conservation Association, the Washington Forest Fire Association, the public press and the clergy of the Northwest.

The Western Forestry and Conservation Association during 1910, printed and circulated 200,000 stickers and 35,000 pamphlets. The State Board of Forestry and Oregon Conservation Association published, posted and furnished the Forest Service for posting, a large number of fire warning notices. The Washington Forest Fire Association likewise published and distributed similar notices besides cooperating with the Forest Service in actual patrol where their holdings were contiguous to National Forest land, thereby preventing any duplication of work and expense. The Washington Conservation Association published and distributed among the school children of that State, an attractive and instructive book entitled "Our Friends, the Trees." Both the States of Oregon and Washington appointed Forest officers as deputy fire wardens, without pay, as a matter of convenience to settlers desiring burning permits, and for the better enforcement of the State laws.

Too much praise cannot be given the press of the Northwest for its services in disseminating articles prepared by various cooperating forces and for the strong editorials which appeared almost daily. The support of the clergy was solicited by a circular letter sent to every minister in Oregon and Washington whose address could be

obtained. As a consequence a number of them made fire prevention the subject of special sermons and in other ways entered actively into the general campaign of education.

Although the fire season was one of the most disastrous in the history of the Northwest it is believed that it would have been much worse had it not been for the awakened public opinion. Aside from normal fire danger to which the Forests are exposed, was the additional danger from recreationists estimated at 68,000 who were in the Forests right at the most dangerous time. In 1908 twenty-seven per cent of the National Forest fires were attributed to campers; in 1909 only twenty-one per cent is charged to them. This reduction is most gratifying when it is remembered that since 1908 the number of persons entering the Forests during the dry season has doubled if not trebled and that the possibility of starting fire was much greater during the summer of 1910 than during the corresponding season of either 1908 or 1909. It would seem from this that the average individual exercises twice the precaution of former years.

The approaching fire season of 1911 finds the forces for fire prevention better organized than ever before and finds one new agency in the field – the Oregon Forest Fire Association, represented by Mr. C. S. Chapman, former District Forester. All are working more or less in common in the campaign of education and at the same time each is vigorously attacking its own special problems.

A number of pamphlets, etc., are attached, which show that the campaign for cooperation with the public is being made largely along argumentative rather than threatening lines.

New Units

The increased business need for closer administration and more intensive methods of protection of the National Forests of the District has made necessary the creation of five new units of administration, i.e., the Okanogan in Washington, the Paulina, Ochoco, Santiam and Minam, in Oregon. The Okanogan has been administered as a division of the Chelan since July 1, 1910, but the other units named will not be administered separately until July 1, 1911.

In the creation of these units the boundaries were made to conform as nearly as possible to the topographic features of the country. Thus, the Paulina and new Deschutes are composed of those portions of the Umpqua and Cascade National Forests lying east of the main Cascade mountains, the present Deschutes taking the name Ochoco. The Santiam is composed of portions of the Oregon and Cascade Forests lying west of the mountains, and while a small unit, is extremely important from the standpoint of its timber and difficulty of protection. The Minam is the southern portion of the Wallowa Forest and the division was made primarily because of the difficulty of the grazing administration. This difficulty has been largely overcome and during the coming year the two Forests will be administered by one Supervisor, stationed at Wallowa, the present headquarters of the Wallowa National Forest.

A portion of the Rainier National Forest known as the Green River Watershed, embracing the right of way of the Northern Pacific which was formerly the dividing line between the Rainier and Snoqualmie, has been added to the latter Forest. This change will greatly facilitate the handling of the protective work along the railroad and will obviate any chance of duplicating or conflicting patrol.

On July 1, 300,000 acres of the Klamath National Forest in California will be added to the Siskiyou. This portion of the Klamath is more convenient to administer from Grants Pass, the headquarters of the Siskiyou, and can be handled more advantageously from that point.

Personnel

The creation of the new units as also the filling of vacancies in the supervisorships of the Deschutes and Olympic, together with the several appointments of deputies to become effective July 1, brings out the lack of suitable supervisor and deputy supervisor material in the District. Every competent man will by July first be assigned as either deputy or supervisor and indeed it was found necessary in order to fill existing vacancies to request the transfer of a deputy from District 5, and a Supervisor from District 2.

Not only is the ranger force failing to develop men suited for the complex and varied work of a supervisor but the technical force seems also to be falling behind in developing men for the administrative work. We have several technical men in the District who, while of value for the investigative end of the work, have failed to show the business qualities, tact, and administrative ability so necessary for a successful supervisor. The apparent failure of the Service to attract men who can develop for the higher and more responsible positions is one of the most serious handicaps to the proper handling of National Forest business. The trouble seems not so much to be that the grade of the men entering the Service is deteriorating, as that the standards set are becoming higher and higher without a corresponding increase in the quality of the new material. The ranger school carried on in cooperation with the University of Washington is helping materially to increase the efficiency of the rangers as such but is not tending to develop supervisor material because the men taking the courses are either deficient in education or are too young to be placed in a position of responsibility.

Permanent Improvements

Owing to the conditions which exist in this District, the National Forest, particularly those on the west side of the Cascade Mountains, have fewer miles of trail and other means of communication within their boundaries than in other Districts. On the west side of the Cascade Range practically no mining has ever been done, and trails have not therefore been constructed by prospectors, as has been done in the other districts. The growth of vegetation is very rank, the standing timber exceedingly heavy, and there are no meadows or other open places where stock can be grazed. Hence, the stockmen have

not developed the country as they have in other districts. The Cascade Range, as is well known, traverses both Oregon and Washington in a northerly and southerly direction. With the exception of the Columbia River there is no break in the range, but in Washington three railroad lines now cross it from east to west. In Oregon there is not a single line crossing the range. The means of rail transportation are found in the country between the Coast Range and the Cascade Range in Oregon, and between the Olympic Mountains, an extension of the Coast Range, and the Cascade Mountains in Washington. This entails therefore the traversing of long distances mainly by means of trails from the railroads into the interior of the Forests. As a result of this condition the cost of getting supplies and material to the Forests is much in excess of that usually found in other parts of the country. The stand of timber is much heavier, the growth of underbrush much more rank and luxuriant and the cost of labor is probably a little higher than in other places.

There is a vast amount of work to be done before the Forests in this District can be placed in the same class as those in other districts as regards means of communication. It is thought from the best records we have been able to obtain that the cost of work here is at least 35% more and probably 60% more than the average in other Districts. Take, for example, the Olympic Forest, on which we constructed two trails during the past summer, one 8 miles long on the south side and one 6 miles long on the east side. The former cost over $500 per mile, the latter over $400 per mile, and on neither was there any rock work or any heavy grading; however, the clearing was extremely heavy and the cost of packing supplies amounted to 45 cents and 32 cents respectively per day per man. The cost of food alone was $1.05 and 75 cents per day per man and the men were paid $3.75 per day and board, making a total cost on the south side trail of $4.75 per day per man, exclusive of the cook's wages. On the Snoqualmie the few trails already built have cost from $150 to $350 per mile; on the Siuslaw where we have kept very close cost records of the trail building, on one trail, ten miles long, the down logs averaged 125 to the mile over the entire distance, varying in diameter from 8 to 72 inches. Removing these logs alone averaged $105 per mile exclusive of the swamping and grading that was necessary. On the Siskiyou the Rogue River Trail, which will be the main line of travel through the Forest, has been under construction for four years; six miles of it in rock cost $1,050 per mile and the work during the past three years has averaged close to $400 per mile. There still remains about ten miles to complete, which it is estimated will cost from $3000 to $3500. It is hoped that we can complete it during the coming summer. These high costs are due to the causes outlined above. The work is remote from existing settlements and sources of supply, and in some places the cost of packing amounts to 8 cents per pound. Practically the same conditions exist on all the west side Forests.

But few bridges have been constructed, though many are needed. During the past year a very important bridge was built over the Umpqua River at a cost of about $2,100. It is a suspension bridge with a span of 160 feet. The cost was higher than usual, due to the exceedingly high cost of packing, it having cost nearly $400 to pack the material in. Being so remote from civilization, it was necessary to how all the timber by hand which also increased the cost. Such bridges as this one are constructed only over streams

which it is practically impossible to ford even at low water. There are many trails which are traveled to a great extent where the same condition exists and it is hoped to construct these bridges, which are for pack animals only, as rapidly as our funds will allow. The cost of maintaining trails in this district is also exceedingly high due to the extremely heavy rain and snowfall. On one of our Forests there is a place which has an annual rainfall in excess of 140 inches, and during November, 1909, the precipitation amounted to 42 inches in the month. The growth of one variety of fern which is very common in this district will in one year's time practically obliterate a trail. It grows to a height of five to seven feet in less than six months' time. This, coupled with the fact that the underbrush grows rapidly necessitates an annual maintenance cost which is unfortunately very high. The heavy snowfall causes many trees to fall during the winter months and this adds to the already heavy maintenance cost.

The disastrous experience with fire during the summer of 1910 proved conclusively that telephone lines as well as trails were urgently needed for the better protection of the standing timber. The few lines that we did have proved of great assistance, but there are many miles to be constructed which are badly needed. When it is known that there are places where it requires at least three days to reach a telephone or other point where help can be summoned in case of fire, and when it is known that this distance is comparatively but a few miles, but owing to the rugged and precipitous nature of the country traveled over it is very slow going, the value of a telephone line can be better appreciated.

On some of the Forests it has been necessary at the ranger stations to clear small areas of land in order to obtain pasturage for the Forest officers' animals. These areas usually do not exceed five or six acres but the cost of clearing such places is from $180 to $250 per acre. The need for the work is thoroughly realized in this office and a careful study has been made of the conditions in the field. Mr. Herring, the District Engineer has traveled over 5,000 miles in the last two years over trails in the different Forests on his inspection trips and in connection with the water power reconnaissance which he has been carrying on. Thus we have a first hand knowledge of the conditions, and have worked out tentatively the improvement work to be taken up on the different Forests.

During the next year practically all of the improvement funds at our command will be used in the construction of trails and telephone lines. The most important telephone work will be the extension of lines from existing lines to or into the Forests in order to facilitate the administration and protection of the Forests. The most important telephone work involves the construction of a 45-mile line up the Skagit River more than half of which will be through the Skagit River Canyon. A 40-mile line ending at the McKenzie River Bridge in the Cascade Forest; and a 35-mile line up the North Umpqua River, all of which are but the beginning of extensive systems which will completely cover the more important points in each of the Forests. On the Crater about 60 miles of line will be constructed. On the Oregon a cooperative line is now under construction from the western boundary of the Forest up the Sandy River which will cross the Cascade Range into eastern Oregon. From this line numerous side lines will lead to the various ranger

stations on the Forest. As stated above, the construction of these lines is the beginning of the trunk lines which will be extended from year to year by means of which practically instantaneous communication can be had from more important points on the Forest with the outside world.

As telephone lines are being handled, so are trails. The more important trails which will be used as trunk trails will be taken up first, but instead of endeavoring to secure a completed piece of work with the money available, we will push the trail through a properly and carefully located grade with the idea of putting it in such condition that pack animals can be taken over it in case of emergency. The important and necessary grading will be done as the swamping is completed but the unimportant grading will be put off until a future year. In this way we believe we can secure two miles of trail over which it is possible to take supplies and men in place of one mile of finished trail.

Since the east side Forests are in an entirely different class from those of the west side, and since on many of them it is possible to travel in an emergency without a well defined trail, and owing to the fact that the fire risk is not nearly so great, it has been decided to use practically all of the funds available for improvement work on the west side of the Cascade Range. It is realized that the fire risk in this portion of the district is much greater than that on the east side and in order to more thoroughly protect the standing timber our energies will be mostly devoted to work in this portion of the district.

Another feature which is often lost sight of in connection with the work in this district is the fact that when a trail crew or telephone crew is organized and taken into the Forest the cost per unit for doing additional work is much less than the cost for the first portion of that work. In other words, if the funds available for this class of work were of a size sufficient to allow us to keep on three crews on one Forest during an entire season, the unit cost would be much less than if it were necessary to send out three crews and keep them on but half the season. Our season is much shorter than in many of the other districts. Fall rains set in about the first of November and on some Forests the precipitation is so heavy that it is impossible to work a crew economically after that date. The snow does not leave the higher altitudes until late in the year; probably the first or middle of June is the earliest date that we can work at an elevation of 2500 feet or above. This necessitates pushing the improvement work very rapidly during the short time at our disposal, and for that reason necessitates the hiring of more men than would be necessary could we work for a longer period.

Much attention is paid to the proper location of both the trail and telephone work in order that they can be extended as the funds are available, working to the end that when all such work is finished we will have a complete network of means of communication, yet none that overlap or are not needed. No work of this kind is started until the route has been gone over thoroughly and carefully and the line clearly defined by competent men. It is thought that by paying close attention to this detail much money is eventually saved in the work.

The construction of houses, barns, pasture fences and other improvement work, while needed on many Forests is thought to be secondary to the construction of trails and telephone lines and hence will not be taken up at least during the next year to the same extent that it has in the past. There will be but few exceptions to this general rule. While it is realized that houses for the use of Forest officers and for the storing of Government property are essential, yet it is believed that with the work already done they can manage to get along until the Forests are more thoroughly covered with trails and telephone lines.

Annual Reports
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GRAZING

Range Management

As a general rule it is possible to control without difficulty the handling of sheep range. The manner in which sheep are handled permits a field supervision in which systematic cooperation between Forest officers and owners is possible without inconvenience to the stockmen.

With cattle it is somewhat different. Owing to the firmly-rooted belief that the old method of simply turning stock loose to graze without any attention whatever is the best and the fact that many small owners must have other sources of income requiring attention, it has been difficult indeed to secure general cooperation. I am please to say, however, that during the past twelve months the cattle men have begun to realize the need for cooperative work and recognized the rights of other classes of stock to a use of the range. The result has been the formation of many organizations for the better handling of stock. The Central Fremont Cattle Grazing Association, comprising a majority of the cattle users of the Fremont National Forest has been formally recognized through an advisory board. The cattle men of the Rainier Forest have also taken the same steps. These are two important organizations. Others have not gone so far but have formed associations for the employment of riders and the construction of drift fences. This is particularly noticeable on the Deschutes National Forest where one association has erected a 17-mile drift fence, two others are taking up this work and all the cattlemen not enjoying the benefits of a fence have combined and hired line riders.

The sheep owners are also giving more personal attention to their business. They are influenced to a great extent by the general slump affecting their interests and feel the need for such attention. But we must give them credit for a desire to assist us in our work of range management. This increased attention will have the tendency to prevent encroachment and the filing of trespass charges. During 1910 many springs were improved on the range and plans are laid for much work along this line by the Forest Service and the stockmen during this season. There is still much to be done on all the grazing ranges of the National Forests to bring about a more even distribution of the

stock but because of a limited and largely inexperienced ranger force the work must necessarily progress more slowly than desired.

This matter of cooperation with the stockmen requires increasing attention. The Service is continuously being criticized for "arbitrary methods of conducting business" and to offset this we must meet with the users in every possible way. The growing need for a stricter attention to the equitable distribution of equities will demand that every possible use of the available forage crop be had. This will necessitate a close study of the effect of grazing on watersheds relied upon to supply water for cities and irrigation purposes, the relation of grazing to fire and young growth. In the study of these questions the stockmen are vitally interested or they should be and to meet with them, interest them and discuss the matter in all its phases is our duty. We must realize more than ever that cooperation is the logical means toward accomplishing results. Constant, regular and friendly consultation on the range will do vastly more to bring about this condition than the pressing of trespass charges. In the calm consideration of the question we mush frankly admit that in the majority of cases trespass results from slack supervision and inattention on our part. If we desire the stockmen to work with us we must meet them half way. We must take the lead as it were and show them on the range just how they can assist in the work of forest protection and the advancement of their interest by studying a well-regulated system of using its forage products.

On many of our Forests it has been found that the most economical method of handling cattle is by the use of drift fences, and as stated above, several stock associations have commenced the construction of such fences. A rather serious problem presents itself in connection with this work. The case is this: We issue a permit for cattle grazing to an owner for, say 400 head. He with others constructs a drift fence to handle the stock. Our protective limit is 150 head and naturally we reduce him to admit new men who get the benefit of the fence. A few men may build the fence, each subscribing in proportion to the number of cattle he has on the Forest. After a while we have a large number of permittees enjoying the use of a fence constructed by the few. These few naturally feel that the new man should compensate them for the share of use obtained. Where all belong to an association adjustment is easy, otherwise it is difficult. The question is coming up now and is quite a factor in influencing a decision to take up the fence construction and many large men object to the proportionate assessment without some assurance that the new men will reimburse them for the use obtained.

The drift fences are primarily for the purpose of facilitating the handling of stock and although proper handling naturally follows with beneficial effect on forest growth it is questionable whether we can compel a new man to reimburse the builders of the fence according to the reduction made in permits and the proportion of use given the new owner. The matter would seem to depend on the usefulness of the fence for Forest protection and it might be said that all are thus useful to a certain degree. However willing we are to assist I think the question ought to be adjusted by encouraging community organization rather than undertaking the responsibility of providing for the reimbursement of the fence builders.

In a few instances petitions have been filed requesting that all stock be excluded from certain watersheds in the interests of city water supply and in other cases settlers adjacent to the Forests have desired the exclusion of sheep from certain ranges in the interests of irrigation. This matter was taken up last season and from reports it appears that conditions are not so intensive that grazing is having a marked influence in preventing a sufficient and pure supply of water being had for all purposes.

The absolute and complete exclusion of stock from watersheds which necessarily must be protected in order that towns and the bottom lands tributary thereto may have an adequate supply of water is not always possible or desirable. It is not possible at present because in its relation to the use of the irrigable bottom lands the grazing of stock on the adjacent watersheds is essential. Without the ownership of stock, in many cases, the bottom lands would be valueless for the reason that lack of transportation facilities and market conditions demand that the products of such lands must be consumed on the ground and the only way in which this can be done is by their use as winter and finishing feed for stock.

The rapid development of the country is so changing this order of things that greater attention must be given the protection of watersheds in the future. Crops are now being raised on former grazing ground, the profits derived from which are far greater than that derived from stock raising. A more intensive system of farming is being practiced and questions relating to further restriction of grazing upon watersheds will in the future arise and it is then that we will be confronted more than ever with the question, "Is it desirable to completely exclude stock from a watershed in the interests of irrigation?" While it might be said that grazing cannot be conducted without some injury resulting it is not fair to suppose, as is often the case, that grazing results seriously on all watersheds and should, therefore, be forbidden.

Although we are inclined to look upon grazing as taking a place second to the objects for which the Forest is created, yet a study of the question will disclose the fact that an even distribution of stock equal to the carrying capacity of the Forest, under efficient supervision, has the direct tendency to promote silviculture by increasing the average of seed germination. The gentle distribution of harrowing of the humus of the forest cover which, while not sufficient to endanger the water conserving powers of the Forest, tends directly to assist the fallen seeds to reach soil congenial to a rapid and certain germination. Regulated grazing then should be looked upon as being necessary in the protection of all National Forests and as the most economical and efficient means of reforestation of such large areas.

Formerly the presence of stock of the Forest range, sheep in particular, was generally considered as detrimental to forest growth. In the light of experience it must be admitted that stock grazing, when well regulated, is beneficial, and one beneficial effect is noticeable in case of fire.

The past overcrowded nature of the grazing Forests has precluded the possibility of a deep study of the question and but little information is available relating to the effect of

fires on the grazing Forests before they were generally crowded with stock. However, observations made during the past season indicate that stock grazing is valuable as a fire preventative. In this respect only the grazing Forests can be considered. No reliable data could be expected from a comparison of results following fire on the heavily timbered and ungrazed ranges of the western slope of the Cascades with the open yellow pine and heavily grazed areas east of the range.

The extent of the fires which occurred upon the Colville during the season of 1910 was due largely to the absence of stock upon the range. The growth of grasses and weeds is dense and rank over the greater part of the Forest and the soil cover is deep and in a highly inflammable condition in the summer season. Through the occurrence of a fire in the vicinity of Mt. Bonaparte which is the only district on the Colville Forest occupied by sheep the effect of grazing as an effective agent in fire control was observed. The absence of an accumulation of dry grasses prevented the rapid spreading of the fire and it was quickly brought under control.

It is certain, of course, that the consumption of the annual growth of forage will restrain the spread of any fire but our observations are not so conclusive that definite statements can with safety be made as to the effect of grazing on the reproduction already established. Many factors enter into a correct plan of grazing on forest range, every plan must be governed by the recognized objects in National Forest creation and intensive forestry will no doubt demand the almost total exclusion of stock. At present, however, with our small ranger force, immense acreage and limited appropriations and facilities for fire fighting, we must depend to a very large extent on stock grazing to restrain fire, and while depending on the presence of stock to assist we must endeavor to so regulate its movements that two purposes will be served, reforestation direct and fire prevention.

Grazing Capacity of National Forests

The ranges at present in use must be considered as being fully stocked under the existing system of handling the stock. Improved methods are however being gradually adopted both by sheep and cattlemen and the grazing capacity will in time increase. For awhile, however, the heavily-grazed areas must be protected in the early part of the year as much as possible. Instead of increasing the stock on these areas it will be necessary to adopt for a few years the system of alternate grazing.

It was expected that the grazing ranges of the District would be increased by the shipment of a large number of sheep to the unused range on the Colville and Okanogan National Forests. It is doubtful whether many owners will consider the proposition this year because of the uncertainty in prices both of wool and mutton. The examination of the range will continue however in order that we may be in a position to take care of all stock that will be brought to the range when conditions become better.

The eliminations from National Forests have affected grazing matters upon the Wallowa National Forest where 7306 sheep were involved, calling for refunds amounting to

$194.90. Free grazing was not allowed on the areas proposed for eliminations. It was known that but few head of stock would be affected and that forest range might be found for all was expected. In cases where this was not possible, refunds were allowed for the unearned proportion of grazing fees.

General Range Conditions

Through the entire District the general climatic conditions appear to favor a more successful grazing season in the matter of forage supply than was experienced during the summer of 1910.

At the opening of the season of 1910 everything indicated an exceptionally abundant forage crop. The spring opened early and during the lambing season the warm weather produced a growth of grasses that put all stock into excellent condition. However, the warm dry weather continued throughout the entire season. Very little rain fell in some sections and none at all in others until the middle of September. This resulted in a general drying up and shortage of forage in some localities before the season was very far advanced.

Reports show that the degree of shortage was greater on all Forests east of the Cascade range and heaviest of all on those located in central and southern Oregon.

As a rule, all Forests of the entire Cascade range from the Chelan to the Crater report that although the effect of the dry season was generally felt the shortage was not so great as to cause much shrinkage in the condition of the stock or loss to the owners. The ranges of these Forests are usually higher than those of the Forests to the east and whenever the rain did fall it fell on the Cascade slopes. Again the allotments are not so crowded.

With regard to the Forests in the State of Washington east of the Cascades, the Colville, Wenatchee and Wenaha, additional labor was required of the field officers in providing range in a few cases where there was danger of overgrazing. No difficulty was experienced in this and all owners were able to use the range throughout the entire grazing seasons.

It was in Oregon, however, that the shortage was severely felt. In northeastern Oregon conditions were much the same as in eastern Washington; extra range was supplied. This could not be done to any extent throughout the Blue Mountain range; on the Umatilla, Deschutes and Fremont National Forests in particular, and many permittees were compelled to remove their stock early in the season and rent pasture on the outside.

The greater part of the sheep ranging on the southern slopes of the Blue Mountain Forests and the Fremont are grazed during the winter months on the Oregon desert. They leave the desert early in the spring because the water supply is at that time becoming short. Trailing to the foothills adjacent to the Forests they are lambed and are

at the boundary ready to cross to their allotments at the opening of the season. During normal years it is possible to feed sheep on the desert during winter months without feeding hay. This is so because all stock are compelled to leave when the water holes dry up; the grass then grows during the spring and early summer and there is usually an abundance of old grass for winter use. The unusual, however, occurred last spring.

The early growth of forage was better in the spring of 1910 than it was in former years and the stock was able to remain on the desert longer than usual, the owners in some cases taking advantage of the abundance of feed to lamb there. Then followed the unprecedented dry spell which continued until the middle of September. The growing grass was mostly consumed and it did not grow again after the stock left. Very little, if any, came to maturity.

Although abundant and heavy rains fell subsequent to September 20 this only served to start growth of forage sufficient to relieve temporarily the distress caused by the shortage. In central and southern Oregon the sheep went onto winter ranges devoid of old grass. The result has been that many sheep owners have lost upwards of 50 per cent of their bands. The winter was not unusually severe but appeared so to stockmen because of the shortage in feed. Stockmen now realize that the desert is overstocked and that the ownership of ranch property producing hay is essential if they expect to succeed in their business.

Changes in Live Stock Industry

The prospect of a severe winter with heavy losses caused many changes in ownership in the fall of 1910. Many owners having no winter range and no hay were dubious about entering the winter and decided to sell out. The prices obtained were low, in very few cases did they exceed $2.50 for ewes where a chance on the winter was to be taken. Where the purchasers were able to provide against severe weather the prices paid were higher. As high as $6.00 per head for 1,000 head of exceptionally good ewes were paid last fall in southern Oregon. These were range sheep and were grazed on and adjacent to the Fremont Forest. Lambs were sold for from $2.50 to $4.50 per head last fall and this spring at the May sales were bringing $6.50 per head. Wethers have averaged about $4.50 during the last six months. Many fall sales of wethers have brought in $4.75 per head in the Portland market. The price of wool at the May sales in Oregon averaged 13 cents per pound and is much lower than last year when 21 cents per pound was freely paid. The market in general has been picking up since last summer. The cattle market for the past twelve months has been stronger in comparison with other years.

The cattle ranges of all Forests with the exception of those in the Blue Mountain region and Fremont range have supplied forage sufficient to carry the stock through the grazing seasons. In central and southern Oregon there was a general shortage of range. This condition forced a good many sales last fall in that section of the District. Prices, as everywhere in the two states have been increasing steadily during the last two years and so much stock has been sold out of the country that there is now about

12,000 head less cattle ranging in the vicinity of the Oregon desert than two years ago. The rapid settlement taking place in this region has also contributed to this condition, the homesteading of the spring and fall ranges is causing big cuts in the herds of the larger outfits.

The present depression in the sheep business and good outlook for cattle is creating a tendency toward a restocking of the cattle ranges on the National Forests by those who sold out during the past two years and became sheep owners. Applications have been received from some of these men for permission to change from sheep back to cattle.

I am convinced that we should adhere strictly to the rule that all persons seeking grazing privileges must be owners of improved ranch property commensurate with the number of stock for which permit is desired and that the property be used in connection with the stock, and that the property be absolutely dependent on a use of the National Forest range. On heavily stocked Forests it is generally necessary to provide for these new owners by reduction in the permits of old users. This reduction should be as low as possible in order to avoid reducing a man who has been in the business for years and is in every respect a permanent man, merely to provide for one who seeks to enter the stock business because it is at present profitable.

The records of the District show that in the case of cattle 833 new owners were admitted during the years 1908, 1909 and 1901 and that only 330 of these new owners applied for the privileges in 1911.

In the case of sheepmen 221 new owners were admitted during the years 1908, 1909 and 1910 and but 133 of them made application in 1911.

With regard to these cattle permittees who have gone out of business, many of them are new settlers who bought a few cattle to assist in the maintenance of their homes and then apparently found the cost of handling them heavy and seized the opportunity of high prices to sell out.

In the case of the sheepmen many new men started in when prices were coming up three years ago, but the slump in the last year has put them out of business. Many also were new at the business, expected to make easy money without experience, were disappointed and after one year sold out. This temporary enthusiasm of the majority of new owners makes it clear that we must protect as much as possible the interests of the permanent men and not seek to reduce them merely to obtain a wide distribution of privileges. The new man should be provided for mainly though sales and transfers.

These sales are going to be frequent enough to provide for these new men for the history of all countries in the pioneer stage is one of frequent changes in property ownership. The settling up of the winter, spring and fall ranges will also be a great factor in decreasing large outfits and promoting property transfers.

Trespass

At the beginning of last grazing season there was every indication that the administration would be greatly hampered in its work because of aggravated forms of trespass. However, the situation was not as bad as expected. Judge Welborn's decision in the cases against Grimaud, et al., erroneously reported by the press, had created an uneasy feeling among the stockmen throughout the District and there was much talk regarding the legality of the grazing charge and right of the Secretary to control grazing on the Forests. There were many threats of trespass but in most instances the supervisors were able to satisfactorily explain the situation and to a great extent the agitation ceased. There were, however, a few restive spirits who either through ignorance or maliciousness took chances and entered the Forests without permit.

The greater number of stockmen fully understand the situation and the successful action in the cases before the Supreme Court this spring has cleared the atmosphere and conditions are generally very satisfactory at present.

The recent dispute concerning trespass with stock on National Forests resulting in many violations of the regulations gave us the opportunity to note rather carefully the result of the procedure which requires all cases to be submitted to Washington, D.C., before action is taken to effect settlement. Delay in handling of cases has resulted but the field force must admit that the cause has been laxity in the preparation of cases in the field.

In the past our methods of settling trespass cases have been more of a "bluff" than anything else, not intentionally of course, but the trespasser was usually reminded that failure to settle his case would result in the loss of grazing privileges. He usually settled without protest. A valuable lesson has been learned under the new procedure in the preparation and conduct of trespass cases and I believe the coming year will see fewer cases returned for insufficiency of evidence. I also believe the District office is competent to handle and settle all cases of innocent trespass.

The past year has made it plain that a number of stockmen observe the regulation merely because they have to. I do not mean to infer that, as a rule, our permittees are inclined to be lawless but there are many who were only too ready to accept any statement if it related to the unconstitutionality of the grazing regulations. Even when they knew better they felt that our hands were tied and took advantage of the situation.

The recent decisions handed down have brought relief but we must not relax our vigilance on that account. The thorough marking of the boundaries and driveways will still be as necessary and supervision on the range and instruction in allotment handling more so than formerly, not altogether because of danger of trespass but mainly to bring about the proper use of the range demanded by the country's development.

Permits

Instructions were issued last season permitting the issuance of fire-year permits on National Forests in this District and it was believed that stockmen would seize the opportunity to place their business on a more stable basis. The idea did not take very favorably, it being argued that the permit being issued annually and without a guarantee of use for the five years, amounted to practically the same as an annual permit, particularly since on most Forests heavy reductions are no longer needed.

The term permit can be handled very well in the case of sheep, but it is practically useless in the case of cattle because of the fluctuating nature of each individual's business. This form of permit will not be further recommended unless the stockmen desire it.

Use of Private Lands

The lands of the Weyerhaeuser Land Company in southern Oregon have again been leased by the permittees of the Fremont National Forest and there will be a continuance of the amicable and very satisfactory arrangement of allotments on that Forest. The Northern Pacific Railway Company, which for the first time last year leased its lands within the Wenatchee Forest to Forest permittees has found the arrangement so satisfactory that the leases have been renewed for this year. It is apparent that these people desire to lease to our permittees for clashes between users are thus avoided and when leases are once made further trouble is practically eliminated for the year.

Numerous trespass cases originate from the use of private lands within the Forests. The growing demand for summer range on the Forests from bona fide settlers and the decrease in available public range on the outside has turned attention to the use of all private lands within the Forest. The owners, realizing that a value lies in the forage crop, are leasing these lands to stockmen. Stockmen desiring to increase or to maintain their present status are anxious to acquire control of them. The result is today that very little, if any, private lands suitable for grazing within the National Forests are not being put to use during the grazing season.

Where this land is leased to our permittees we are able to cope with the situation but in cases of lease to outsiders a problem is presented. It is here we have difficulty with trespass and proof of encroachment necessitates much labor in ascertaining positively whether or not the stock involved is on the National Forest. The boundaries of much of the private land follows quarter section lines which of course are not surveyed and in many cases where the lines of alienated land are ascertained the proper marking on the ground is not always kept in mind.

A more intensive development of the country and the consequent greater demand for range will require that the boundaries between private land and Forest land be clearly and plainly marked even though the private lands be within the exterior limits of the Forest. The pressure of business is increasing so rapidly that a complete knowledge of the location of the lines of all interior holdings and their proper marking on the ground is becoming most essential. I understand that the exchange of large bodies of private

lands is contemplated in the interests of more efficient administration. The large stockmen in this District who lease these lands are of course opposed to this idea; they fear elimination of the private lands if assembled in a body and consequent loss of protection.

Protection against Disease

This spring the inspection of cattle in Lake and Klamath Counties, Oregon, showed the presence of scab to a great extent. Infected herds were quarantined by the State Veterinarian in the feed yards during the winter and instructions issued to have the cattle dipped before turning them out. The owners ran short of feed and as the cattle were poor and in no condition to dip they turned out on the range, the result being that both Lake and Klamath Counties were quarantined May 1. The order does not require a general dipping, but merely calls for the inspection and issuance of a clean certificate before removed from the counties or from place to place in the counties covered by the order.

One or two owners desire to dip and are making preparations toward this end. Others do not want to go to the expense, and should they not do so the result of dipping by others will be useless. The state should issue a general dipping order and compel dipping under state supervision each year for at least five years. One or two dippings will not get all the cattle and unless the state oversees the dipping it will never amount to much and the eradication of the disease will be impossible.

Drs. Hamilton and Glazier of the Bureau of Animal Industry are at Silver Lake investigating the situation in the interests of the Federal Government.

Protection against Wild Animals

With one exception no unusual damage to stock has occurred on account of predatory animals. The exception referred to is the outbreak of rabies in Eastern Oregon. The loss in stock was not heavy for immediate and vigorous action was taken to prevent it by the employment of eight hunters by the Forest Service. The State of Oregon placed Dr. Lytle, State Veterinarian, in charge of the work, and he also employed men to help in the work of extermination. Assistance was rendered by all stockmen who offered a bounty of $1.50 per head in addition to the state bounty of $1.50 for every coyote killed. Our best hunter, W.R. Hamersley, was transferred to the Wallowa Forest for four months, February 1 to May 31 and did excellent work. Three thousand coyotes have been killed in Wallowa County in the last six months and recently Supervisor Harris of the Wallowa National Forest reported that the rabid coyotes had been practically destroyed.

The greatest losses from depredations of coyotes occurs among the sheep in Central Oregon. There the coyotes are very numerous and although our best hunters are stationed on the Forests adjoining the desert but little reduction seems to take place in their number. Hunters Hamersley and Canterbury of the Fremont Forest have each

averaged one coyote a day since their employment. Hamersley has been on over two years. His kill for last January was 51 coyotes. Searcy of the Umatilla is another good man and is making a good record.

Loss from the attacks of bears are not heavy and but few large bears are killed. Most of the bears taken are small brown and black ones, generally considered to be harmless.

Protection against Poison Plants

Losses from poisonous plants appear to be decreasing and it is believed this is the result of interest taken in the matter by the Forest Service. The stockmen are giving thought to better methods of handling stock, being influenced by the supervisors and rangers on the ground and through them are acquiring knowledge of the location and effect of poison plants on the stock under different systems of grazing.

The usual loss in sheep near Abert Lake, Oregon, has not been so heavy this season as in former years. Since the investigation by the Bureau of Plant Industry last spring the sheepmen have paid particular attention to the movement of their bands over the trails from the desert to the foothills of the Fremont range. It is hoped that the investigation being carried on by Assistant Botanist Eggleston, who is now on the ground, will discover the real cause of the loss and means for preventing it in future.

Forage and Pasture Investigation

The work of opening the vast ranges in the Paulina Mountains of Central Oregon to summer grazing through the development of water, is being taken up again this year and $1,500 is available for expenditure in the work. An effort is to be made to determine whether or not deep boring will result in the discovery of water. If success does not follow the work this year the construction of a tank or reservoir will be taken up. The loose nature of the pumice soil is, however, against the latter method.

The work done last season with the well drill cost in all $4,337.83 for a period of three months. This includes the cost of the drill and equipment and transportation to drilling site, which amounted to $2,228.33. The balance of $2,109.50 covered cost of labor, provisions, horse feed, horse hire and transportation of provisions and horse feed.

Five wells were drilled as follows:

No. 1	115 feet
2	70 feet
3	130 feet
4	60 feet
5	120 feet

The first four holes were abandoned on account of large seams and crevices being encountered in the lava. The tools were so crooked that the holes could not be

successfully driven and they would not hold water to drill with. Work ceased on well No. 5 on December 1, 1910 on account of depth of snow and bad weather. The drilling showed 43 feet of pumice and 77 feet of lava and was left in good condition to go deeper. It is at this well that work has been resumed this season.

The total depth of the wells is 495 and no water. The cost per foot for last season's work, less price of drill and equipment was $4.53. We hope to reduce this in future work for many disadvantages were met with which I think the experience of last fall will do away with this season.

The plant has been strengthened to cope with the unforeseen character of the formations to be drilled through and success is looked for this year.

Grazing Reconnaissance

Very little really satisfactory work was accomplished last season in grazing reconnaissance work. The majority of supervisors and rangers have not had a clear conception of the importance of the work nor thoroughly grasped the essential points to be kept in mind. The best work comes from the Oregon, Cascade and Rainier National Forests. The work on these Forests is excellent and in spite of a severe fire season a very intelligent idea of the grazing capacity of the various allotments has been worked out.

During 1910 each ranger in the District was assigned to the work of gathering and compiling data in accordance with the plan or outline sent out. The results were however far from uniform and were deficient in that the features of accessibility and adaptability have been in most cases lost sight of. Accurate reconnaissance work can follow only the employment of men who, through training and experience, are qualified to gather uniformly the necessary data.

The work of a reconnaissance crew must be thorough and the basis of thoroughness is an accurate survey not merely of section lines but of the whole area covered. Accuracy may attend the classification of range types but without a correct knowledge of forage plants and their value as such the work will be deficient. No great time and money should be spent in connection with a special reconnaissance crew unless every effort is made to produce results the accuracy of which is cannot be questionable. We don't want to go to great expense and then find that the work is practically useless. It is therefore clear that we are not justified in attempting anything beyond the experimental stage until there is a thoroughly competent force available which can be depended upon to give us uniform results.

I am, then, opposed to going into the work in a large way with special crews until we are better prepared to place at the head of each party a trained expert.

Through lack of these men but little special work can be accomplished. It is therefore being carried out in this District as well as it can be under the circumstances. A copy of

the reconnaissance outline has been placed in the hands of each ranger with instructions to study it carefully and gather all his data regarding range types, capacity and conditions in accordance with the plan. Three crews have been started at land classification work on the Oregon, Chelan (Okanogan Division), and Colville. This opportunity will be seized to obtain information covering range types and forage values of use to the grazing administration. The work however will cover areas suitable possibly for settlement and not perhaps future grazing range. The study will, at any rate, show what can be accomplished in this way and will be of value. In District 6 it might be said that two types of range are to be met with, each requiring at this time different methods of work: one, the permanent ranges of the distinct east slope of the Cascade Mountains and the ranges of Eastern Washington and Oregon, and, two, the west slopes and summits of the Cascade range.

The former with its comparatively light timbered slopes and open grassy ranges and glades shows but little change from year to year and a classification of types would not be subject to much revision at any time. The work of a reconnaissance party here should be thoroughly intensive, covering the whole of the range and paying particular attention to the even distribution of the stock by development of springs. Special grazing reconnaissance work on the west slope and summits of the Cascades should not at present cover the entire area of the Forest but should be confined to the known grazing areas. The Cascade grazing ranges, sheep ranges in particular, are what might be called "patchy," that is, portions of comparatively open range may be grazed for a few days when a drive of several miles may be necessary to reach more range upon which sheep may be handled profitably. The greater part of the range around these patches is inaccessible to sheep and much of it could not be used without building expensive trails. I believe then that at present, work should be confined to the known grazing areas and when they are definitely located and thoroughly examined, work on the present inaccessible areas should commence. I do not mean by this that opportunity should not be seized to do grazing work with timber reconnaissance parties.

The experimental work in connection with the coyote-proof pasture on the Wallowa National Forest showed excellent results last season and interested stockmen have expressed the intention of giving more care to their stock on the winter and spring range by properly enclosing and subdividing the pasture. Freedom from continual harassing by dogs on the winter range is a great factor in bringing sheep through the winter in good strength and in making for a high percentage at lambing time. In addition to properly fenced pastures the manner of feeding hay should receive attention. Grain, hays, wheat, barley, oats, rye, should never be fed as cut and stacked. It should all go through a hay-cutting machine and when fed in this way not only is there a saving of 50 per cent in hay for it is all consumed, but the stock do 50 per cent better.

The work this season, 1911, will cover the same ground as last year and particular attention will be given to the comparative weight of lambs. An average bunch of lambs will be picked from those turned into the pasture, weighed and marked for weighing in the fall. An effort will be made to pick and weigh small lots taken from bands grazing on

the outside range on different parts of the Forest. Weights will be compared at the end of the grazing season.

Game

In the early part of the year 1910 there arose much agitation and discussion relative to the framing of better laws for the protection of game in the State of Washington. In order to obtain information as a basis to securing practical legislation to improve conditions and prevent the rapid depletion of game animals, birds and fish, Governor Hay appointed two commissions, one for Eastern Washington and one for the western slope, to inquire into the distribution of game animals, birds and fish. These Commissions requested the cooperation of the Forest Service which, through its field men, was in an excellent position to supply valuable data.

A letter was issued calling for a report by October 1 in time to place the information before the commissions. Supervisor Benedict represented the Service in compiling the data and in meeting with the commissions and his report shows a remarkable uniformity in the information collected indicating at once that the field officers in general have given much attention to the distribution of game. This feature would also indicate that the reports submitted can with confidence be used as a basis for further work.

The step taken by the State of Washington has aroused interest in Oregon. This was foreseen and the supervisors of the Oregon Forests were also asked to gather information of a similar nature. The information was placed in the hands of Governor West and has been referred by him to the State Game and Fish Commission.

The Grazing office has also collected information regarding the relationship existing between the outbreak of fires on the Forests and the presence of hunters in the woods. It has developed that many disastrous fires occurred simultaneously with the opening of the game seasons and since it is possible that some information of this kind may be requested by lumber associations or State game authorities it was deemed advisable to be prepared. It is not the intention of this office to take the initiative or to be prominent in any step to bring about changes in the game laws, but if it appears that early game seasons are responsible for loss by fire the information can be advanced to assist any legislation undertaken to better conditions.