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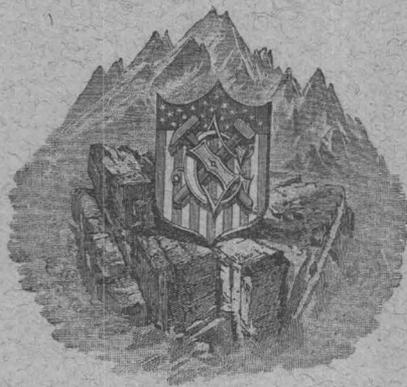
Series H, Forestry, 1

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
CHARLES D. WALCOTT, DIRECTOR

THE
FORESTS OF OREGON

BY

HENRY GANNETT



WASHINGTON
GOVERNMENT PRINTING OFFICE
1902

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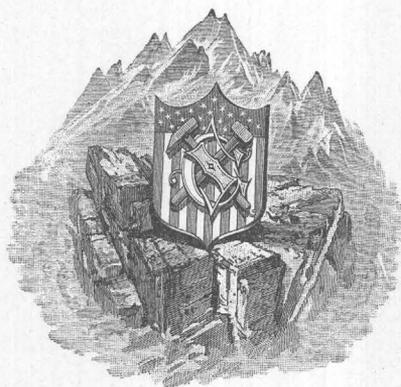
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LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
UNITED STATES GEOLOGICAL SURVEY,
Washington, D. C., June 17, 1902.

SIR: I transmit herewith, for publication in the series of Professional Papers, the results of an estimate of the stand and character of the timber of Oregon.

Very respectfully, yours,

HENRY GANNETT,
Geographer.

Hon. CHARLES D. WALCOTT,
Director United States Geological Survey.

THE FORESTS OF OREGON.

By HENRY GANNETT.

In the Nineteenth Annual Report there was published an estimate of the standing timber in Oregon, which was based upon cruisions made by the Oregon and California Railroad Company, the Willamette Valley and Cascade Range Wagon Road Company, and by lumbermen. Since that time a large amount of additional information concerning the forests of the State has been obtained, in part by detailed examinations made by Messrs. J. B. Leiberg, H. D. Langille, F. G. Plummer, Arthur Dodwell, and T. F. Rixon, of the areas lying between latitudes 42° and 43° and longitudes 121° and 123° and the Cascade Range Forest Reserve, in part through reconnaissances made by the Northern Pacific Railroad Company, but mainly through examinations made by Mr. A. J. Johnson, of Astoria, Oreg., in the employ of this office as a special forest expert. Mr. Johnson has been employed upon this work the greater part of two years. He was supplied with all the information at hand concerning the timber lands of the State, and armed with this he has visited nearly every timbered township in the State, making personal examinations, and obtaining information from all reliable sources. With the exception of the areas above noted, the following figures and descriptions are based mainly upon Mr. Johnson's work, supplemented in certain places by the other data above mentioned.

CLASSIFICATION OF LANDS.

The land-classification map of the State herewith presented as Pl. I (in pocket) is also made up mainly from Mr. Johnson's work, supplemented from the work of Messrs. Leiberg, Langille, Plummer, Dodwell, and Rixon in the Cascade Range Forest Reserve and in the areas between latitudes 42° and 43° and longitudes 121° and 123°.

The area of Oregon is 96,030 square miles, of which 1,470 square miles are estimated as water surface, consisting of lakes, rivers, etc., leaving 94,560 square miles as land surface. Of this area, 28,843 square miles, or 30 per cent, are covered with

timber of merchantable size and quality; 40,228 square miles, or 43 per cent, are wooded, including in this the area of merchantable timber; 51,980 square miles, or 55 per cent, are at present open country, including the areas which were open before the settlement by whites and those which have been cleared by settlement; the remainder of the State consists of rocky and desert country in the Cascade Range and in the plateaus to the east.

The Coast Range presents an almost unbroken wooded region extending from the Columbia to the south boundary of the State. Toward the south boundary, however, the forests become more open, the southern slopes of the mountains being largely without timber, while, as a rule, the northern slopes are well forested. The great burned areas in the Coast Range are, in the main, well advanced toward restocking with timber. Succeeding this region on the east is a depression extending from Columbia River south to the Siskiyou Mountains, which consists in large part of open country. The northern portion of it consists of the Willamette Valley, beyond which to the southward succeed the valleys of Umpqua and Rogue rivers. The valley of the Willamette is a broad open expanse. How much of this valley was originally forested and has been cleared by man it is impossible at this time to say, but probably strips of considerable width on either side were formerly forested and have thus been cleared. The valleys of Umpqua and Rogue rivers contain much open land, in which are scattered bodies of timber.

The Cascade Range is heavily timbered from the west base to its crest and to a varying distance upon the eastern side. As in the Coast Range, the forest is less dense in the southern part of the State, and to a large extent is confined to the northern slopes. From the crest the forest extends eastward to varying distances, the distance being greatest in the southern part of the State, in Klamath and Lake counties, nearly all of the former county being covered by forests of yellow pine.

In the northeastern part of the State is a large, irregular, isolated body of timber covering the Blue and Wallowa mountains. These forests are open and light as compared with those in the western part of the State.

The crest of the Cascade Range is a natural dividing line between two very different portions of Oregon. West of this line the rainfall is heavy, and consequently the forests are, as a whole, dense, and in parts extremely luxuriant. East of that boundary the rainfall is light, the forests are comparatively scanty and open, and the stand of timber is small. The total area of that part of the State west of the crest of the range is 28,877 square miles, of which 15,089 square miles, or 52 per cent, are occupied by merchantable timber, and 7,102 square miles, or 24 per cent, are open country. As a contrast to this the eastern part of the State comprises 65,683 square miles, of which 13,754 square miles, or only 21 per cent, are timbered, and 44,878 square miles, or 68 per cent, are open country.



RED FIR IN COLUMBIA COUNTY, OREG.

The following table classifies the land west and east of the crest of the Cascade Range, and of the State as a whole:

Classification of lands in Oregon.

Class.	West of Cascades.	East of Cascades.	The State.
	<i>Square miles.</i>	<i>Square miles.</i>	<i>Square miles.</i>
Total area	28,877	65,683	94,560
Merchantable-timber area	15,089	13,754	28,843
Open country	7,102	44,878	51,980
Burned area	5,159	936	6,095
Cut area	799	280	1,079
Barren	359	1,983	2,352

The area given as cut over is necessarily only a small portion of that actually cleared, inasmuch as many hundreds of square miles were cleared long ago, are now under cultivation, and are here included in the open country.

FIRES.

The most startling feature shown by the land-classification map of this State is the extent of the burned areas, especially in the Coast Range and in the northern half of the Cascades. It must be understood that the areas represented here as burned are only those in which the destruction of timber was nearly or quite complete. Areas which have been burned over with only a partial destruction of the timber are not here represented. It will be noted that the burns are greatest and most frequent in the most moist and most heavily timbered parts of the State, and are smaller and fewer where the rainfall is less and where the timber is lighter. This is owing to the density and abundance of the undergrowth in the heavily forested regions, which feeds the fire and vastly increases its heat. In the comparatively sparsely timbered southern portions of the Coast Range and the Cascades and in the Blue Mountains, where the forests are largely or mainly of yellow pine in open growth, with very little litter or underbrush, destructive fires have been few and small, although throughout these regions there are few trees which are not marked by fire, without, however, doing them any serious damage.

The areas here represented as burned comprise altogether not less than 6,095 square miles, or 7 per cent of the area of the State. Since these burned areas are almost invariably taken from the area formerly timbered, their area may be compared with the timbered area. Out of a total area at one time timbered, not less than 18 per cent, therefore, has been destroyed by fire. Of the amount of the destruction of timber by this agency we may make some estimate, since it is roughly proportional to the amount of land over which the fires have run.

The present stand of timber in the western portion of the State being approximately 154,713 million feet, and the burned area being about one-third of the timbered area, the destruction of timber by fire in this part of the State has been approximately 51,000 million feet. Similarly it appears that in the eastern part of the State the destruction amounts to about 3,000 million feet, a total of 54,000 million feet in the State. This at \$1 per 1,000 feet, the present average stumpage price, gives a total loss by fire of \$54,000,000. This is a high price to pay for carelessness. The destruction has been even greater here than in Washington, where, as was estimated, 40,000 million feet have been destroyed in a similar manner.

Since this region, especially that portion of it west of the Cascades, where the great burns have occurred, is abundantly watered, and in all other respects extremely favorable for tree growth, all of these burns are in some stage of reforestation, and in most of them reforestation has gone forward rapidly and very favorably. Much of this burned country is now covered with a dense stand of young trees. The species following the fires are, in nearly all cases, similar to those destroyed. Fir follows fir, yellow pine follows yellow pine. There is traceable, however, in the southern part of the State, a tendency toward an extension of the territory of the yellow and sugar pines, with a corresponding reduction of the fir areas. East of the crest of the Cascades some areas formerly occupied by yellow pine have been restocked by lodgepole pine. As a rule, however, even east of the Cascades, the same species succeed, and in this region it is almost invariably yellow pine, since that is the prevailing tree.

In some cases, however, and especially in the largest burns, the work of reforestation has made little progress, owing probably to the difficulty of reseeding large burned areas. Since over many square miles all the trees were killed, the seeds of a new crop have had to come from outside the region, and hence the seeding process has been slow. Areas are reported which were burned twenty-five to fifty years ago on which there is no vegetation larger than brush and ferns, trees of any species not yet having obtained a foothold.

The earliest burns in the State of which we have record occurred in 1843. From that time down to the present fires of greater or less magnitude have occurred yearly, mainly in the late summer and early fall, when everything is driest. The greatest fires, however, seem to have occurred prior to and during the earliest settlements, between 1843 and 1870. Apparently the fires in recent years have not been as great or as disastrous as these earlier ones.

It is said that the burn between the forks of Coquille River, in the southwestern part of the State, occurred in 1843, and that after a lapse of twenty-five years, during which the region had made much progress in reforestation, a second fire occurred in the same region, in 1868. Since this latter fire the area has made great progress



A. THE GREAT NESTUCCA BURN.



B. THE GREAT YAQUINA BURN.

toward reforestation. In 1846 occurred two of the great burns in the Coast Range, the Yaquina burn and that extending along the coast from Cape Perpetua to Siuslaw River. The Yaquina burn extended north and south over four townships, and from the coast across to Willamette Valley, an area of 450,000 acres. It is said to have been set by Hudson Bay trappers for the purpose of driving out game. In this purpose it was certainly effective, as it is said that all the game of the region which was not immediately destroyed by the fire was driven to the seashore. In this great region it is reported that there has been little regrowth, the ground being covered with blackberry vines and ferns, in which still stand in many places dead and charred tree trunks.

The other large area burned in 1846 included 207,000 acres, embracing three townships north and south by an equal number east and west.

Heavy fires are reported to have occurred in 1848 and 1850, while between 1850 and 1860, the exact date unknown, occurred the great Nestucca burn, which included most of townships 3, 4, and 5 south, and extended east and west across the entire breadth of the Coast Range, comprising an area of nearly 500 square miles.

The year 1868 is known as the year in which the whole coast was afire, the year in which the sun was darkened for weeks and the people had to burn candles in the daytime. In this year occurred the great burn extending from Coos Bay southward along the coast to Rogue River Mountains. In this year also the area between the forks of Coquille River was reburned.

The great burn in the northern part of the Cascade Range, extending from the Willamette base line southward to township 11, appears to be a composite affair, composed of many different burns overlapping one another. The earliest and largest of them, however, is by common repute assigned a great age. Fires are reported in this region as early as 1860-61, and at various times since then.

STAND OF TIMBER.

The timber of Oregon is, in density and quality, closely comparable with that of Washington, and over most of the area the species of trees are very nearly the same.

The total stand of timber in the State is estimated at 213,398 million feet B. M., an average stand per acre of timbered land of 12,200 feet. The stand, however, as in Washington, differs widely in different parts of the State. West of the crest of the Cascades the total stand of timber is estimated at 171,780 million. Thus 80 per cent of the total timber of the State is found in a region which is 30 per cent of the total area of the State. The average stand of timber upon the timbered land of this region is not less than 17,700 feet per acre.

The total stand of timber upon the area east of the Cascades is only 41,618 million, and the average stand per acre is 4,700 feet.

SPECIES OF TIMBER.

Not only do these two sections of the State differ widely in the extent of their forests, but they differ also in species.

Of the timber of Oregon, red fir constitutes not less than 66 per cent, a proportion somewhat larger than in Washington. Pine, including yellow and sugar pine, constitutes 18 per cent, a proportion much larger than in Washington. Spruce constitutes 5 per cent, the same as in Washington; hemlock 5 per cent and cedar only 2 per cent, being much less than in the more northern State.

In the western part of the State red fir forms 79 per cent of the forest, and the only other component of magnitude is the Sitka spruce, other species being of little relative importance. Yellow pine constitutes but 2 per cent. East of the crest, on the other hand, yellow pine forms 80 per cent of the forest, with red fir holding second rank.

Fir forms practically a pure forest on either side of Willamette and Rogue River valleys, including the eastern slopes of the Coast Range and the lower portion of the west slope of the Cascade Range. This species shares the western part of the Coast Range with the Sitka spruce and cedar, while in the higher parts of the Cascade Range other species of fir and cedar are found. The southern part of this region west of the Cascade crest contains much yellow and sugar pine.

Sitka spruce is found in a narrow strip lugging the Pacific coast, a region of continual fogs and moisture. It is here mingled with cedar, hemlock, and fir.

Yellow pine forms pure or nearly pure forest over all the timbered area east of the Cascade Range. It crosses the range near Crater Lake, and spreads over the Umpqua and Rogue River valleys and the Coast Range in a mixed forest with fir and sugar pine.

Sugar pine occupies an area in the southwestern part of the State on both sides of the Cascade Range, where it is mixed with yellow pine and fir.

Two small tracts of redwood, comprising about 400 acres, are found in the southwest corner of the State, in T. 39 S., R. 12 W., and T. 40 S., R. 13 W. These are the most northern occurrences of these species.

The following tables show the total stand and its classification by species in the State as a whole, and the same in the eastern and western parts of the State:

STAND OF TIMBER, BY COUNTIES.

Composition of forest in Oregon.

Species.	West of Cascades.		East of Cascades.		Total.	
	Million feet B. M.	Per cent.	Million feet B. M.	Per cent.	Million feet B. M.	Per cent.
Red fir.....	136,543	79	4,762	11	141,305	66
Yellow pine.....	3,886	2	33,254	80	37,140	17
Sitka spruce.....	8,915	5			8,915	5
Red cedar.....	4,547	3			4,547	2
Hemlock.....	8,887	5	1,082	3	9,969	5
White cedar.....	2,652	2			2,652	1
Noble fir.....	2,355	1	454	1	2,809	1
Sugar pine.....	1,648	1	341	1	1,989	1
White fir.....	723		704	2	1,427	
Tamarack.....			704	2	704	
White pine.....	287	2	175		462	2
Incense cedar.....	208		53		261	
Engelmann spruce.....	29		89		118	
Lovely fir.....	1,100				1,100	
Total.....	171,780		41,618		213,398	

CLASSIFICATION OF LANDS AND STAND OF TIMBER, BY COUNTIES.

The following table summarizes the total stand of timber and the average stand per acre of timbered land in each county.

Total stand of timber and stand per acre in Oregon, by counties.

County.	Stand.	Average stand per acre.
	Million feet B. M.	Feet B. M.
Baker.....	3,084	8,100
Benton.....	1,839	12,600
Clackamas.....	8,516	25,200
Clatsop.....	16,736	37,400
Columbia.....	9,841	31,200
Coos.....	13,557	24,500
Crook.....	7,577	4,800
Curry.....	5,466	11,000
Douglas.....	21,156	13,200
Grant.....	2,370	2,800
Harney.....	336	1,300
Jackson.....	10,327	10,000
Josephine.....	3,616	6,000
Klamath.....	11,822	5,500
Lake.....	3,106	3,000

Total stand of timber and stand per acre in Oregon, by counties—Continued.

County.	Stand.	Average stand per acre.
	<i>Million feet B. M.</i>	<i>Feet B. M.</i>
Lane	34,006	17,900
Lincoln	6,881	30,300
Linn	9,433	12,300
Malheur	130	2,100
Marion	3,351	11,900
Morrow	147	1,435
Multnomah	1,915	29,300
Polk	4,454	22,900
Tillamook	16,861	39,500
Umatilla	257	4,800
Union	3,273	3,800
Wallowa	3,304	4,700
Wasco	5,988	17,600
Washington	2,628	16,200
Wheeler	359	800
Yamhill	1,062	16,400

The heaviest average stand per county is in Tillamook, on the coast. Other coast counties show very heavy stands, particularly Clatsop and Lincoln. Generally speaking, the counties in the Coast Range have the heaviest stands in the State, with those on the west slope of the Cascade Range as second to them in stand. Compared with those farther south, the counties bordering on Columbia River have the heavier stands, as in Columbia and Multnomah.

BAKER COUNTY.

This county lies in the eastern part of the State. Most of its area is comprised in the valley of Powder River and the Snake, and is composed of level country and low hills. The western part forms the eastern slope of the Blue Mountains, which rise to altitudes of 9,000 feet. The slopes of this range contain some merchantable timber, in which considerable cutting has been done for the supply of mines and the building of Baker City, the county seat.

Classification of lands in Baker County.

	Square miles.
Total area	2,275
Merchantable-timber area	595
Woodland	96
Cut lands	120
Open country	1,400
Barren	64



R. FIR, SHOWING RESULT OF FOREST FIRE.

Amount and classification of timber in Baker County.

	Million feet B. M.
Yellow pine	2,960
Tamarack	62
Red fir	62
Total	3,084

Average stand of timber per acre of timbered land, 8,100 feet B. M.

BENTON COUNTY.

This county lies in the western part of the State, being comprised in part in the valley of Willamette River and in part in the Coast Range, of which it occupies a portion of the eastern slope. The eastern, valley part of the county is mainly open and occupied by farms, with timber in small patches scattered over it. The western, hill portion is in part covered with merchantable timber. Another portion of what was formerly covered with merchantable timber has been cut, and a third part has been burned, being included within the great Yaquina burn.

Classification of lands in Benton County.

	Square miles.
Total area	677
Merchantable-timber area	228
Cut area	119
Burned area	88
Open country	242

Amount and classification of timber in Benton County.

	Million feet B. M.
Red fir	1,728
Spruce	74
Cedar	37
Total	1,839

Average stand of timber per acre of timbered land, 12,600 feet B. M.

CLACKAMAS COUNTY.

This county is in the northwestern part of the State, the western portion extending down to the middle of the Willamette Valley, while its boundary on the east is the crest of the Cascade Range. The western, valley portion is open and is largely occupied by farms, with which are interspersed groves and patches of woodland. Much the larger part of the county, however, lies on the west slopes of the Cascade Range, and contains considerable areas of merchantable timber, together with several large burned areas; indeed, the burned areas comprise nearly one-half of the area of the county.

THE FORESTS OF OREGON.

Classification of lands in Clackamas County.

	Square miles.
Total area	1,861
Merchantable-timber area	528
Cut area	38
Burned area	886
Open country	401
Barren	8

Amount and classification of timber in Clackamas County.

	Million feet B. M.
Red fir	7,986
Noble fir	265
Red cedar	177
White pine	88
Total	8,516

Average stand of timber per acre of timbered land, 25,200 feet B. M.

CLATSOP COUNTY.

This is the most northwestern county of the State, bordering on Columbia River at its mouth and the Pacific Ocean. Its area is comprised entirely in the Coast Range. The forests are extremely dense and heavy, and, compared with the area of the county, but little cutting has been done, and the burned areas, although numerous, are small and collectively amount to less than 5 per cent of the area of the county.

Classification of lands in Clatsop County.

	Square miles.
Total area	820
Merchantable-timber area	698
Cut area	32
Burned area	40
Open country	2
Barren	48

Amount and classification of timber in Clatsop County.

	Million feet B. M.
Red fir	10,543
Spruce	3,683
Hemlock	1,506
Cedar	1,004
Total	16,736

Average stand of timber per acre of timbered land, 37,400 feet B. M.

COLUMBIA COUNTY.

This county lies east of Clatsop, bordering on Columbia River on the north and east. It is a hilly county, comprising a portion of the Coast Range, and is largely covered with merchantable timber. Numerous small areas have been burned, amounting collectively to a little more than 10 per cent of its area, and some cutting has been done.

Classification of lands in Columbia County.

	Square miles.
Total area	677
Merchantable-timber area	493
Cut area	56
Burned area	80
Barren	48

Amount and classification of timber in Columbia County.

	Million feet B. M.
Red fir	8,561
Cedar	1,083
Hemlock	197
Total	9,841

Average stand of timber per acre of timbered land, 31,200 feet B. M.

COOS COUNTY.

This county borders on the Pacific Ocean, in the southwestern part of the State, and includes upon the east a considerable part of the Coast Range. Much of the western portion of the county is low and marshy, and contains many small open areas. Burns have in time past been frequent, and have destroyed the timber upon more than one-fourth of the area of the county. Most of them are of great age, having occurred more that fifty years ago, and the tracts are now in great part restocked with young timber. Some cutting has been done, especially in the neighborhood of Coos Bay.

Classification of lands in Coos County.

	Square miles.
Total area	1,578
Merchantable-timber area	866
Burned area	424
Open country	248
Barren	40

Amount and classification of timber in Coos County.

	Million feet B. M.
Red fir	10,168
White cedar	2,033
Spruce	1,356
Total	13,557

Average stand of timber per acre of timbered land, 24,500 feet B. M.

CROOK COUNTY.

This large county lies in the central part of the State, its western portion extending to the crest of the Cascade Range, whence it stretches far out into the plateau to the east. It contains a large body of timber and woodland upon the east slope of the range, and this body of timber stretches out onto the plateau far to the east of the mountains. Besides this main body of timber there are several others in the eastern part of the county. The timber consists almost exclusively of yellow pine.

Classification of lands in Crook County.

	Square miles.
Total area	7,756
Merchantable-timber area	2,466
Woodland	799
Burned area	216
Open country	4,020
Barren	255

Amount and classification of timber in Crook County.

	Million feet B. M.
Yellow pine	7,483
Red fir	94
Total	7,577

Average stand of timber per acre of timbered land 4,800 feet B. M.

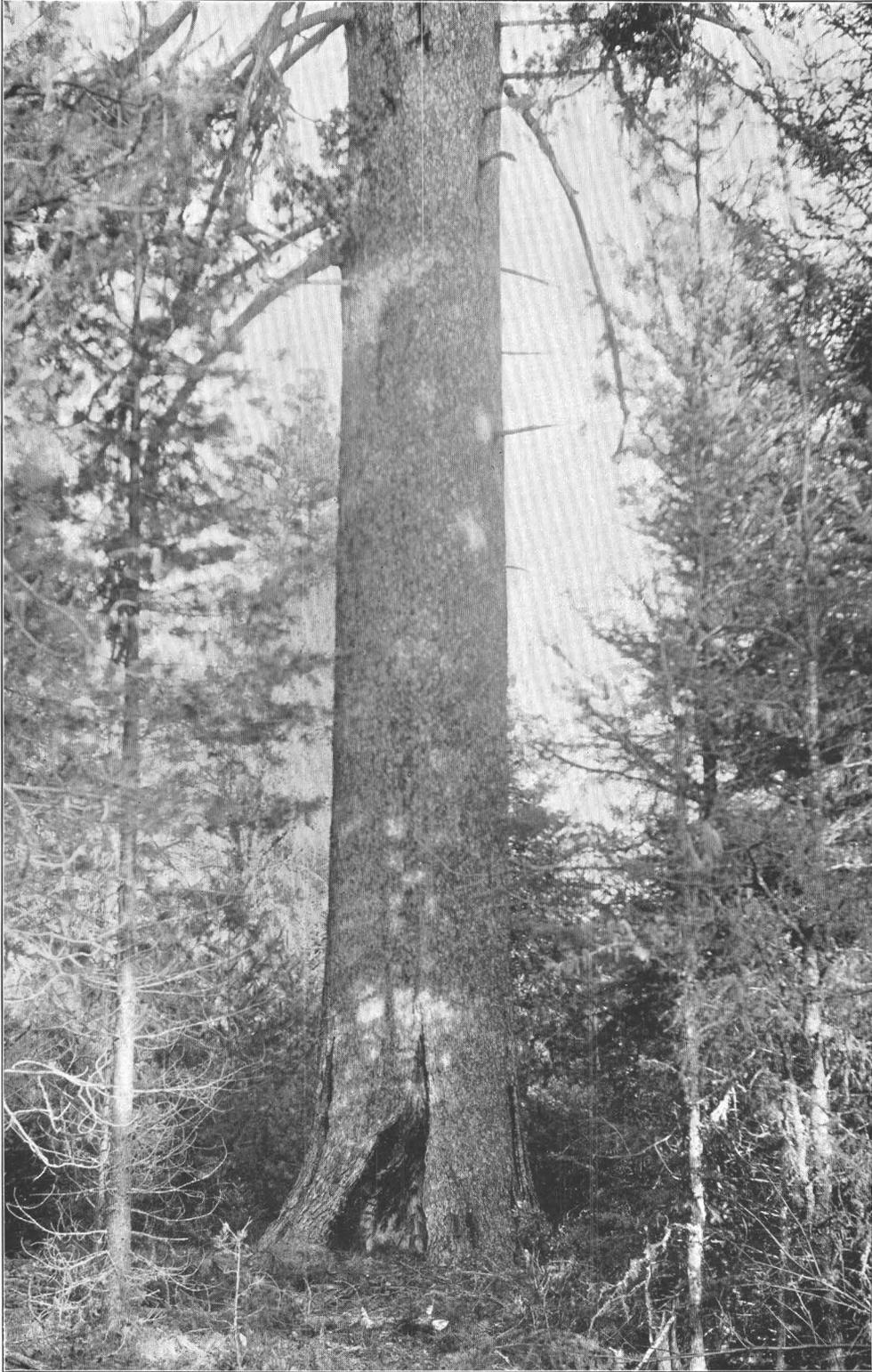
CURRY COUNTY.

This is the most southwestern county of the State, bordering upon the Pacific Ocean and the California line. Near the coast is a strip of open country, and in the eastern part of the county the timber becomes somewhat scattering, especially upon the south slopes of the mountains. There has been no cutting of any consequence in the county, but the northern part has been badly burned.

In the southwestern part of the county, in T. 39 S., R. 12 W., and T. 40 S., R. 13 W., there are small tracts, aggregating about 400 acres, of redwood, the sole representatives of this species in the State, and the most northern extension of the species.

Classification of lands in Curry County.

	Square miles.
Total area	1,454
Merchantable-timber area	782
Burned area	272
Open country	384
Barren	16



SUGAR PINE, SHOWING RESULT OF FOREST FIRE.

Amount and classification of timber in Curry County.

	Million feet B. M.
Red fir.....	4,810
White cedar.....	547
Sugar pine.....	109
Total.....	5,466

Average stand of timber per acre of timbered land, 11,000 feet B. M.

DOUGLAS COUNTY.

This large county stretches northwestward from the crest of the Cascades to the coast, including the valley of Umpqua River. It is heavily timbered in the east and west—that is, in the Cascade and Coast ranges—while the central portion is largely composed of open country, dotted with farms alternating with patches of timber. The eastern portion of the county, in the Cascade Range, contains several burns, but none of great magnitude; the western portion, near the Pacific coast, was in large part burned many years ago and is now covered with a young growth of timber.

Classification of lands in Douglas County.

	Square miles.
Total area.....	4,861
Merchantable-timber area.....	2,513
Woodland.....	341
Burned area.....	531
Cut area.....	20
Open country.....	1,428
Barren.....	28

Amount and classification of timber in Douglas County.

	Million feet B. M.
Red fir.....	17,485
Hemlock.....	3,014
Sugar pine.....	263
Yellow pine.....	263
Red cedar.....	131
Total.....	21,156

Average stand of timber per acre of timbered land, 13,200 feet B. M.

GILLIAM COUNTY.

This is one of the northern counties of the State, east of the Cascade Range, bordering on the north on Columbia River. The county has an area of 1,123 square miles. It contains no timber whatever.

GRANT COUNTY.

This county lies toward the eastern part of the State, adjoining Baker County on the east. It includes the western slopes of the Blue Mountains, with the long spurs running westward from them, and contains considerable timbered and wooded land, in very irregular form.

Classification of lands in Grant County.

	Square miles.
Total area	4,560
Merchantable-timber area	1,308
Woodland	749
Open country	2,419
Barren	84

Total stand of timber in this county is 2,370 million feet, all of which is yellow pine.

Average stand per acre of timbered land, 2,800 feet B. M.

HARNEY COUNTY.

This large county lies toward the southeastern part of the State. Its surface is mainly level or undulating, but is intersected by several ranges of mountains and hills, such as Steins Mountain, in the southwestern part. The only timber contained in the county is toward its northern edge, where a range of hills bears scattering pines.

Classification of lands in Harney County.

	Square miles.
Total area	9,986
Merchantable-timber area	400
Open country	9,586

Total stand in this county is 336 million feet B. M., all of which is yellow pine.

Average stand per acre of timbered land, 1,300 feet B. M.

JACKSON COUNTY.

This county is situated in the southwestern part of the State, bordering the California line on the south, and extending on the east to the crest of the Cascade Range. The western part of the county is largely open country, dotted with farms and with patches of timber, while the eastern part, in the Cascade Range, and the southern part, in the Siskiyou Mountains, are timbered, but not heavily, with a mixed growth of yellow and sugar pines, red fir, and other species. There are many burned areas in the western part of the county, but they do not cover a great area, but little more than 5 per cent of the area of the county having been included in destructive fires.

JACKSON AND JOSEPHINE COUNTIES.

23

Classification of lands in Jackson County.

	Square miles.
Total area	2,721
Merchantable-timber area	1,682
Burned area	146
Open country	874
Barren	19

Amount and classification of timber in Jackson County.

	Million feet B. M.
Yellow pine	2,375
Sugar pine	516
White pine	116
Red fir	5,679
White fir	723
Noble fir	619
Incense cedar	63
Hemlock	207
Engelmann spruce	29
Total	10,327

Average stand of timber per acre of timbered land, 10,000 feet B. M.

JOSEPHINE COUNTY.

This county lies west of Jackson and extends on the south to the California line. Most of the area of the county is included in the Coast Range, and bears a scattered light growth of timber composed mainly of fir and yellow and sugar pine. A considerable part of this county has been cut over.

Classification of lands in Josephine County.

	Square miles.
Total area	1,684
Merchantable-timber area	930
Cut area	200
Open country	554

Amount and classification of timber in Josephine County.

	Million feet B. M.
Red fir	1,591
Yellow pine	1,012
Sugar pine	760
Incense cedar	145
White cedar	72
Noble fir	36
Total	3,616

Average stand of timber per acre of timbered land, 6,000 feet B. M.

KLAMATH COUNTY.

This county lies in the southern part of the State, bordering on the south upon California, its eastern boundary being the divide of the Cascade Range. The western part of the county is mountainous, while the central and eastern parts are plains and valleys, intersected by narrow mountain ranges or occupied by lakes. Much more than two-thirds of the area of this county is wooded, and more than one-half is covered with merchantable forests. The forests cover the eastern slope of the range, while in the rest of the county open and timbered tracts alternate irregularly.

Classification of lands in Klamath County.

	Square miles.
Total area	5,854
Merchantable-timber area	3,329
Woodland	837
Burned area	132
Open country	1,503
Barren	53

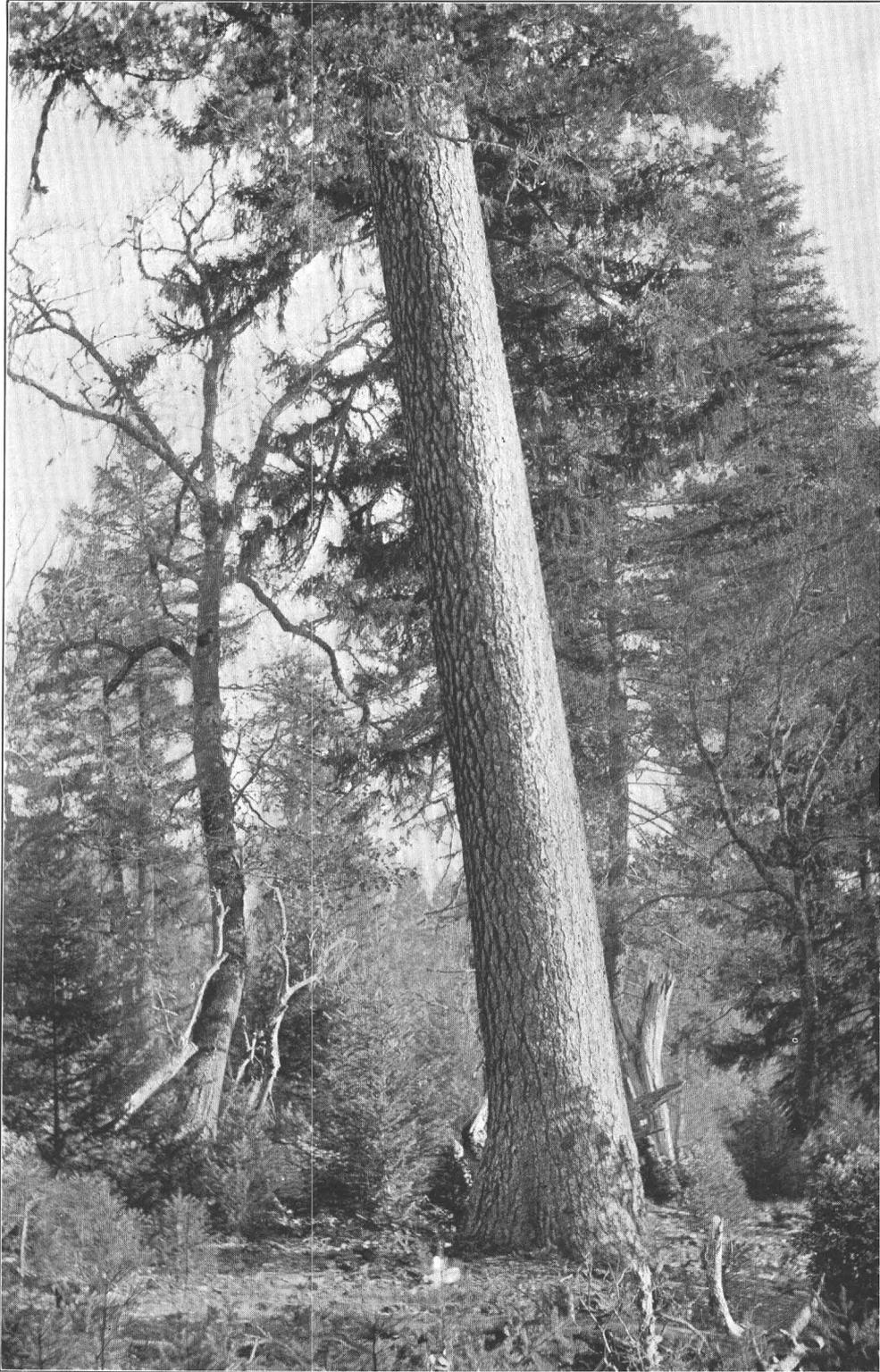
Amount and classification of timber in Klamath County.

	Million feet B. M.
Yellow pine	8,532
Sugar pine	341
White pine	85
Red fir	1,024
White fir	569
Noble fir	228
Incense cedar	53
Hemlock	901
Engelmann spruce	89
Total	11,822

Average stand of timber per acre of timbered land, 5,500 feet B. M.

LAKE COUNTY.

This county lies east of Klamath, bordering on California and Nevada on the south. The only timber in the county is found in its western portion, where it joins the great bodies which stretch over from Klamath County. Its surface is mainly a plateau, intersected by several narrow mountain ranges, and in the northern part by a great flow of lava, which has all the aspects of a desert.



SUGAR PINE 10 FEET IN DIAMETER.

Classification of lands in Lake County.

	Square miles.
Total area	7,834
Merchantable-timber area	1,624
Woodland	120
Open country	4,956
Barren	1,134

Total stand of timber is 3,106 million feet B. M., all of which is yellow pine.

Average stand of timber per acre of timbered land, 3,000 feet B. M.

LANE COUNTY.

This county stretches from the crest of the Cascade Range westward to the coast, in its central portion intersecting the open valley of Willamette River. This valley is largely occupied by farms, alternating with patches of timber. The eastern and western portions of the county are heavily forested, and especially the portion within the Cascade Range, where, although there are several burns of magnitude, there is a vast extent of heavy forest. In the Coast Range, the portion bordering upon the coast, with a breadth equivalent to three townships eastward, is included in one of the great coast burns.

Classification of lands in Lane County.

	Square miles.
Total area	4,380
Merchantable-timber area	2,956
Cut area	33
Burned area	801
Open country	531
Barren	59

Amount and classification of timber in Lane County.

	Million feet B. M.
Red fir	27,827
Red cedar	471
Yellow pine	236
Noble fir	636
Hemlock	3,736
Lovely fir	1,100
Total	34,006

Average stand of timber per acre of timbered land, 17,900 feet B. M.

LINCOLN COUNTY.

This county lies along the Pacific coast, toward the northern part of the State, stretching from the coast back into the Coast Range. Upon three-fifths of its area the timber has been destroyed by fire, mainly by the great Yaquina burn, most of the area of which is included within this county.

THE FORESTS OF OREGON.

Classification of lands in Lincoln County.

	Square miles.
Total area	1,008
Merchantable-timber area	354
Burned area	598
Open country	17
Barren	39

Amount and classification of timber in Lincoln County.

	Million feet B. M.
Red fir	4,679
Spruce	1,927
Cedar	275
Total	6,881

Average stand of timber per acre of timbered land, 30,300 feet B. M.

LINN COUNTY.

This county stretches from the summit of the Cascade Range westward to Willamette River, the western part of it being included within the valley of that stream, and consisting of open farming country alternating with patches of timber. The eastern portion, comprising about two-thirds of the county, lies in the Cascade Range and is in the main heavily timbered, although several large burns have reduced the timbered area.

Classification of lands in Linn County.

	Square miles.
Total area	2,311
Merchantable-timber area	1,193
Burned area	345
Open country	767
Barren	6

Amount and classification of timber in Linn County.

	Million feet B. M.
Red fir	8,843
Noble fir	393
Red cedar	197
Total	9,433

Average stand of timber per acre of timbered land, 12,300 feet B. M.

MALHEUR COUNTY.

This county is in the southeast corner of the State. It is comprised entirely in a semidesert plateau region, and presents, in the main, a level surface, traversed here and there by narrow ranges. The only timber in the county is in its northwest corner, where a little stretches over from the Blue Mountains.

MARION AND MORROW COUNTIES.

Classification of lands in Malheur County.

	Square miles.
Total area	9,784
Merchantable-timber area	96
Open country	9,688

Total stand of timber is 130 million feet B. M., all of which is yellow pine.

Average stand of timber per acre of timbered land, 2,100 feet B. M.

MARION COUNTY.

This county is situated toward the northwestern part of the State, and stretches from the crest of the Cascade Range westward to Willamette River. That portion of it lying within the valley of the Willamette is largely occupied by farms, and consists of open country alternating with patches of timber. The mountainous portion of the county has been badly burned, but still contains a considerable area of merchantable timber.

Classification of lands in Marion County.

	Square miles.
Total area	1,170
Merchantable-timber area	439
Burned area	236
Open country	491
Barren	4

Amount and classification of timber in Marion County.

	Million feet B. M.
Red fir	3,102
Noble fir	83
White pine	83
Red cedar	83
Total	3,351

Average stand of timber per acre of timbered land, 11,900 feet B. M.

MORROW COUNTY.

This is one of the northern counties of the State, bordering on the north on Columbia River. Its surface is mainly level or undulating, rising in the south into hills which may be regarded as westward spurs from the Blue Mountains. The only timber in the county is in these hills, in the southern part, and consists almost entirely of yellow pine in scattering stands.

Classification of lands in Morrow County.

	Square miles.
Total area	2,021
Merchantable-timber area	160
Woodland	98
Open country	1,763

Total stand of timber is 147 million feet B. M., all of which is yellow pine.

Average stand of timber per acre of timbered land, 1,435 feet B. M.

MULTNOMAH COUNTY.

This county lies in the western part of the State, west of the Cascade Range, and borders on Columbia River. Eastward it stretches far up the slopes of the range, but does not reach its summit. The timber has been cut from nearly one-half of this county, and the timbered area still remaining is nearly one-fourth of its total area.

Classification of lands in Multnomah County.

	Square miles.
Total area	429
Merchantable-timber area	102
Woodland	18
Cut area	207
Burned area	23
Open country	25
Barren	54

Amount and classification of timber in Multnomah County.

	Million feet B. M.
Red fir	1,686
Noble fir	154
Hemlock	58
Red cedar	17
Total	1,915

Average stand of timber per acre of timbered land, 29,300 feet B. M.

POLK COUNTY.

This county lies in the western part of the State, bordering on the east on Willamette River, and stretching westward into the Coast Range. The eastern half of the county lies in an open valley, and is largely occupied by farms, alternating with patches of timber, while the western half is quite heavily forested.

Classification of lands in Polk County.

	Square miles.
Total area	701
Merchantable-timber area	304
Cut area	3
Burned area	10
Open country	384

Amount and classification of timber in Polk County.

	Million feet B. M.
Red fir	4,276
Red cedar	178
Total	4,454

Average stand of timber per acre of timbered land, 22,900 feet B. M.

SHERMAN COUNTY.

This is one of the northern counties, bordering on the north upon Columbia River. It has an area of 736 square miles. It contains no timber whatever.

TILLAMOOK COUNTY.

This is a northwestern county, bordering upon the Pacific, and lying immediately south of Clatsop. Most of its area is included within the western slopes of the Coast Range. It was originally one of the most heavily timbered areas in the Northwest, and still contains a large amount of timber, although the timber in much of its area was destroyed many years ago by the great Nestucca burn.

Classification of lands in Tillamook County.

	Square miles.
Total area	1, 119
Merchantable-timber area	667
Cut area.....	18
Burned area	361
Open country.....	73

Amount and classification of timber in Tillamook County.

	Million feet B. M.
Red fir	13, 995
Spruce	1, 854
Cedar	674
Noble fir	169
Hemlock	169
Total.....	16, 861

Average stand of timber per acre of timbered land, 39,500 feet B. M.

UMATILLA COUNTY.

This county lies in the northeastern part of the State, bordering on the north on Washington. The northwestern part of the county consists of an undulating country, without timber, while the southeastern part contains a portion of the Blue Mountains and is covered more or less densely with yellow-pine forests. Considerable cutting has been done along the line of the Oregon Railway and Navigation Company's road.

Classification of lands in Umatilla County.

	Square miles.
Total area	3, 116
Merchantable-timber area	84
Woodland.....	478
Burned area	41
Cut area.....	83
Open country	2, 375
Barren	55

THE FORESTS OF OREGON.

Amount and classification of timber in Umatilla County.

	Million feet B. M.
Yellow pine	252
Tamarack	5
Total	257

Average stand of timber per acre of timbered land, 4,800 feet B. M.

UNION COUNTY.

This county is situated in the northeastern part of the State, bordering Snake River on the east. The southern and western parts consist of open valley country, the valley of Powder River and of the Grande Ronde. The northeastern portion comprises the southern slopes of the Wallowa Mountains, rising 10,000 to 11,000 feet above the sea. These slopes are covered to altitudes of between 8,000 and 9,000 feet with an open pine forest.

Classification of lands in Union County.

	Square miles.
Total area	3,146
Merchantable-timber area	1,324
Woodland	292
Cut area	69
Burned area	95
Open country	1,302
Barren	64

Amount and classification of timber in Union County.

	Million feet B. M.
Yellow pine	2,749
Red fir	262
Tamarack	262
Total	3,273

Average stand of timber per acre of timbered land, 3,800 feet B. M.

WALLOWA COUNTY.

This is the northeastern county of the State, bordering on Snake River and the State of Washington. The northern and southern parts of this county are forested, the former consisting of the Blue Mountains and the latter of the northern slopes of the Wallowa Mountains. The timber consists mainly of yellow pine and is fairly heavy for that class of timber.

Classification of lands in Wallowa County.

	Square miles.
Total area	2,784
Merchantable-timber area	1,093
Burned area	57
Open country	1,464
Barren	170



A. YELLOW PINE, BLUE MOUNTAINS, SHOWING RESULT OF BURN.



B. TAMARACK GROVE, BLUE MOUNTAINS.

WASCO COUNTY.

Amount and classification of timber in Wallowa County.

	Million feet B. M.
Yellow pine	2,544
Red fir	430
Tamarack	330
Total	3,304

Average stand of timber per acre of timbered land, 4,700 feet B. M.

WASCO COUNTY.

This is a northern county, bordering on the north on Columbia River, while its western limit is the summit of the Cascade Range. The eastern part of this county, comprising much the larger portion, is open, consisting of the valley of Deschutes River and the slopes leading down to it. The western portion of the county, lying in the Cascade Range, is mountainous and is heavily forested, excepting for one large burn, which includes nearly one-seventh of the entire area of the county.

Classification of lands in Wasco County.

	Square miles.
Total area	2,962
Merchantable-timber area	531
Woodland	295
Cut area	8
Burned area	395
Open country	1,629
Barren	104

Amount and classification of timber in Wasco County.

	Million feet B. M.
Red fir	2,890
Yellow pine	2,286
Noble fir	226
Hemlock	181
Cedar	135
White fir	90
White pine	90
Silver fir	45
Tamarack	45
Total	5,988

Average stand of timber per acre of timbered land, 17,600 feet B. M.

WASHINGTON COUNTY.

This county lies in the northwestern part of the State, bordering on the east upon Columbia River and stretching westward into the Coast Range. Most of the area of the county consists of open country, occupied by farms and small patches of timber. The only merchantable timber is in the northwestern part, and covers a relatively small area.

Classification of lands in Washington County.

	Square miles.
Total area	715
Merchantable-timber area	253
Cut area	63
Burned area	68
Open country	331

Amount and classification of timber in Washington County.

	Million feet B. M.
Red fir	2,575
Red cedar	53
Total	2,628

Average stand of timber per acre of timbered land, 16,200 feet B. M.

WHEELER COUNTY.

This is a new county, a little north of the center of the State. Its area consists largely of open country, the valleys of John Day River and its branches, but it is intersected by east and west ranges of hills, which may be regarded as westward spurs from the Blue Mountains, and which contain a scattering growth of yellow pine.

Classification of lands in Wheeler County.

	Square miles.
Area of county	1,746
Merchantable-timber area	744
Woodland	88
Open country	914

Total stand of timber is 359 million feet B. M., all of which is yellow pine.

Average stand of timber per acre of timbered land, 800 feet B. M.

YAMHILL COUNTY.

This county lies in the northwestern part of the State, bordering on the east upon Willamette River and stretching westward into the Coast Range. The eastern part of the county is open and is mainly occupied by farms and patches of timber, while the western portion, which otherwise would be heavily forested, is almost entirely included within the area of the great Nestucca burn. The area of merchantable timber in this county is, in consequence, very small.

YAMHILL COUNTY.

33

Classification of lands in Yamhill County.

	Square miles.
Total area	711
Merchantable-timber area	101
Cut area.....	10
Burned area	250
Open country.....	350

Amount and classification of timber in Yamhill County.

	Million feet B. M.
Red fir	1,009
Cedar	32
Spruce	21
Total.....	1,062

Average stand of timber per acre of timbered land, 16,400 feet B. M.

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PUBLICATIONS OF UNITED STATES GEOLOGICAL SURVEY.

[Professional Paper No. 4.]

The serial publications of the United States Geological Survey consist of (1) Annual Reports, (2) Monographs, (3) Professional Papers, (4) Bulletins, (5) Mineral Resources, (6) Water-Supply and Irrigation Papers, (7) Topographic Atlas of the United States—folios and separate sheets thereof, (8) Geologic Atlas of the United States—folios thereof. The classes numbered 2, 7, and 8 are sold at cost of publication; the others are distributed free. A circular giving complete lists may be had on application.

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Three volumes on forestry have been published, as Part V of the Nineteenth, Twentieth, and Twenty-first annual reports, each consisting of several papers.

Correspondence should be addressed to—

THE DIRECTOR,
UNITED STATES GEOLOGICAL SURVEY,
WASHINGTON, D. C.

November, 1902.

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