Professional Paper No. 7 Series H, Forestry, 4

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

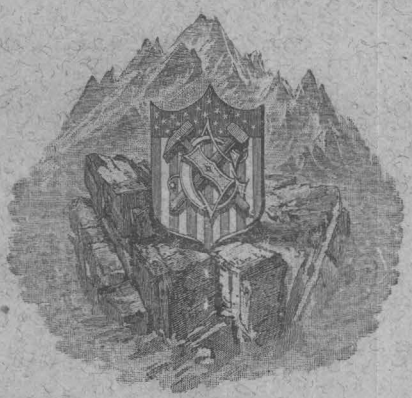
FOREST CONDITIONS

IN THE

OLYMPIC FOREST RESERVE, WASHINGTON

FROM NOTES BY

ARTHUR DODWELL AND THEODORE F. RIXON



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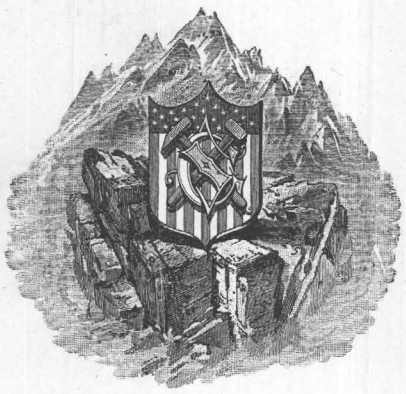

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DEPARTMENT OF THE INTERIOR,
UNITED STATES GEOLOGICAL SURVEY,
Washington, D. C., June 17, 1902.

SIR: I beg to transmit herewith, for publication as a professional paper, a report upon the forest conditions of the Olympic Forest Reserve, Washington, prepared from field notes taken by Messrs. Arthur Dodwell and Theodore F. Rixon. This report treats of the reserve as originally constituted, including all the lands which have been thrown open in recent years.

Very respectfully yours,

HENRY GANNETT,
Geographer.

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

FOREST CONDITIONS IN OLYMPIC FOREST RESERVE, WASHINGTON.

From notes by ARTHUR DODWELL and THEODORE F. RIXON.

LOCATION AND BOUNDARIES.

This reserve is situated in the northwestern part of Washington and occupies most of what is known as the Olympic Peninsula. Its original limits, as set forth in the executive order of President Cleveland of February 22, 1897, were as follows:

Beginning at the southeast corner of township twenty-one (21) north, range five (5) west, Willamette base and meridian, Washington; thence northerly along the surveyed and unsurveyed range line between ranges four (4) and five (5) west, to the point for the northeast corner of township twenty-three (23) north, range five (5) west; thence easterly along the unsurveyed and surveyed township line to the point for the southeast corner of township twenty-four (24) north, range four (4) west; thence northerly along the unsurveyed range line to the point for the northeast corner of said township; thence easterly along the unsurveyed and surveyed sixth (6th) standard parallel north, to the southeast corner of township twenty-five (25) north, range three (3) west; thence northerly along the surveyed and unsurveyed range line between ranges two (2) and three (3) west, to the northeast corner of township twenty-nine (29) north, range three (3) west; thence westerly along the surveyed and unsurveyed seventh (7th) standard parallel north, to the point for the southeast corner of township thirty (30) north, range nine (9) west; thence northerly along the unsurveyed and surveyed range line to the northeast corner of said township; thence westerly along the township line between townships thirty (30) and thirty-one (31) north, to the northeast corner of township thirty (30) north, range fourteen (14) west; thence northerly along the range line to its intersection with the shore of the Strait of Juan de Fuca; thence northwesterly along said shore line to the east boundary of the Makah Indian Reservation; thence southerly along the east boundary to the southeast corner of said reservation and westerly along the south boundary thereof to the high-water mark on the Pacific coast; thence southerly along said coast line to the north boundary of the Quinaielt Indian Reservation; thence southeasterly along the north boundary to the eastern point of said reservation and southwesterly along the south boundary thereof to the point of intersection with the fifth (5th) standard parallel north; thence easterly along said parallel to the southeast corner of township twenty-one (21) north, range five (5) west, the place of beginning.

On April 7, 1900, this reserve was reduced by the elimination of the following tracts, all situated in Clallam County. Most of these areas were withdrawn

from the reserve because a large proportion of the land had been alienated by the Government:

Townships twenty-eight (28) north, ranges thirteen (13) and fourteen (14) west, Willamette base and meridian, Washington; fractional township twenty-eight (28) north, range fifteen (15) west; sections one (1) to eighteen (18), both inclusive, townships twenty-nine (29) north, ranges three (3), four (4), and five (5) west; sections four (4), five (5), six (6), seven (7), and the north half of section eight (8), township twenty-nine (29) north, range twelve (12) west; all of township twenty-nine (29) north, range thirteen (13) west, except sections thirteen (13), twenty-three (23), twenty-four (24), twenty-five (25), and twenty-six (26); township twenty-nine (29) north, range fourteen (14) west; fractional township twenty-nine (29) north, range fifteen (15) west; sections one (1) to twelve (12), both inclusive, township thirty (30) north, range nine (9) west; sections twenty-seven (27) to thirty-four (34), both inclusive, township thirty (30) north, range ten (10) west; sections twenty-five (25) to thirty-six (36), both inclusive, township thirty (30) north, range eleven (11) west; sections seventeen (17) to thirty-six (36), both inclusive, township thirty (30) north, range twelve (12) west; townships thirty (30) north, ranges thirteen (13) and fourteen (14) west; and township thirty (30) north, range fifteen (15) west.

The reserve now comprises an area of 3,030 square miles, or 1,939,200 acres, and includes parts of Clallam, Jefferson, Chehalis, and Mason counties.

The work of examining this reserve has been carried on during the seasons of 1898, 1899, and 1900 by Messrs. Arthur Dodwell and Theodore F. Rixon. During the first season they examined 10 townships situated in the eastern part of the reserve. During the second season they examined 61 townships, comprising the northern and most of the western parts of the reserve, the total area examined in these two seasons comprising 71 townships, several of them being partial or fractional townships. During the season of 1900 they completed the survey of the reserve by the examination of the remaining 36 townships. The total area examined during these three seasons was 3,483 square miles. As most of these examinations were made prior to the reduction in the reserve which was above noted, they include the areas which have since been withdrawn, but, as matters of information, their description of the townships and portions of townships since withdrawn from the reserve are here given.

This area, with its topographical and general forest characteristics, is shown on Pl. I. Considering the areas gone over, the examinations were exceedingly minute. They included estimates for each section of the following items of information: The timbered, burned, cut, and nontimbered areas; the depth of humus and forest litter; the total stand of timber, and the stand of the principal species recognized by the lumber trade; the average height, diameter, and clear length; and the percentage of dead and diseased trees. Of course it is understood that these are estimates only, but they are estimates based on observation and made by the best of trained observers—men who for many years have followed the profession of estimating the stand of timber.

TOPOGRAPHY.

The reserve includes the Olympic Mountain group, with its slopes upon the east, north, and south, together with the long slope to the west, and a considerable extent of lowland bordering the Pacific coast. The Olympics are a group of mountains of nearly circular shape, radiating from a central mass. This central mass culminates in Mount Olympus, with an altitude of 8,150 feet. Many other summits rise to altitudes ranging between 7,000 and 8,000 feet, and large areas lie above timber line, which here has an altitude of 5,500 to 6,000 feet. In the neighborhood of the timber line are great tracts of open country, some of which is covered with ice, other is barren and rocky, while much of the greater part of it consists of open grass lands, which will in the future be of value for summer pasturage.

Glaciers and snow fields are numerous in the central parts of the mountains, and though individually of small area, collectively cover a large territory.

This mountain mass is drained by many rivers, which head in or near the central mass and radiate outward in all directions. The streams flowing to the east empty into Hood Canal, and are short, with steep descents. The principal of these are the Quilcene, Dusewallips, Duckabush, Hamahama, and Skokomish. To the south flow the Humptulips, Wynooche, and Satsop. To the north, into the Strait of Juan de Fuca, flow the Dungeness and Elwha, while to the west flow directly into the Pacific the Quillayute, with its branches, the Dickey, Soleduck, Bogachiel, and Kalawa, and Hoh River, Queets River, and the Queniult. These westward-flowing streams are much longer than the others and have much less rapid courses.

The climate of this region is controlled by the prevailing westerly winds from the Pacific Ocean, and is characterized by great uniformity of temperature and by a very heavy rainfall, that at Neah Bay, on the northwest coast, being probably the heaviest in the United States, with the possible exception of the Alaskan coast. The purpose in making this reserve was not, therefore, the preservation of the water supply, since that is ample—indeed, almost excessive in its amount—but the preservation of its forest resources from wasteful destruction.

AGRICULTURAL LAND.

Along the northern edge of the reserve, in Clallam County, there is a narrow strip of comparatively level land, and upon the west side is a large area of equally level or undulating land, extending north and south across the reserve, with a breadth of about three townships eastward from the coast. Nearly all of this, however, is heavily forested. It contains a few prairie openings of trifling amount, having a total area of about 4,000 acres. These prairies may, of course, be classed as agricultural land, and, it may be added, have been entirely taken up by settlers. The rest of this large area of land, which is approximately level, is heavily forested.

In the southern edge of the reserve, in Chehalis and Mason counties, there are also large areas of land which are level, or nearly so, and are covered with dense forests.

If this land were cleared of its timber it should unquestionably be classed as agricultural land, but the expense of clearing it, which ranges from $100 to $200 per acre, seems to take it out of that category, for no farm land in any part of the United States, except in the immediate neighborhood of great cities where the land could profitably be used for market gardening, is worth any such price. It is true that the cost of clearing the land would be met, in part, by the value of the timber removed; but this would, in any case, be only a small part of the expense involved. The claim, therefore, that in these heavily forested, well-watered regions the land should be classed as agricultural appears to be ill founded. It is true that much of this heavily-timbered land has been taken up, and some of it undoubtedly by bona fide settlers, but that the experiment has proved unprofitable is shown by the fact that, although 341 homestead entries have been made within the limits of the reserve in Clallam County, there were in 1899 only 83 residents found there. This appears to furnish incontestable evidence that the experiment of farming under the prevalent conditions in this region has not proved profitable.

STAND OF TIMBER.

Taken as a whole this is the most heavily forested region of Washington, and, with few exceptions, the most heavily forested region of the country. The densest forests are found in the townships near the Pacific coast, in the northwestern part of the reserve, and in the southern tier of townships; while in the mountains, as the altitude increases, the forests become less dense and the species become of less value for lumber. The distribution of forests, as regards the stand of timber, is shown upon Pl. I, and by townships, as a unit, upon the diagram which constitutes Pl. II. In this the stand of timber is represented by the height of the column of colors, and the breadth of the several color bands indicates the proportional amount of the different timber species.

The total area examined was 3,483 square miles. Of this 2,883 square miles, or 83 per cent, are covered with merchantable timber; 177 square miles, or 5 per cent, have been burned; 16 square miles have been logged; 255 square miles, or 8 per cent, are naturally timberless, consisting almost entirely of alpine meadows; and 150 square miles, or 4 per cent, consist of rocks and ice, lying high up near the summits of the mountains.

The timber of the reserve amounts to the enormous total of 60,998,250 M feet B. M., sufficient to supply the entire United States demand for two years. The average stand upon the timbered lands is 33,000 feet B. M. per acre. Taking the township as a unit the average stand per acre upon its timbered land ranges from

OLYMPIC FOREST RESERVE, WASHINGTON

Showing total stand of timber and proportion of each species

Vertical scale of stand

1 0 1 2 3 BILLION FEET B.M.

SPECIES

Fir · Cedar · Hemlock · Spruce · Lovely fir · Boundaries of reduction, April 7, 1900

R.16 W. R.15 W. R.14 W. R.13 W. R.12 W R.11 W. R.10 W. R.9 W. R.8 W. R.7 W. R.6 W. R.5 W. R.4 W. R.3 W.

T.33 N. T.32 N. T.31 N. T.30 N. T.29 N. T.28 N. T.27 N. T.26 N. T.25 N. T.24 N. T.23 N. T.22 N. T.21 N.

P A C I F I C O C E A N

JULIUS BIEN & CO. LITH. N.Y

3,000 feet B. M., amid the high mountains, up to 59,000 feet B. M. on T. 32 N., R. 14 W., in the northwest corner.

The timber consists, as classified by lumbermen, of the following species and amounts:

Amount of timber in Olympic Forest Reserve, by species.

Species.	M feet B. M.	Per cent.
Red fir	14,521,750	24
Cedar	6,390,250	10
Hemlock	25,837,250	42
Spruce	3,492,500	6
Lovely fir	10,756,500	18

The greater part of the red fir is found along the southern border of the reserve. The stand is heavy also in the eastern tier of townships, and there is also considerable in the northern part of the reserve, but in the high mountains and in the neighborhood of the Pacific coast this species is practically entirely wanting. The tree grows to the largest dimensions in those areas where the stand is heaviest, reaching a maximum average per township of 243 feet in height, with 56 inches in diameter and 77 feet clear height. The tree is everywhere very free from disease, even in the high mountains, where the conditions are not favorable for its growth.

Cedars are found in all parts of the reserve, excepting in the high mountain region. They are especially abundant in the neighborhood of the Pacific coast, where the Alaska cedar finds a congenial habitat, especially in the low, swampy lands bordering the rivers, near their mouths. The tree is not tall, scarcely reaching half the height of the red fir, but exceeds it in girth. It commonly reaches its greatest development where the stand is heaviest, but this is not always the case. The highest average height per township in the reserve is 144 feet, and the greatest diameter 54 inches. The clear height is nowhere great, the greatest average per township being 35 feet. The tree is extremely subject to disease, a large proportion being rotten at the heart. Indeed, in many townships nearly half the stand is injured by disease.

Hemlock is by far the most abundant tree on the reserve, being found in considerable quantity in every township, and in many townships it forms more than half the stand. It is not a large tree, either in height or diameter, and the amount of clear trunk is not great. It is little affected by disease, excepting in the high mountains, where the percentage of diseased trees is great.

The spruce upon the reserve consists almost entirely of Sitka spruce, the Engelmann spruce being in such small quantities as to cut no figure from a merchantable

point of view. Sitka spruce is found only in the neighborhood of the coast, extending inland nowhere more than 30 miles, and generally ceasing within less than that distance from the coast. Its stand is heaviest a little back from the coast, since immediate coast conditions seem to be rather too damp for its best development. While not as tall as the red fir, it is in girth and probably in timber yield the greatest tree of the reserve. The maximum average height, taking the township as a whole, is 226 feet, 81 feet of which is clear. Its maximum average diameter is 62 inches, or more than 5 feet. The tree is little affected by disease, less so probably than any other species upon the reserve.

The lovely fir is very abundant in the Olympic Reserve, being second in amount only to the hemlock. It is found everywhere excepting on the immediate coasts of the Pacific, and except in the highest mountains the stand is heavy. It is a mountain tree, not being found in any commercial amount below an altitude of about 1,500 feet. It is not a large tree, the maximum average height per township being 164 feet, and the diameter 35 inches. It appears to be but slightly subject to disease.

TIMBER TREES.

The principal timber trees of the reserve are as follows:

Red fir (*Pseudotsuga taxifolia*): This tree grows in abundance. Indeed, it is the principal forest tree throughout the western part of the State of Washington, with the exception of the country immediately bordering on the Pacific Ocean, while it extends up the mountain slopes to an altitude of about 3,500 feet.

Lovely fir (*Abies amabilis*): A tall silvery-barked tree found at considerable elevations, being rarely found below 1,500 feet.

Subalpine fir (*Abies lasiocarpa*): Found only on the higher parts of the mountains and rarely below an elevation of 5,000 feet.

White pine (*Pinus monticola*): This is found on the western slope of the reserve above an elevation of 500 feet, being frequently found in swamps and wet places.

Red cedar (*Thuja plicata*): This tree forms an important component of the forest upon the coast, where it is often seen measuring 50 feet in circumference. Indeed, one tree in the valley of the Elwha measured 84 feet in circumference. It is commonly found growing in low and swampy lands.

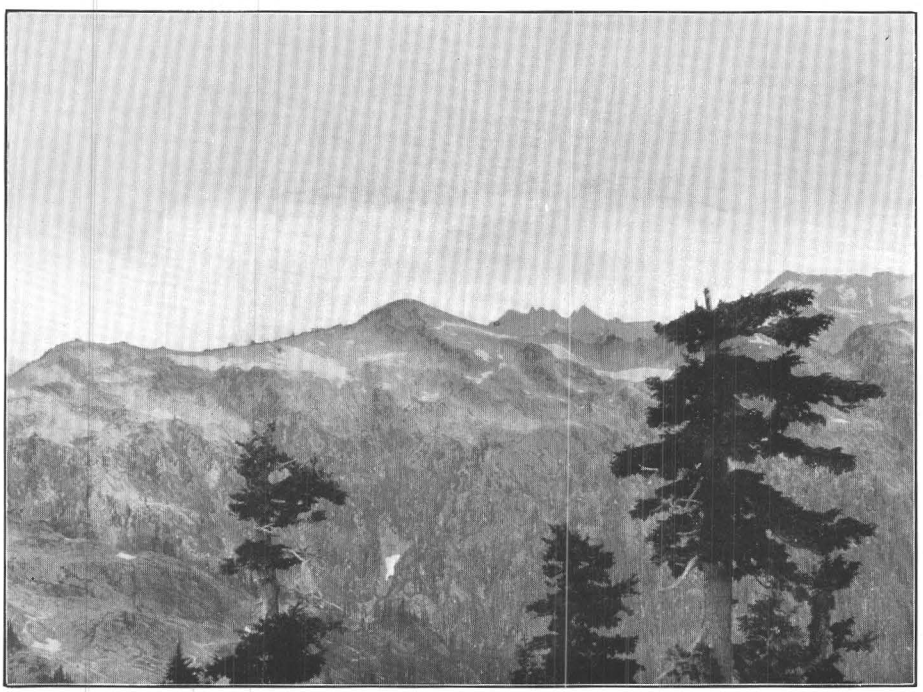
Alaska cedar (*Chamæcyparis nootkatensis*): This is found on mountain ridges below 3,500 feet.

Sitka spruce (*Picea sitchensis*): This is found only in the neighborhood of the Pacific coast.

Mertens hemlock (*Tsuga mertensiana*): This tree is an almost universal component of the forest up to an altitude of 4,500 feet.

Vine maple (*Acer circinatum*): A small tree, sometimes trailing like a vine, which is common at altitudes below 2,000 feet.

A. MOUNT OLYMPUS.



B. DIVIDE BETWEEN QUEETS AND QUENIULT RIVERS.

Maple (*Acer macrophyllum*): A pretty shade tree which often grows very large. It is found only upon bottom lands, and is used for making fine furniture, taking a beautiful finish. It is rarely found at altitudes above 1,500 feet.

Madroña (*Arbutus menziesii*): This species is found along Puget Sound and in the valley of Elwha River. The wood is of a brown color and very tough. It is seldom found more than 12 inches in diameter.

Cottonwood (*Populus trichocarpa*): This is common along streams or on low, wet ground, often growing to a diameter of 5 feet. It is of value for paper pulp.

PLANTS AND SHRUBS.

Alder (*Alnus oregona*) is commonly found along streams of lower altitudes. Dogwood (*Cornus nuttallii*), salal, crab apple, bearberry, and rhododendron are also found.

FOREST FIRES.

As will be seen from the map (Pl. I), considerable tracts of timber land have been burned over, the total area being 177 square miles, or 5 per cent of the area of the reserve. These burns, as shown on the map, are mainly along the northern border and in the northeastern part of the reserve, on waters flowing into the Strait of Juan de Fuca.

The fires east of the Elwha were started about seven years ago from a ranch, and have continued to extend nearly every year. In no case is the fire great enough to burn up the timber completely, but only sufficient to kill the trees and leave them standing. Most of the litter and humus is consumed, and the loss of the humus has seriously retarded reproduction. What reproduction there is in this district is mostly balsam and fir of very inferior quality and of no value whatever for timber, as it branches too close to the ground. Reproduction of red fir is practically impossible, since in no instances observed has it been reproduced after fire. The only two burned areas that have been restocked are those in secs. 2, 3, 4, 8, 9, 10, 11, 12, and 13, T. 30 N., R. 11 W., and in T. 29 N., R. 3 W., where the young growth is balsam and fir. In other burns the old dead timber is standing, with no reproduction whatever except a few small hemlocks here and there. Even the underbrush has not yet commenced to grow.

HUMUS, FOREST LITTER, AND UNDERBRUSH.

The depth of humus is very great along the coast line and adjacent rolling country, but gradually diminishes as the altitude increases, until finally vegetation ceases altogether and the land on the higher ridges is completely bereft of all soil, being washed by the melting snows year after year until nothing is left but the barren rock or rotten shale and slate.

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The forest litter is extremely heavy, being made up of the windfalls of centuries—in fact, the most expensive item in clearing land in western Washington is getting rid of the rotten and decayed wood, which never dries, but in clearing has to be continually turned over and burned until it is finally all consumed, after immense trouble and labor.

The forest litter, of course, is much heavier in the burns, where considerable timber is down, and is increased by falling trees and timber. When finally the light penetrates the gloom the underbrush, comprising huckleberry, salmon berry, devil's walking cane, salal, wild currants, and blackberries, commences to thrive, getting so matted together that it is next to impossible to force one's self through the network of vines.

As the altitude increases the underbrush diminishes, until finally it ceases altogether.

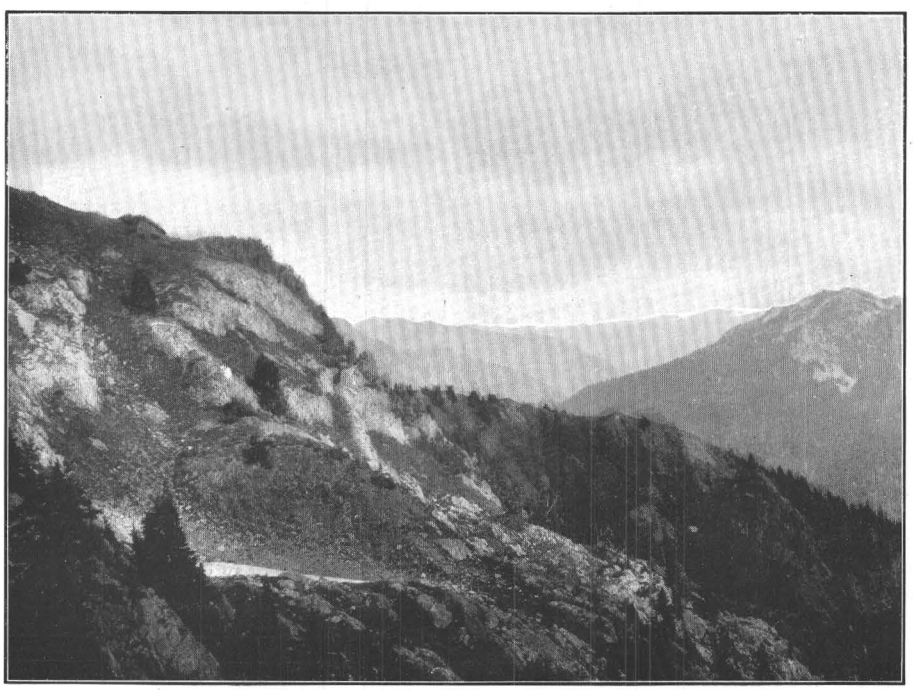
On the lower lands the density of the timber growth has practically nothing to do with the growth of the underbrush, as in numerous places it has been noticed that where a heavy growth of fir and hemlock is standing the brush is extremely dense. The principal requirements for the growth of underbrush are dampness and gloom, as too much sun absorbs the moisture.

LOGGING.

But little logging has been done within the limits of the reserve, an area of only 10,289 acres having been logged. In T. 30 N., R. 9 W., along the north boundary, about 5,000,000 feet B. M. of fir and cedar have been removed, and on Squim Bay, in T. 29 N., R. 3 W., a few logs have been cut near the shore, perhaps 250,000 feet B. M. of fir and spruce. In T. 25 N., R. 3 W., a little more than a quarter section has been cut. It is only in the southern tier of townships that logging operations on any considerable scale have been carried on. From Kamilche and Shelton, on Puget Sound, logging railroads have been extended up into T. 21 N., R. 5 W., and T. 21 N., R. 6 W. In these two townships 1,640 and 7,440 acres have been cut, respectively, the timber being shipped by rail to Puget Sound. The output here is not far from 500,000 feet B. M. per day. In T. 21 N., R. 9 W., 1,031 acres have been cut in the valley of Humptulips River, whence the timber has been floated to Grays Harbor.

The reason why logging operations have not been carried on more extensively is that the rivers are too swift and subject to too many freshets, the logs being hung on the numerous bars or washed up into the brush out of the river bed. Moreover, there are no places to catch and hold the logs if they were driven down the river successfully. Especially is this true of the rivers emptying into the ocean.

A. DIVIDE BETWEEN QUEETS AND QUENIULT RIVERS.



B. ELWHA RIVER VALLEY.

MINING.

Mining operations are being pushed considerably along the ridge dividing Lillian Creek from Morse Creek—in other words, along the north watershed of the Elwha, but so far nothing that will pay to work has been found. All the mines are prospects; no large amount of work has yet been done on any of them.

Assays shows $4 or $5 in gold and copper per ton, but no free-milling ore has yet been discovered. The formation does not warrant the belief that any paying mine will ever be located upon this portion of the reserve. No granite (except a few bowlders), slate, or porphyry has thus far been discovered on the reserve.

GRAZING LANDS.

Large areas of grazing lands are found in the mountainous portions of the reserve, mostly upon the tops of the ridges, between an elevation of 4,000 and 6,000 feet. They are scattered among bunches of timber, but for the most part lie above timber line, as shown by the map (Pl. I). The total area of these high mountain pastures is estimated at about 255 square miles, or about 8 per cent of the area examined. At present there is no grazing carried on, mainly on account of the difficulty of cutting trails, but it is believed that in the near future grazing will become a profitable industry.

ROADS AND TRAILS.

There are numerous roads and trails within the reserve—in fact all of the surveyed townships have one or more wagon roads and numerous trails. The latter, however, are mostly grown up and hard to find. The principal roads are the following:

From Port Angeles to Piedmont, on Lake Crescent; from Port Angeles, by way of Elwha and Lake Sutherland, to Lake Crescent; from Clallam to La Push, at the mouth of the Hoh River; from Quillayute Prairie to Dickey Lake; and several in T. 29 N., Rs. 5, 4, and 3 W.

The traveled trails are as follows: From Dungeness River 6 miles; from the intersection of Indian River and the Elwha up Elwha River to within 4 miles of its head; from Sappho, near Lake Pleasant, to the head of Soleduck River; from Lake Crescent to intersection with trail on Soleduck; up the North Fork of Kalawa River to intersection with Soleduck trail, crossing through low divide in sec. 11, T. 29 N., R. 12 W.; up Bogachiel River to sec. 31, T. 28 N., R. 10 W.; up Hoh River to sec. 36, T. 27 N., R. 11 W.; numerous trails all along and through the coast country and Lake Ozette to West Clallam, and finally a main trail starting from Hoquiam, or Grays Harbor, running north to Queniult Lake and thence

to the Queets and Clearwater. From the latter stream it runs north to Hoh River, connecting through to Port Angeles. There are numerous branches leading off from this, but they are short and bad.

NAVIGATION.

The Indians pole their canoes up nearly all the rivers for a considerable number of miles, trapping and fishing. This is the only way of navigating, as the currents are so swift that it is impossible to row or paddle. Even this form of navigation is practicable only at low water, for when the rivers are in flood it is dangerous to be upon them, not only on account of the swiftness of the current, but because of the presence of driftwood. Queniult River is navigable for canoes from the lake at the eastern point of the Indian reservation to its mouth, and most of the supplies for the few settlers in the valley above the lake are brought in by this route. Queets River is utilized in a similar manner.

RAILROAD CONSTRUCTION AND LOGGING FACILITIES.

There are no railroads in the reserve at present, except the logging railways from Shelton and Kamilche into T. 21 N., R. 5 W., and T. 21 N., R. 6 W., noted elsewhere in this report. The survey for the Port Angeles Eastern, from Port Angeles, Wash., to Olympia, Wash., passes around the head of Squim Bay, in T. 29 N., R. 3 W., and a logging road which starts at Clallam ends at the northeast corner of T. 30 N., R. 9 W., but eventually will be extended to Lake Crescent.

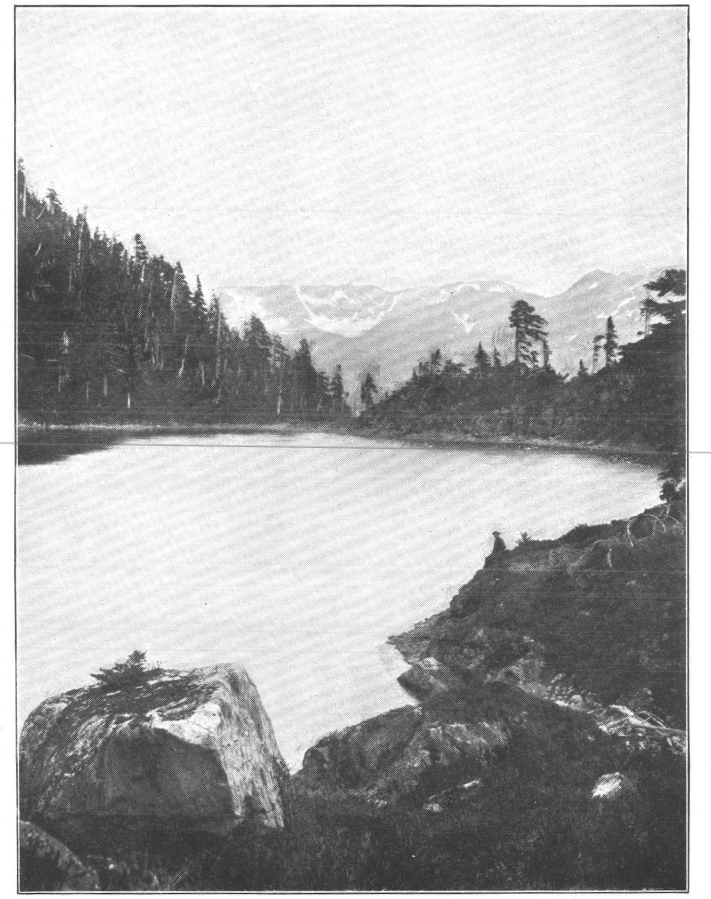
A railroad can be easily constructed from the head of the logging road in T. 30 N., R. 9 W. up Lyre River, around Lake Crescent, and through the low divide at the head of the lake, to the Soleduck, and thence up the Soleduck or down the coast.

Roads can also be easily built up any of the rivers very cheaply, as the country is generally flat for a quarter of a mile or more on either side of them and has very light grades, and, with the exception of two canyons on the Elwha, all of the rivers are free from these obstructions.

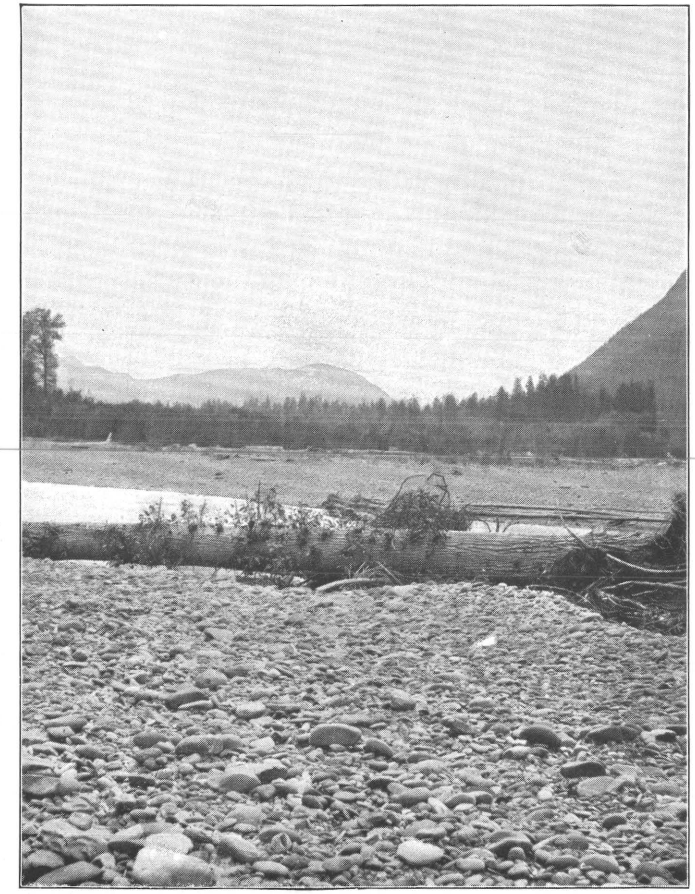
Eventually a railroad will be built either from some point on the Strait of Juan de Fuca or from Grays Harbor, thence around the coast, with spurs up the numerous rivers, in order to tap the timber belts.

Taken as a whole, there is very little timber on the west slope of the reserve that can not be easily reached, and when the time comes when that quality of timber is marketable there are very few reserves, if any, that can be logged so easily and thoroughly as the western slope of the Olympic Forest Reserve.

Within the area of the Olympic Forest Reserve the streams which are suitable for driving purposes are few in number, and are, in most cases, drivable for only short distances above their mouths. Of all the streams flowing out of the mountains



A. LAKE ON DIVIDE BETWEEN QUEETS AND HOH RIVERS.



B. FORKS OF QUENIULT RIVER.

to the east into Puget Sound, none are drivable. All are short, with steep gradients, and flow in narrow, rocky canyons. Of those flowing southward the only streams which can be used for driving logs for any part of their length are the East and West forks of Humptulips River and Wishkah River, and these can be used for this purpose only 4 to 6 miles within the reserve—that is, in the southern tier of townships. Of the streams flowing to the west the Queniult, Queets, and Clearwater are unfitted for driving purposes. Hoh River can be used as far as the east line of R. 12 W. The Bogachiel and its branch, the Kalawa, can be used for driving logs as far up as the east line of range 13. The Dickey is drivable for half a dozen miles, and the Ozette from Ozette Lake to its mouth.

The only stream within the entire reserve which is drivable for any great distance is the Soleduck, by which logs can be transported from the east line of R. 10 W. to its mouth.

Except in cases where these drivable streams can be utilized it will be found necessary to build railroads in order to get the timber out, and fortunately for this purpose, the valleys of all the streams, excepting those flowing eastward into Puget Sound, are of easy grade and sufficiently wide for the construction of such roads. Of course in the higher parts of the mountains, where the timber is scanty and poor, the construction of such roads will be difficult and expensive, but it will probably be many generations before the timber in these regions will be needed.

DETAILED DESCRIPTIONS.

Township 21 North, Range 5 West.

This township, situated in the southeast corner of the reserve, consists mainly of rolling table-lands, rising into mountains along the west line and in the northwest corner. The soil is chiefly clay and loam, and the underbrush is dense. The township is heavily timbered, mainly with red fir, with a little hemlock and cedar, all of good quality.

The timber in the north part of this township can be logged to the South Fork of Skokomish River, up which it will be necessary to build a railroad, as the river is not drivable. In the south part of the township the timber can be logged cheaply by railroad by an extension to existing roads.

Forest conditions in T. 21 N., R. 5 W.

Timbered area	acres	16,920
Burned area	do	4,480
Cut area	do	1,640
Total stand of timber	feet B. M.	814,250,000
Average stand per acre	do	48,100
Depth of humus	inches	3
Litter		Medium.

Statistics of forest trees in T. 21 N., R. 5 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Fir	742	161	32	36	5	11	177
Cedar	11	98	26	16	2	7	121
Hemlock	61¼	103	18	14	2	4	118

Township 21 North, Range 6 West.

This township, in the southern tier of the reserve, is rolling and broken in the northeastern part and in the northwest corner, while the southern part is gently rolling. It is drained by Middle and West forks of Satsop River. The timber consists chiefly of red fir of good quality and very heavy stands. There is considerable hemlock and a small amount of cedar, the latter also being of good quality. A large part of this township, fully one-third of it, has been logged off and subsequently burned, and logging operations are at present being actively carried on in sections 16, 20, 21, and 22. The lumbering is being carried on by means of a railroad built from Oyster Bay on Puget Sound.

The soil is clay loam on the creeks and rivers, becoming gravel on the uplands. The underbrush is dense.

Forest conditions in T. 21 N., R. 6 W.

Timbered area	acres	15,600
Cut area	do	7,440
Total stand of timber	feet B. M.	749,500,000
Average stand per acre	do	48,000
Depth of humus	inches	5
Litter		Heavy.

Statistics of forest trees in T. 21 N., R. 6 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Fir	531	204	41	46	4	9	216
Cedar	39	153	41	25	7	17	212
Hemlock	179½	124	21	21	3	5	134

Township 21 North, Range 7 West.

This township, situated on the south line of the reserve, has a steep, rolling and broken surface, drained by the East and West forks of Satsop River. There are trifling burned areas in sections 6 and 7, amounting altogether to 50 acres.

The timber consists chiefly of red fir, in heavy stands, the trees being very large and containing much clear lumber. Perhaps four-fifths of the entire stand is of good quality. The hemlock upon the township is small, not more than half of it of good quality. The cedar, of which there is a considerable amount, is mainly of good quality. The soil consists mostly of red shot clay and loam. The underbrush is dense.

The western part of this township can be logged into Wynooche River with ease. The remainder of the township can be logged to the two branches of Satsop River, but neither of these streams is of any value for logging purposes, as the banks are low and there are many sand bars. Their valleys, however, afford easy routes for logging railways.

Forest conditions in T. 21 N., R. 7 W.

Timbered area	acres	23,000
Burned area	do	50
Total stand of timber	feet B. M.	1,211,750,000
Average stand per acre	do	52,600
Depth of humus	inches	5
Litter		Heavy.

Statistics of forest trees in T. 21 N., R. 7 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	747	230	51	59	9	8	239
Cedar	121¾	145	48	35	8	13	234
Hemlock	324	144	23	30	5	7	148
Spruce	3	203	50	63	2	4	200
Lovely fir	16	155	19	32	2	4	143

Township 21 North, Range 8 West.

This township consists of rolling, broken country, drained by Wynooche and Wishkah rivers, and the East Fork of Humptulips River. It is well timbered throughout, the timber consisting chiefly of red fir, with considerable hemlock, and small amounts of cedar and lovely fir. The fir is very large and of good quality; the cedar and hemlock are small and somewhat scattered, half of these two species only being of good quality. The soil consists of red shot clay and gravel. The underbrush is dense.

The eastern part of this township can be logged to Wynooche River, although this is a poor logging stream, with low banks and a great many sand bars. The southwestern part can be logged to Wishkah River, which is a good logging stream, with good banks. The method used on this river in driving logs is by means of splash dams built at favorable points along the river. The northwest corner of this

township can be logged to the East Fork of Humptulips River, which can be driven during the winter season. The valley of the river is favorable for the construction of a logging railroad.

Forest conditions in T. 21 N., R. 8 W.

Timbered area	acres	23,040
Total stand of timber	feet B. M.	1,165,500,000
Average stand per acre	do	50,600
Depth of humus	inches	6
Litter		Hea vy

Statistics of forest trees in T. 21 N., R. 8 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	792½	226	50	72	4	6	237
Cedar	68	132	45	27	8	15	222
Hemlock	253	145	22	26	4	8	136
Lovely fir	52	151	31	35	3	5	150

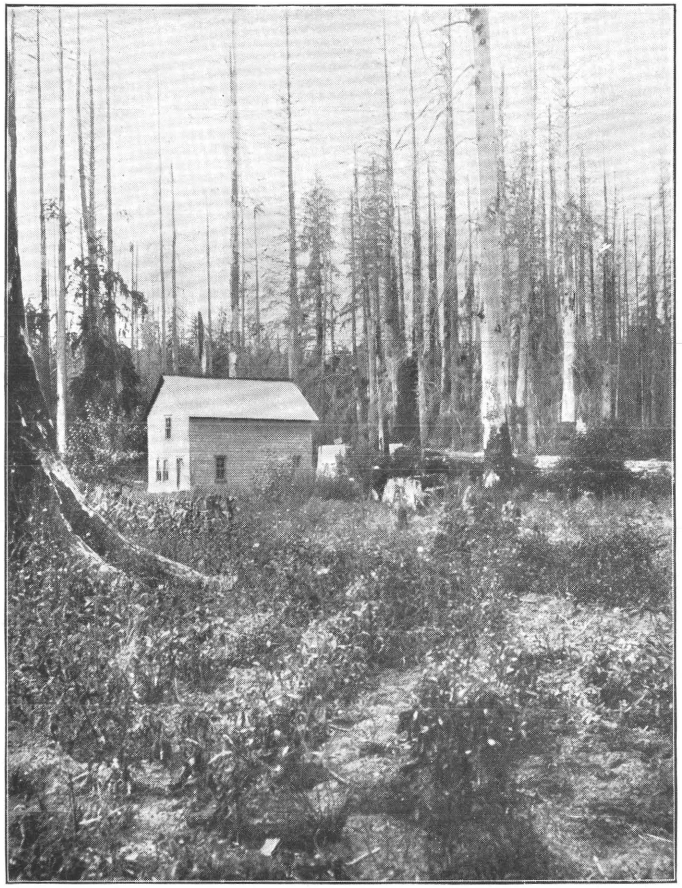
Township 21 North, Range 9 West.

This township, situated on the south boundary of the reserve, consists of rather steep, rolling land, rising to a maximum elevation of 1,230 feet. A small part consists of level bottom land along the West Fork of Humptulips River, which with the East Fork drains the township. The timber consists chiefly of fir, of good quality, with very heavy stands. It contains also some cedar, spruce, and hemlock, but these species are quite scattering, and only 60 per cent of the trees are of good quality. The soil consists mainly of red shot clay. The underbrush is dense.

This township can be logged to Humptulips River, which is a good logging stream during the winter season. At present parties are cutting timber in sections 20, 21, and 29, in the valley of the West Fork of Humptulips River.

Forest conditions in T. 21 N., R. 9 W.

Timbered area	acres	21,809
Burned area	do	200
Cut area	do	1,031
Total stand of timber	feet B. M.	1,159,250,000
Average stand per acre	do	53,100
Depth of humus	inches	5
Litter		Heavy.



A. EVERGREEN POST-OFFICE.

B. RANCH IN SEC. 14, T. 21 N., R. 10 W.

Statistics of forest trees in T. 21 N., R. 9 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	741½	217	42	72	4	6	226
Cedar	36½	127	45	25	8	17	210
Hemlock	313	125	21	23	5	8	143
Spruce	49¾	191	49	57	3	5	199
Lovely fir	18½	150	30	36	2	4	160

Township 21 North, Range 10 West.

This township, situated on the south line of the reserve, consists entirely of gently rolling land. A small part of section 6 lies within the Queniult Indian Reservation. There are within the township three small burns, comprising altogether three-fourths of a section. The timber consists almost entirely of red fir, cedar, and hemlock. The first is of good quality, with very heavy stands; the cedar occurs mainly in the swamps, and is of very good quality; the hemlock, however, is small and not more than half of it is of value. There is in the township a little spruce, but it is quite scattering. The soil consists of clay and gravel in the upland, and in the swamps clay and loam. Underbrush is everywhere dense.

This township can all be logged southeastward to Humptulips River, which is a good logging stream during the winter season. Another means of getting the timber is by building a railroad, which can be carried through in part of the township very cheaply.

Forest conditions in T. 21 N., R. 10 W.

Timbered area	acres	22,560
Burned area	do	480
Total stand of timber	feet B. M.	1,058,500,000
Average stand per acre	do	47,000
Depth of humus	inches	7
Litter		Heavy.

Statistics of forest trees in T. 21 N., R. 10 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Fir	446	214	41	49	7	6	220
Cedar	226	128	39	30	10	21	216
Hemlock	336	138	22	27	4	6	148
Spruce	50½	197	48	54	3	4	192

Township 21 North, Range 11 West.

More than two-thirds of this township is included within the Queniult Indian Reservation, the portion within the forest reserve comprising the southeastern part. The surface consists mainly of level, swampy land, the remainder being slightly rolling upland. The timber consists mostly of cedar of good quality, the stands of which are in some localities very heavy. Some good fir is found on the bench lands, and considerable hemlock, which, however, is small and of poor quality. There is also a little spruce, which is of excellent quality. The soil consists of clay and gravel on the uplands, and in the swamp of clay loam. The underbrush is dense.

This township can be logged eastward to Humptulips River very cheaply.

Forest conditions in T. 21 N., R. 11 W.

Timbered area	acres..	7,095
Total stand of timber	feet B. M..	253,250,000
Average stand per acre	do...	35,700
Depth of humus	inches..	8
Litter		Heavy.

Statistics of forest trees in T. 21 N., R. 11 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Fir	19½	196	39	45	7	9	217
Cedar	145½	121	31	26	10	25	205
Hemlock	77	132	19	22	5	7	144
Spruce	11¼	192	44	48	2	5	184

Township 22 North, Range 5 West.

This township is drained mainly by the South Fork of Skokomish River. East of the river the surface consists of rolling and level bench lands. On the west the country is moutainous and rugged. The soil is clay, sand, and loam on the bottom lands, while on the upland it consists of clay and gravel. The underbrush is dense. The timber consists chiefly of red fir, with some hemlock and cedar, all of excellent quality.

The timber in this township will have to be logged by two different routes, that in the northern part by a railroad from Lake Cushman through the northeastern part of the township. The south part of the township can be logged into the South Fork of Skokomish River.

Forest conditions in T. 22 N., R. 5 W.

Timbered area	acres	22,080
Burned area	do	960
Total stand of timber	feet B. M.	768,750,000
Average stand per acre	do	34,800
Depth of humus	inches	3
Litter		Heavy.

Statistics of forest trees in T. 22 N., R. 5 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	672½	152	24	24	3	6	160
Cedar	23¾	79	11	10	2	6	83
Hemlock	70½	99	11	10	2	4	106
Lovely fir	2	148	22	20	3	9	147

Township 22 North, Range 6 West.

This township is mountainous and somewhat rugged, and is drained mainly southward by the West Fork of Skokomish River, and by the East and Middle forks of Satsop River, while the northern part is drained by the North Fork of Skokomish River. The timber consists chiefly of red fir and hemlock, half of which is of good size and quality. It contains also a little cedar and lovely fir, but in scattering form. The soil is clay in the valleys, grading to gravel upon the mountains. The underbrush is dense, consisting of huckleberry, salal, vine maple, salmon berry, devil cane, yew, arrowwood, dogwood, alder, elderberry, and ferns.

The south and west parts of this township can be logged down the Middle and East forks of Satsop River, the eastern part down the West Fork of Skokomish River, while the northern part can be logged to the North Fork of Skokomish. On all these streams it would be necessary to build skid roads and tramways, as they are not drivable, and owing to the rugged character of the country the township would be an expensive and difficult one to log.

Forest conditions in T. 22 N., R. 6 W.

Timbered area	acres	23,040
Total stand of timber	feet B. M.	631,250,000
Average stand per acre	do	27,400
Depth of humus	inches	3
Litter		Heavy.

Statistics of forest trees in T. 22 N., R. 6 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	355½	168	29	28	4	8	181
Cedar	32¾	95	17	13	6	11	106
Hemlock	224	123	18	16	4	9	141
Lovely fir	19	98	18	16	5	17	150

Township 22 North, Range 7 West.

The surface of this township, with the exception of a tract of bench land and bottom land along Wynooche River, is all steep, rugged, and mountainous. It is drained by Wynooche River and the West Fork of the Satsop. There is on the former stream quite an area of bottom land. A tract of 615 acres, or nearly one section, lying mostly in section 19, has been burned. The timber in the township consists mainly of red fir in very heavy stands, large, and of good quality. There is also considerable hemlock, lovely fir, and cedar—not large, but of good quality. The soil consists of clay and gravel. The underbrush is dense.

The western part of this township can be logged to Wynooche River, which, however, is of no value as a logging stream, since it has low banks and flows through a deep canyon in this township. There is, however, a good route for a railroad along the river. The eastern part of the township can be logged to the West Fork of Satsop River, which, like the Wynooche, is of no value for driving purposes, but offers a good route for a railroad from the south.

Forest conditions in T. 22 N., R. 7 W.

Timbered area	acres.	22,425
Burned area	do	615
Total stand of timber	feet B. M.	1,022,500,000
Average stand per acre	do	45,600
Depth of humus	inches	5
Litter		Heavy.

Statistics of forest trees in T. 22 N., R. 7 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	430	219	49	59	9	10	233
Cedar	101	132	39	25	10	18	209
Hemlock	364	147	22	22	6	9	143
Lovely fir	127½	142	22	31	3	6	138

Township 22 North, Range 8 West.

The surface of this township is rugged and mountainous, with the exception of a tract of bench land in the southeast corner, in the valley of Wynooche River. It is drained by that stream and by the East Fork of Humptulips River. The timber consists chiefly of hemlock and lovely fir, four-fifths of which is large, clear, and of good quality. It contains also some red fir, in large stands and of good quality. This is found on the bench lands in the southeastern part of the township. The soil is red shot clay, and the underbrush is dense.

The eastern part of this township can be logged to Wynooche River, which, as has been stated elsewhere, is of no value as a logging stream, having low banks and many sand bars. The western part can be logged to the East Fork of Humptulips River, which, however, is in the same condition; but a railroad can be built easily along each of these rivers, thus affording access to the timber.

Forest conditions in T. 22 N., R. 8 W.

Timbered area	acres	22,940
Burned area	do	100
Total stand of timber	feet B. M.	1,077,500,000
Average stand per acre	do	46,900
Depth of humus	inches	5
Litter		Heavy.

Statistics of forest trees in T. 22 N., R. 8 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	133	210	47	50	8	8	228
Cedar	65½	131	36	27	7	13	216
Hemlock	528	146	28	29	5	7	150
Lovely fir	351	153	33	37	3	5	153

Township 22 North, Range 9 West.

The surface of this township consists almost entirely of rolling and broken hills and mountains. It is drained in part by the West Fork of Humptulips River, which flows southwestward across it, and by several smaller streams. The timber consists mostly of cedar, hemlock, and lovely fir, with a trifling amount of spruce and red fir. Perhaps 70 per cent of the stand in the township is of good quality. The soil consists of clay and gravels, and the underbrush is dense.

The eastern part of this township can be logged to the West Fork of Humptulips River, which, however, is of no use as a logging stream, since there are low banks

and many sand bars; still there can be built, with little expense, a tramway along the river bank, and the timber can then be handled with skid roads and chutes to the valley. The western part of this township can be logged very cheaply toward the west.

Forest conditions in T. 22 N., R. 9 W.

Timbered area	acres	22,870
Burned area	do	170
Total stand of timber	feet B. M.	926,500,000
Average stand per acre	do	40,300
Depth of humus	inches	5
Litter		Heavy.

Statistics of forest trees in T. 22 N., R. 9 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	17½	214	42	48	6	8	226
Cedar	152	131	41	27	9	18	221
Hemlock	475	138	21	26	7	10	143
Spruce	22	180	47	48	3	5	195
Lovely fir	260	140	25	32	4	6	141

Township 22 North, Range 10 West.

The northwest half of this township lies within the Queniult Indian Reservation, the southeastern half only being within the forest reserve. It contains a large burn, mainly in sections 12 and 13, comprising 1,240 acres. The surface of the township is rolling, becoming more level in the western part. The timber consists chiefly of cedar and hemlock, three-fifths of which is of good quality. There is also a little red fir and spruce of good quality. The soil is red shot clay, and the underbrush dense.

This township can be logged very cheaply by means of a railroad into it from Grays Harbor.

Forest conditions in T. 22 N., R. 10 W.

Timbered area	acres	10,260
Burned area	do	1,240
Total stand of timber	feet B. M.	429,000,000
Average stand per acre	do	42,000
Depth of humus	inches	6
Litter		Heavy.

Statistics of forest trees in T. 22 N., R. 10 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	58½	224	49	50	7	6	229
Cedar	119	141	48	29	14	24	219
Hemlock	215¾	138	21	28	7	6	147
Spruce	35¾	213	52	55	3	5	215

Township 23 North, Range 5 West.

This township, situated in the southeastern part of the reserve, is rugged and mountainous, with the exception of a small area of bottom land above Lake Cushman and on Skokomish River just above the lake. The soil is clay and loam. The underbrush is dense. The timber consists of fir, with some hemlock and cedar, all of excellent quality.

The timber in the northern part of this township can all be logged into Lake Cushman very cheaply; that in the southern part of the township should be logged to the South Fork of Skokomish River, which would be somewhat expensive, owing to the ruggedness of the country.

Forest conditions in T. 23 N., R. 5 W.

Timbered area	acres	19,105
Rugged and barren area	do	640
Burned area	do	2,560
Grazing area	do	735
Total stand of timber	feet B. M.	542,250,000
Average stand per acre	do	28,400
Depth of humus	inches	3
Litter		Light.

Statistics of forest trees in T. 23 N., R. 5 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	287¾	138	25	21	6	10	160
Cedar	71¾	108	21	16	6	13	133
Hemlock	116½	98	14	12	5	11	114
Lovely fir	66¼	98	15	13	5	14	114

Township 23 North, Range 6 West.

This township, situated in the southern part of the reserve, is drained by the South Fork of Skokomish River. It is nearly all mountainous and rugged; it contains much snow, even in summer, and considerable areas of rocky and barren

country. Its soil is thin, consisting mainly of clay and gravel. Underbrush is dense along the river and creeks, but sparse upon the mountains. The timber consists of red fir, hemlock, lovely fir, and cedar, all of excellent quality, except high upon the mountains.

The timber on this township can be logged to the South Fork of Skokomish River, although this is a poor logging stream, with low banks. It will probably be necessary to construct a railroad up its valley for the purpose of carrying out the timber.

Forest conditions in T. 23 N., R. 6 W.

Timbered area	acres	20,736
Rocky and barren area	do	1,664
Burned area	do	192
Grazing area	do	448
Total stand of timber	feet B. M.	383,500,000
Average stand per acre	do	18,500
Depth of humus	inches	3
Litter		Heavy.

Statistics of forest trees in T. 23 N., R. 6 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	161	158	27	24	7	12	178
Cedar	42¼	103	17	12	7	15	108
Hemlock	96¼	109	14	11	5	16	115
Lovely fir	84	106	14	12	5	15	112

Township 23 North, Range 7 West.

The surface of this township is rugged and mountainous. It is drained by Wynooche River. It contains a considerable area of upland pasture, lying at great elevations. The timber consists chiefly of hemlock and lovely fir, three-fourths of which is of poor quality, being stunted and scrubby. Most of the stand of any value is in the valley of Wynooche River.

The soil consists of clay and gravel. The underbrush is dense along the river and creeks, consisting of huckleberry, salal, vine maple, salmon berry, devil cane, alder, yew, and ferns. On the upland the underbrush is light.

The timber in this township will be difficult and expensive to handle, as the river is of no value for driving purposes. The only possible outlet is by building a tramway along the river bank and handling the timber by means of chutes down to the tramway.

Forest conditions in T. 23 N., R. 7 W.

Timbered area	acres	19,900
Rocky and barren area	do	1,280
Mountain meadows	do	1,860
Total stand of timber	feet B. M.	369,750,000
Average stand per acre	do	19,000
Depth of humus	inches	3
Litter		Medium.

Statistics of forest trees in T. 23 N., R. 7 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	53	143	28	34	8	17	214
Cedar	36¾	66	17	12	10	42	210
Hemlock	167½	88	18	15	9	42	203
Lovely fir	112½	78	18	15	8	44	204

Township 23 North, Range 8 West.

The surface of this township is rough and mountainous, most of it lying at great elevations. It is drained mainly by the East and West forks of Humptulips River. The timber consists mainly of hemlock and lovely fir, all of which is of poor quality excepting that along Humptulips River. The soil consists of clay and gravel. The underbrush is dense and is composed of huckleberry, salal, alder, vine maple, salmonberry, devil cane, yew, arrowwood, ferns, and elderberry.

North of the divide a narrow strip of the township consisting of between one and two sections in width, can be logged to Queniult River, while the remainder of the township can be logged down Humptulips River, which, however, is of no value as a driving stream; still, a railroad or tramway could be built into this township from the south.

Forest conditions in T. 23 N., R. 8 W.

Timbered area	acres	23,040
Total stand of timber	feet B. M.	481,500,000
Average stand per acre	do	20,900
Depth of humus	inches	3
Litter		Light.

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Statistics of forest trees in T. 23 N., R. 8 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	38	102	23	17	8	14	176
Hemlock	233½	117	20	19	6	14	146
Lovely fir	210	116	22	23	5	11	144

Township 23 North, Range 9 West.

This township contains Queniult Lake and a trifling portion of Queniult Indian Reservation, which deducted from it leaves as the land surface of the township 31¼ sections, or 20,000 acres. The surface differs greatly in different parts of the township, the southeastern portion being steep and rugged, while the remainder of the township is level or rolling. The timber consists mainly of hemlock, which is found most abundantly on the high divides, and which is of very good quality. There is also some good fir timber in the bottom lands around the lake and river, while a little cedar and spruce are scattered over the township. The soil is a clay loam in the lowlands, and on the uplands clay and gravel. The underbrush is dense.

This township can be logged to Queniult Lake very cheaply, and there are numerous good locations for sawmills along its shores which can be reached by railroad from Grays Harbor to the southward.

Forest conditions in T. 23 N., R. 9 W.

Timbered area	acres	22,955
Burned area	do	85
Total stand of timber	feet B. M.	590,500,000
Average stand per acre	do	25,600
Depth of humus	inches	5
Litter		Heavy.

Statistics of forest trees in T. 23 N., R. 9 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	119¼	205	41	43	5	7	215
Cedar	52	124	38	24	8	17	212
Hemlock	334¾	137	22	26	5	7	145
Spruce	18½	189	38	41	3	4	188
Lovely fir	66	138	25	30	4	6	142

Township 23 North, Range 10 West.

Half of this township is included within the Queniult Indian Reservation and Queniult Lake, the northern half only being within the reserve. There is one small burn in the township, comprised mainly in section 14, with an area of 320 acres. The surface of the township, with the exception of a strip of bench land near the line of the Indian reservation, is rugged and mountainous, rising to a height of 2,700 feet. The timber consists chiefly of hemlock and lovely fir, 60 per cent of which is of good quality. There is a little scattering red fir, cedar, and spruce in the lowlands, but it is small and scrubby. The soil is red shot clay in the ridges and clay loam on the bench lands. The underbrush is very dense.

The timber on this township, with the exception of a small tract near its northern boundary, can be logged very cheaply to Queniult Lake.

Forest conditions in T. 23 N., R. 10 W.

Timbered area	acres..	10,200
Burned area	do...	380
Total stand of timber	feet B. M..	457,000,000
Average stand per acre	do...	45,000
Depth of humus	inches..	5
Litter		Heavy.

Statistics of forest trees in T. 23 N., R. 10 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	40	185	34	40	2	4	200
Cedar	16¼	122	41	23	8	24	230
Hemlock	240¾	146	26	50	4	6	152
Spruce	28	178	35	36	2	4	173
Lovely fir	132	152	32	34	2	5	148

Township 23 North, Range 11 West.

Five-sixths of this township is comprised within the Queniult Indian Reservation. The remaining sixth is a triangular strip along the line of the township, being the only portion within the forest reserve. The surface consists mainly of rolling country, with red shot clay soil, and heavily forested. The timber consists of hemlock, lovely fir, and cedar, there being no red fir or spruce reported. The undergrowth is dense, consisting of huckleberry, salal, salmon berry, ferns, alders, vine maples, devil cane, and arrowwood.

The timber on this fractional township can be logged only by railroad to the south or west.

Forest conditions in T. 23 N., R. 11 W.

Timbered area	acres..	3,650
Total stand of timber	feet B. M..	179,250,000
Average stand per acre	do...	49,000
Depth of humus	inches..	5
Litter		Heavy.

Statistics of forest trees in T. 23 N., R. 11 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	14¼	115	49	22	8	31	243
Hemlock	97	147	25	29	4	8	157
Lovely fir	68	152	30	34	2	6	149

Township 24 North, Range 4 West.

This township is in the eastern part of the reserve. With the exception of a little over a section along Hamahama River, it is practically all rugged and mountainous. The soil is clay and loam in the bottom lands of the river and gravel on the mountain ranges. The underbrush is dense except on the ridges, and the timber consists of fir and hemlock, with some cedar and a little lovely fir. It is all tributary to Hamahama River, but as this stream is of no value for logging purposes and as there is not sufficient water for driving anything larger than shingle bolts, it will be necessary to build a railroad from Hood Canal up the valley of the river across the township.

Forest conditions in T. 24 N., R. 4 W.

Timbered area	acres..	21,917
Rocky and barren area	do...	550
Burned area	do...	213
Grass-land area	do...	360
Total stand of timber	feet B. M..	566,750,000
Average stand per acre	do...	25,800
Depth of humus	inches..	3
Litter		Heavy.

Statistics of forest trees in T. 24 N., R. 4 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	306¼	134	22	19	2	6	144
Cedar	62½	97	16	12	2	9	112
Hemlock	167	114	14	12	2	4	123
Lovely fir	31	117	14	12	2	4	122

Township 24 North, Range 5 West.

This township, drained by Skokomish River and its North Fork, is very rugged and mountainous, with the exception of the narrow valleys of the streams. The soil is gravelly and rocky. The underbrush is mainly light. The timber consists of red fir, hemlock, cedar, and lovely fir, all of which is of good quality, except in the high mountains.

Most of the timber in this township can be logged to the North Fork of Skokomish River, with the exception of a small area in the eastern part, which is in the drainage basin of Hamahama River. The North Fork of the Skokomish is a poor logging stream, since it flows through a deep canyon with rock walls and has a steep slope.

Forest conditions in T. 24 N., R. 5 W.

Timbered area	acres	17,600
Rocky and barren area	do	1,600
Burned area	do	640
Mountain meadows	do	3,200
Total stand of timber	feet B. M.	485,500,000
Average stand per acre	do	27,600
Depth of humus	inches	3
Litter		Medium.

Statistics of forest trees in T. 24 N., R. 5 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Fed fir	137¼	176	28	20	8	12	178
Cedar	76½	85	16	11	5	10	98
Hemlock	140¾	116	17	12	9	20	126
Spruce	1¾	193	26	24	2	4	180
Lovely fir	129¼	126	18	14	8	20	132

Township 24 North, Range 6 West.

This township is mountainous, with the exception of a small tract along Camp Six Stream. The soil is mainly clay and coarse gravel. Underbrush is chiefly light, except in the valleys of the creeks. The timber consists of lovely fir, hemlock, red fir, and cedar. The timber can be logged eastward to the North Fork of Skokomish River.

Forest conditions in T. 24 N., R. 6 W.

Timbered area	acres	17,920
Rocky and barren area	do	640
Mountain meadows	do	4,480
Total stand of timber	feet B. M.	359,250,000
Average stand per acre	do	20,000
Depth of humus	inches	3
Litter		Medium.

Statistics of forest trees in T. 24 N., R. 6 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	59¼	145	24	21	8	16	153
Cedar	55¾	73	16	11	6	13	105
Hemlock	113½	93	15	11	7	18	110
Spruce	6¼	170	25	25	1	2	165
Lovely fir	124½	93	14	12	6	17	111

Township 24 North, Range 7 West.

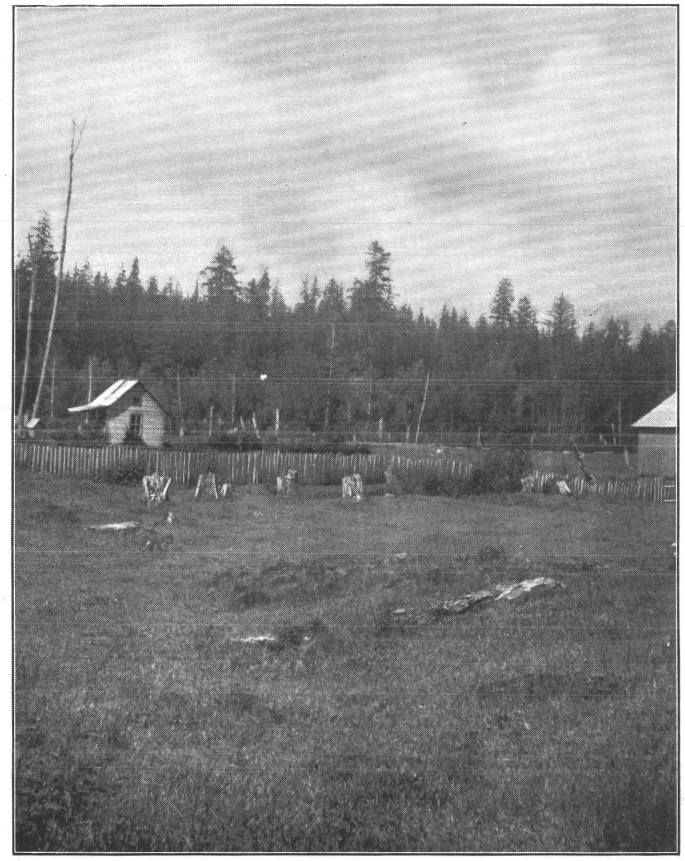
The surface of this township is rugged and mountainous. It is drained by Queniult River, flowing from northeast to southwest through it. It contains considerable area of grass land, lying at great elevation, mainly above timber line. The timber is nearly all hemlock and lovely fir, four-fifths of which is of poor quality. There is a small amount of red fir in the immediate valley of Queniult River. The soil is mainly gravel. The underbrush is dense along the rivers and creeks, and is composed of huckleberry, salal, yew, salmon berry, and vine maple.

The timber in this township will be very difficult and expensive to handle, as its surface is extremely rugged. It can be logged to Queniult River, but this is of no value as a driving stream, and it will be necessary to build a railroad into the township.

Forest conditions in T. 24 N., R. 7 W.

Timbered area	acres	19,965
Rocky and barren area	do	480
Mountain meadows	do	2,560
Burned area	do	35
Total stand of timber	feet B. M.	358,500,000
Average stand per acre	do	18,000
Depth of humus	inches	3
Litter		Light.

A.



B

RANCHES IN QUEETS RIVER VALLEY.

Statistics of forest trees in T. 24 N., R. 7 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	27	132	27	26	7	12	196
Cedar	29¾	60	16	13	8	38	195
Hemlock	184¾	97	19	17	9	33	191
Lovely fir	117	94	20	18	8	31	187

Township 24 North, Range 8 West.

The surface of this township is rugged and mountainous both in the northwest and southeast, while along Queniult River, which traverses the township from side to side, is a broad, level valley mainly of bench land. The timber on these bench lands consists mainly of fir of excellent quality. It is large and occurs in heavy stands, and scattered among it is a little spruce and cedar. Upon the hills and mountains are hemlock and lovely fir, but they are of poor quality, being stunted and scrubby.

The timber on the bench lands of Queniult River can be logged to that stream, or, since that is a poor driving stream, to a railroad up its valley, which affords an excellent route for such a road. The timber in the mountains will be very difficult and expensive to get out.

Forest conditions in T. 24 N., R. 8 W.

Timbered area	acres	20,907
Rocky and barren area	do	320
Mountain meadows	do	1,493
Burned area	do	320
Total stand of timber	feet B. M.	748,250,000
Average stand per acre	do	36,000
Depth of humus	inches	3
Litter		Medium.

Statistics of forest trees in T. 24 N., R. 8 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	187½	201	39	40	6	9	213
Cedar	75¼	118	49	20	9	14	192
Hemlock	321	132	22	22	6	11	148
Spruce	42	191	46	49	4	5	186
Lovely fir	122½	130	24	24	4	10	152

Township 24 North, Range 9 West.

Nearly all this township consists of rugged, mountainous country, much of it lying at considerable altitude above sea, only one-third of its area consisting of grass land above the limit of timber, which is drained in part by the Queniult and in part by streams flowing to Queets River. A small area in the southeast corner, including most of the valley of the Queniult, has been burned. The timber consists mainly of lovely fir and hemlock, which is of good quality on the lowlands, while on the uplands it becomes scrubby and of no value except for firewood. Near the south line of the township there is a small tract of good red fir and spruce. The soil is gravelly. The underbrush is dense along the creeks and river, consisting of huckleberry, salal, vine maple, alder, yew, salmon berry, devil cane, and ferns. In the uplands it is of course light.

On the north of the divide the timber can be logged to Queets River, which is, however, of no value as a logging stream. On the south the timber can be handled to the Queniult, which also is of no value for this purpose; still both of these rivers afford a good route for a railroad, with very easy grades.

Forest conditions in T. 24 N., R. 9 W.

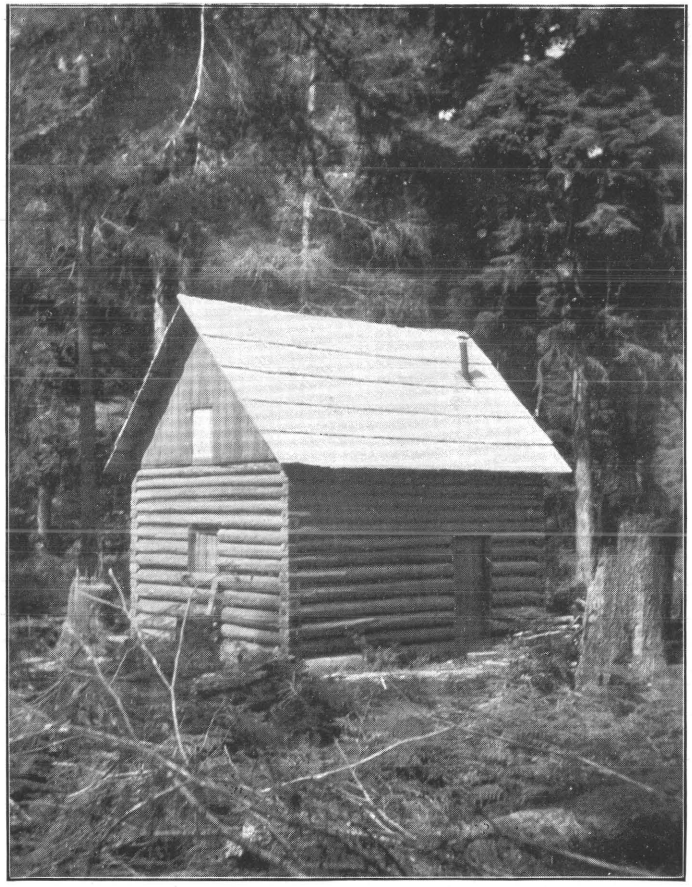
Timbered area	acres	15,200
Burned area	do	640
Mountain meadows	do	7,200
Total stand of timber	feet B. M.	539,750,000
Average stand per acre	do	34,200
Depth of humus	inches	3
Litter		Light.

Statistics of forest trees in T. 24 N., R 9 W.

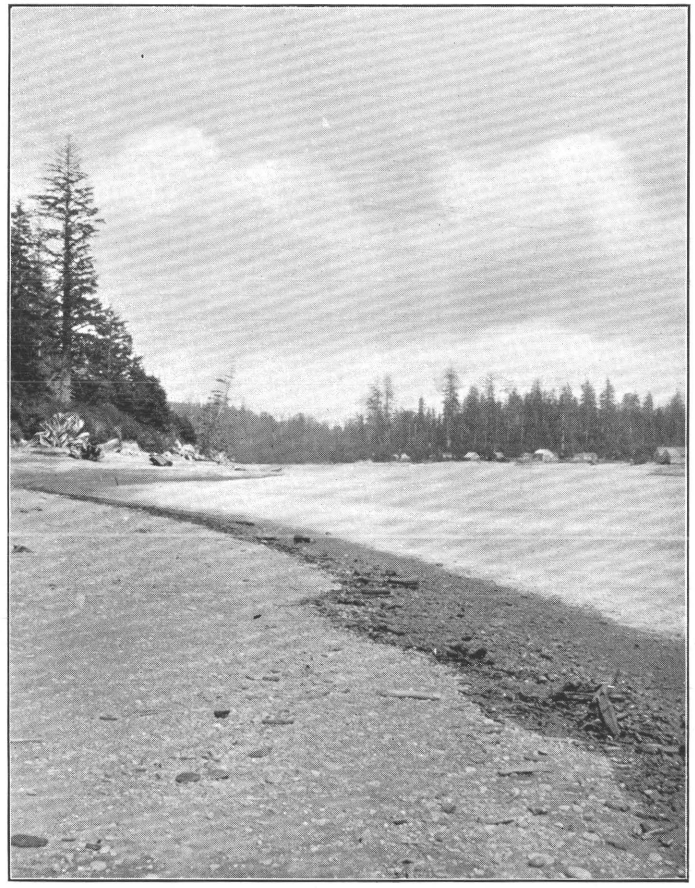
Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	13	178	40	45	4	6	213
Cedar	28¼	80	21	17	8	20	172
Hemlock	246½	118	24	22	6	15	161
Spruce	8	193	45	50	3	4	193
Lovely fir	244	123	27	26	4	11	156

Township 24 North, Range 10 West.

This township consists almost entirely of rather steeply rolling lands. It is drained by Queets River and other smaller streams. The timber consists mainly of hemlock and lovely fir, 60 per cent of which is of good quality, the stands being



A. HOUSE IN SEC. 12, T. 24 N., R. 11 W.



B. GRANVILLE, AT MOUTH OF QUENIULT RIVER.

quite heavy on this township. There is a small amount of cedar and a trifling amount of spruce and fir found in the lower valleys. The soil is a red shot clay and gravel and the underbrush is dense.

This township can all be logged westward to Queets River by means of logging railways built up that stream and its branches.

Forest conditions in T. 24 N., R. 10 W.

Timbered area	acres	22,900
Burned area	do	140
Total stand of timber	feet B. M.	910,750,000
Average stand per acre	do	40,000
Depth of humus	inches	5
Litter		Heavy.

Statistics of forest trees in T. 24 N., R. 10 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	6¼	188	33	39	3	4	211
Cedar	62½	116	44	21	8	19	226
Hemlock	459	147	26	27	5	8	148
Spruce	12	195	55	53	8	5	207
Lovely fir	371	152	32	34	3	5	149

Township 24 North, Range 11 West.

The surface of this township is rolling in the northern and eastern parts, and level in the southern and western parts, especially along Queets River, which flows diagonally across it from northeast to southwest. Much of the valley of this river has been burned, mainly in sections 10, 15, 16, 17, and 19, the entire burned area amounting to 2,260 acres. The timber consists chiefly of cedar, hemlock, and lovely fir, about half of which are of good quality. There was considerable spruce in the township, but much of it was burned in the fire above referred to. The soil is a clay loam and gravel, and the underbrush is dense.

This township can be logged cheaply to Queets River, which, although of no value as a logging stream, having very low banks and many sand bars, still affords an excellent route for a railroad into the township for logging purposes.

Forest conditions in T. 24 N., R. 11 W.

Timbered area	acres	20,780
Burned area	do	2,260
Total stand of timber	feet B. M.	788,250,000
Average stand per acre	do	37,500
Depth of humus	inches	7
Litter		Heavy.

Statistics of forest trees in T. 24 N., R. 11 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	7½	188	33	39	2	4	207
Cedar	160¾	115	47	22	7	29	234
Hemlock	355	138	21	23	3	6	146
Spruce	37	198	52	55	2	4	206
Lovely fir	228	153	28	36	2	5	151

Township 24 North, Range 12 West.

A strip along the southern portion of this township lies within the Queniult Indian Reservation, leaving an area within the forest reserve of 19,860 acres. The surface is mainly low, and to a great extent marshy, rising, however, in the northern part to rolling, broken hills. It is drained by Queets River, flowing from east to west across the southern portion, and by the Clearwater flowing in from the north. The timber consists chiefly of cedar and hemlock, half of which is of good quality. There is also some spruce, which is of excellent quality, and a little lovely fir. The soil is a clay loam and gravel, and the underbrush is dense.

This township can be logged very cheaply to Queets River, which, however, is of no value as a logging stream, since it has low banks and sand bars. There is an easy route for a railroad along this river, by means of which the township can be easily and cheaply logged.

Forest conditions in T. 24 N., R. 12 W.

Timbered area	acres	19,736
Burned area	do	124
Total stand of timber	feet B. M.	505,500,000
Average stand per acre	do	25,000
Depth of humus	inches	7
Litter		Heavy.

Statistics of forest trees in T. 24 N., R. 12 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	2	190	42	44	3	5	215
Cedar	166	132	49	24	7	39	239
Hemlock	221	124	20	20	4	7	141
Spruce	56	177	49	47	2	5	186
Lovely fir	60½	164	27	38	3	5	148

Township 24 North, Range 13 West.

This is a fractional township lying on the Pacific coast, a part of it being included in the Queniult Indian Reservation. It comprises altogether only 8,280 acres, or a little more than one-third of a complete township. The surface is rolling in the eastern part, while in the western part, bordering on the coast, it is nearly all level swamp land. All the land is forested, the timber in the eastern part being of excellent quality, while that bordering on the coast is poor and scrubby. It consists mainly of hemlock and cedar, with a little spruce and lovely fir. The soil is a red shot clay on the upland, while in the swamp lands along the coast it is clay loam. The underbrush is dense.

This township can be logged cheaply by means of a railroad built near to and parallel with the coast.

Forest conditions in T. 24 N., R. 13 W.

Timbered area	acres	8,280
Total stand of timber	feet B. M.	240,000,000
Average stand per acre	do	29,000
Depth of humus	inches	6
Litter		Heavy.

Statistics of forest trees in T. 24 N., R. 13 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	84	103	42	20	9	45	224
Hemlock	135	123	18	19	4	7	143
Spruce	14	169	44	40	2	4	192
Lovely fir	7	150	30	36	2	3	155

Township 25 North, Range 3 West.

This township is mountainous, except some small tracts of bottom land along the Duckabush River. The soil is clay, loam, and gravel. The underbrush is dense except on the ridges. The timber consists mainly of red fir, with some hemlock and cedar, and the fir is of excellent quality.

This township will be very difficult to log because of the ruggedness of the country. In the southern part it can be logged southward into Hamahama River, while the eastern part of the township can be logged down Fulton Creek by tramway or skid road. The northern part can be logged into Duckabush River.

Forest conditions in T. 25 N., R. 3 W.

Timbered area	acres	19,182
Mountain meadows	do	3,680
Cut area	do	178
Total stand of timber	feet B. M.	604,000,000
Average stand per acre	do	31,000
Depth of humus	inches	3
Litter		Heavy.

Statistics of forest trees in T. 25 N., R. 3 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	458¼	157	31	31	2	6	173
Cedar	34¾	73	11	9	3	5	89
Hemlock	102½	94	13	12	2	4	110
Lovely fir	8½	92	14	14	2	5	117

Township 25 North, Range 4 West.

This township, which is traversed by Duckabush River from west to east, is mountainous and rugged, with the exception of about 1,000 acres of bottom land along the river. The soil on the upland is clay and coarse gravel, with clay and loam on the bottom land. The underbrush is dense on the bottom land, becoming sparser on the ridges. The timber consists of red and lovely fir and hemlock, with a little cedar.

The timber in this township is mainly in the northern part, and can be logged into Duckabush River, and the little which stands in the southern part of the township can be taken to Hamahama River.

Forest conditions in T. 25 N., R. 4 W.

Timbered area	acres	16,622
Rocky and barren area	do	1,760
Burned area	do	178
Mountain meadows	do	4,480
Total stand of timber	feet B. M.	340,000,000
Average stand per acre	do	20,400
Depth of humus	inches	3
Litter		Medium.

RANCH NEAR HEAD OF QUENIULT LAKE.

Statistics of forest trees in T. 25 N., R. 4 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	171	154	31	32	3	7	173
Cedar	6½	74	12	10	3	7	90
Hemlock	91	96	15	13	3	7	115
Lovely fir	71½	99	14	13	3	7	118

Township 25 North, Range 5 West.

This township is drained mainly by Duckabush River, which flows across it from west to east. Its surface is mainly mountainous and very rugged. Its soil is clay and gravel, and the underbrush is light. The timber consists chiefly of hemlock and lovely and red fir, with a little cedar.

The timber in this township is principally in the northern part, and can be logged to Duckabush River. This stream, however, is of no value for driving purposes, and it will be necessary to build a tram road up its valley to get the timber out.

Forest conditions in T. 25 N., R. 5 W.

Timbered area	acres	12,480
Rocky and barren area	do	5,760
Mountain meadows	do	4,800
Total stand of timber	feet B. M.	206,000,000
Average stand per acre	do	16,500
Depth of humus	inches	2
Litter		Light.

Statistics of forest trees in T. 25 N., R. 5 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	30¾	152	27	19	5	9	157
Cedar	16¼	52	10	8	5	16	78
Hemlock	72	90	16	12	8	30	116
Spruce	½	160	24	24	2	4	160
Lovely fir	86½	108	17	13	9	42	119

Township 25 North, Range 6 West.

This township consists entirely of rocky and mountainous country, through which flows Queniult River from northeast to southwest in a narrow valley or canyon. Nearly half its area consists of open grass lands at great elevations. The timber consists almost entirely of lovely fir and hemlock of poor quality, the stands being almost entirely in the river valley. The soil is mainly gravel and rock. The underbrush is dense along the river, while that on the upland is light. It consists of huckleberry, salal, yew, vine maple, alder, and ferns.

The timber on this township can be logged to Queniult River, which, however, is of no value as a driving stream, as it has low banks and many sand bars; still, tramways can be built along the river bank and the timber can be handled by means of chutes and skid roads.

Forest conditions in T. 25 N., R. 6 W.

Timbered area	acres	16,547
Rocky and barren area	do	1,813
Mountain meadows	do	4,680
Total stand of timber	feet B. M.	196,750,000
Average stand per acre	do	12,000
Depth of humus	inches	3
Litter		Light.

Statistics of forest trees in T. 25 N., R. 6 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	11¼	143	27	22	8	16	182
Cedar	9½	51	16	11	9	58	124
Hemlock	92	71	18	15	10	57	194
Lovely fir	84	71	18	15	9	53	194

Township 25 North, Range 7 West.

The surface of this township is rugged and mountainous, and a large proportion of it lies above timber line and consists of open grass land. The timber is composed chiefly of hemlock and lovely fir, which, except along the streams, where it is of good quality, is small and scrubby. The soil is mainly coarse gravel, and the underbrush is dense, especially along the rivers.

It will be very expensive to get the timber out of this township, owing to the ruggedness of its surface. The only means by which it can be done is by tramways built along the streams and by the use of chutes to bring the timber down from the mountain sides.

Forest conditions in T. 25 N., R. 7 W.

Timbered area	acres	16,440
Rocky and barren area	do	1,920
Mountain meadows	do	4,680
Total stand of timber	feet B. M.	399,750,000
Average stand per acre	do	24,300
Depth of humus	inches	3
Litter		Light.

Statistics of forest trees in T. 25 N., R. 7 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	8½	137	35	32	5	10	198
Cedar	31¼	74	22	17	9	41	183
Hemlock	206	112	23	20	8	29	161
Lovely fir	154	119	24	20	6	26	163

Township 25 North, Range 8 West.

The surface of this township is very rugged and mountainous, much of it being at a considerable altitude. One-third of the township is at such an elevation as to be practically destitute of timber, and consists of upland pastures. The timber consists almost entirely of lovely fir and hemlock, with a little cedar along the streams. On Queets River, in the northwest corner, and the North Fork of Queniult, in the southeast, the timber is of good quality, but upon the mountain slopes it is small and stunted. The soil is thin and stony. The underbrush is dense along the creeks, but scanty on the mountain sides.

With the exception of a small tract of timber in the northwest corner, which can be taken to Queets River, this township can be logged to the North Fork of Queniult River. This, however, is of no value for driving purposes, but tramways can be built up its valley for the purpose of getting out the timber.

Forest conditions in T. 25 N., R. 8 W.

Timbered area	acres	17,601
Rocky and barren area	do	853
Mountain meadows	do	4,586
Total stand of timber	feet B. M.	444,000,000
Average stand per acre	do	25,200
Depth of humus	inches	3
Litter		Light.

Statistics of forest trees in T. 25 N., R. 8 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	½	135	32	36	4	6	190
Cedar	32½	73	22	16	9	35	175
Hemlock	220	101	22	19	8	33	162
Lovely fir	191	104	23	21	6	26	156

Township 25 North, Range 9 West.

A large part of this township, especially all the southern half, is rugged and mountainous, with a considerable area of elevated grass land. Across the northern part flows Queets River, from east to west, carrying with it a broad belt of level bottom land averaging a mile in width. The timber consists mostly of hemlock and lovely fir, especially upon the mountainous portion of the township. In the bottom land of Queets River there is some red fir, cedar, and spruce, all of good quality. The soil is a clay loam, and the underbrush is dense.

This township can be logged to Queets River, although this is not a good logging stream, having low banks and not sufficient water for driving purposes. A railroad can, however, be built cheaply along its course.

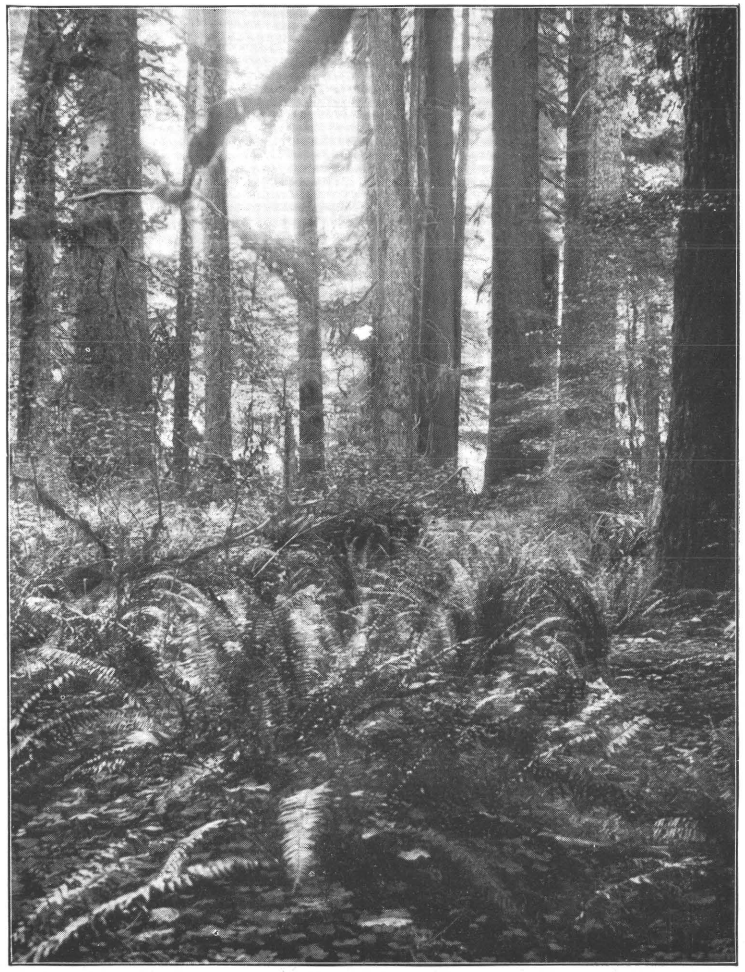
Forest conditions in T. 25 N., R. 9 W.

Timbered area	acres	24,876
Mountain meadows	do	2,964
Total stand of timber	feet B. M.	881,500,000
Average stand per acre	do	35,400
Depth of humus	inches	3
Litter		Light.

Statistics of forest trees in T. 25 N., R. 9 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	112	206	43	42	2	5	216
Cedar	75	115	36	21	8	26	215
Hemlock	402	133	24	24	5	11	149
Spruce	82½	199	48	48	2	4	202
Lovely fir	210	131	25	25	4	10	139

A.



B.

FIR, SPRUCE, AND HEMLOCK IN QUEETS RIVER BOTTOM.

Township 25 North, Range 10 West.

The surface of this township is steep and somewhat rugged, with the exception of a tract of bottom and bench land along Queets River a little more than a mile in width, stretching across the southern part of the township. The timber along the northern part of the township is nearly all hemlock and lovely fir, three-fourths of which is of good quality and in very heavy stands. In the southern part, in the bottom and bench lands of Queets River, there are some good stands of red fir, spruce, and cedar, all of excellent quality. The soil consists of clay and loam, and the underbrush is very dense.

The northern part of this township can be logged to Clearwater River, which flows across its northern edge from east to west. This stream is, however, of no value for driving purposes, and the timber will be quite expensive to handle. The southern part of the township can be logged cheaply to Queets River by building a railroad up its valley, which can be done at little expense.

Forest conditions in T. 25 N., R. 10 W.

Timbered area	acres..	23,040
Total stand of timber	feet B. M..	1,001,250,000
Average stand per acre	do...	43,500
Depth of humus	inches..	5
Litter		Heavy.

Statistics of forest trees in T. 25 N., R. 10 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Age.*
Red fir	31½	203	42	42	3	6	217
Cedar	65½	122	37	24	7	22	212
Hemlock	466	156	28	29	4	6	161
Spruce	64¼	202	49	56	2	4	208
Lovely fir	374	164	29	34	3	5	160

Township 25 North, Range 11 West.

The surface of this township is rolling, with a rather steep westward slope. It is drained by branches of Clearwater River. The entire surface is forested, the timber consisting chiefly of hemlock and lovely fir, with a little cedar and spruce. About four-fifths of the timber is of good quality, with large and heavy stands, especially along the streams. The soil is red shot clay in the valleys, grading to gravel in the uplands. The underbrush is dense everywhere.

With the exception of a small tract in the southeast corner, which can be logged to Queets River, the lumber can all be taken down the branches of Clearwater. Although none of these are good logging streams, still their valleys afford excellent routes for tramways, which can be built cheaply into the township.

Forest conditions in T. 25 N., R. 11 W.

Timbered area	acres	23,040
Total stand of timber	feet B. M.	860,750,000
Average stand per acre	do	37,400
Depth of humus	inches	5
Litter		

Statistics of forest trees in T. 25 N., R. 11 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	61½	121	49	24	8	22	232
Hemlock	482	148	24	29	5	8	157
Spruce	24¼	200	53	54	2	4	205
Lovely fir	293	156	28	32	3	5	160

Township 25 North, Range 12 West.

The surface of this township is nearly all open and mountainous, with the exception of the valley of Clearwater River, which flows from east to west across the southern part of the township with a belt of bottom land nearly a mile in width. The timber consists mostly of hemlock and lovely fir, of good quality. This is found only on the high ridges, while on the lowlands it becomes small and poor. There are some good stands of spruce, of excellent quality, and a little poor, scattering cedar. The soil is red shot clay on the upland, with clay and loam on the bottom lands. The underbrush is dense.

The entire area of this township can be logged to Clearwater River, which, however, is of no value as a logging stream, though a railroad can be built up its valley at little expense.

Forest conditions in T. 25 N., R. 12 W.

Timbered area	acres	23,040
Total stand of timber	feet B. M.	676,750,000
Average stand per acre	do	29,400
Depth of humus	inches	6
Litter		Heavy.

Statistics of forest trees in T. 25 N., R. 12 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	¼	200	60	60	4	6	230
Cedar	38½	129	48	27	7	22	220
Hemlock	438	147	20	28	4	7	149
Spruce	73	225	56	61	2	4	213
Lovely fir	127	156	23	32	3	5	148

Township 25 North, Range 13 West.

This fractional township lies on the Pacific coast, and comprises approximately 15,120 acres, all of which is timbered. The surface is somewhat rolling and broken in the eastern part, becoming more nearly level toward the coast. Near the latter are areas of marshy land. Along the coast the timber is small and scrubby and of poor quality, but improves in quality inland. It consists almost entirely of cedar and hemlock, 40 per cent of which, taken as a whole, is of good quality. The soil is red shot clay, and the underbrush is dense.

This township can be logged to the south and west by building a railroad into it, either from the Strait of Juan de Fuca or from Grays Harbor. There being no harbor in this neighborhood, it can not be logged directly to the coast.

Forest conditions in T. 25 N., R. 13 W.

Timbered area	acres	15,120
Total stand of timber	feet B. M.	533,500,000
Average stand per acre	do	35,300
Depth of humus	inches	6
Litter		Heavy.

Statistics of forest trees in T. 25 N., R. 13 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	218	99	54	21	7	43	241
Hemlock	287	131	19	21	4	6	152
Spruce	27	175	44	41	2	5	191
Lovely fir	1½	140	28	30	4	6	150

Township 26 North, Range 3 West.

This township is drained mainly by Dusewallips River, which flows across it from east to west. Its surface, with the exception of small areas of bottom land along the river, is mountainous and rugged. The soil is very stony and gravelly. Underbrush is sparse. The timber consists of red fir and hemlock, with a little lovely fir and a trifling amount of cedar. It is all of good quality, except on the high divides, where it is small and stunted.

The timber in this township, with the exception of a few sections along the north line, which can be logged to Quilcene River, will go to Dusewallips River. This, however, is a poor logging stream, and it will be necessary to build a railroad or tramways along the river to get the lumber out.

Forest conditions in T. 26 N., R. 3 W.

Timbered area	acres	17,780
Rocky and barren area	do	1,660
Burned area	do	1,680
Mountain meadows	do	1,920
Total stand of timber	feet B. M.	606,000,000
Average stand per acre	do	34,100
Depth of humus	inches	3
Litter		Light.

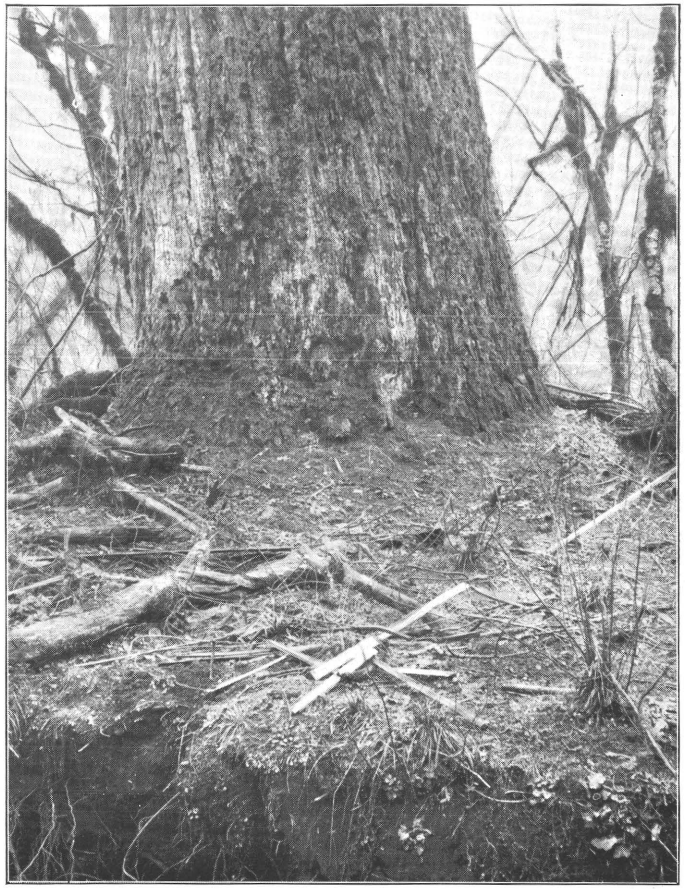
Statistics of forest trees in T. 26 N., R. 3 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	332	162	27	41	7	3	186
Cedar	11	112	23	21	6	17	189
Hemlock	225	124	15	22	7	6	118
Lovely fir	38	130	15	35	18	8	152

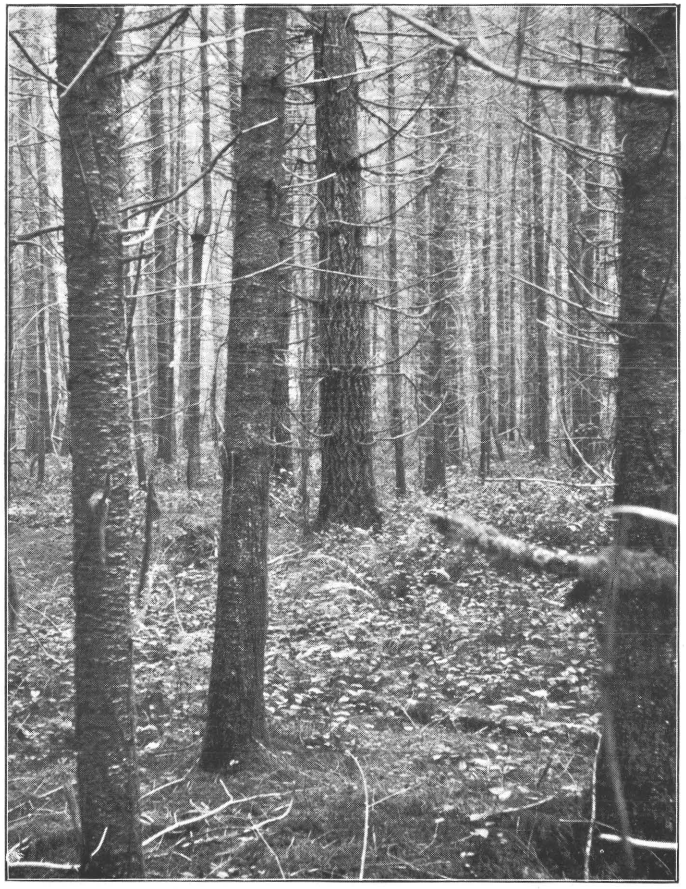
Township 26 North, Range 4 West.

This township is drained almost entirely by Dusewallips River, which flows across it from the northwest to the southeast. Its surface is mountainous and rugged, its soil clay and gravel, and the underbrush is sparse. The timber consists of hemlock and lovely and red fir, with a little cedar, all of good quality excepting on the high ridges, where the timber becomes small and stunted.

The timber can nearly all be logged to Dusewallips River, but as this is a poor logging stream it will be necessary to build a railroad or tramways up its valley; and moreover, owing to the steepness of the slopes, it will be necessary to bring the timber down in flumes from the ridges.



A. FIR 43 FEET IN CIRCUMFERENCE.



B. SECOND GROWTH OF FIR.

Forest conditions in T. 26 N., R. 4 W.

Timbered area	acres	16,960
Rocky and barren area	do	2,560
Mountain meadows	do	3,520
Total stand of timber	feet B. M.	516,000,000
Average stand per acre	do	30,400
Depth of humus	inches	2
Litter		Medium.

Statistics of forest trees in T. 26 N., R. 4 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	119	108	25	24	3	5	153
Cedar	13½	72	19	27	6	19	133
Hemlock	186	72	15	15	4	9	120
Lovely fir	197½	84	17	17	4	13	127

Township 26 North, Range 5 West.

This township contains the high divide at the heads of branches of Dusewallips, Elwha, and Queniult rivers, and is mountainous and rugged, with very little soil and light underbrush. It contains but little timber, consisting mainly of lovely and red fir and hemlock. The timber can be logged down the branches of Dusewallips, Queniult, and Elwha rivers, but as these streams are very rapid the timber will have to be handled by chutes and flumes.

Forest conditions in T. 26 N., R. 5 W.

Timbered area	acres	9,950
Rocky and barren area	do	6,050
Mountain meadows	do	7,040
Total stand of timber	feet B. M.	101,750,000
Average stand per acre	do	12,300
Litter		Light.

Statistics of forest trees in T. 26 N., R. 5 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	15½	111	23	20	3	6	133
Cedar	3¼	67	15	11	8	25	118
Hemlock	38	74	15	11	5	25	120
Lovely fir	45	80	17	13	4	27	124

Township 26 North, Range 6 West.

This township is drained almost entirely by Elwha River, and its surface is mountainous and rugged, with the exception of the narrow valley of the river. The soil is very thin and stony. The underbrush is light. The timber consists chiefly of hemlock and lovely and red fir, and is of poor quality, excepting in the narrow valley of the Elwha.

The timber can be logged mainly to Elwha River, although this is of no value as a logging stream, as it has low banks and not sufficient water for driving. Still, along its banks tramways or logging roads can be built.

Forest conditions in T. 26 N., R. 6 W.

Timbered area	acres	14,686
Rocky and barren area	do	3,946
Mountain meadows	do	4,408
Total stand of timber	feet B. M.	296,000,000
Average stand per acre	do	20,100
Depth of humus	inches	2
Litter		Light.

Statistics of forest trees in T. 26 N., R. 6 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	64	144	31	36	3	6	172
Cedar	5	80	20	18	6	20	130
Hemlock	101	84	17	15	4	26	125
Lovely fir	126	92	18	17	4	28	127

Township 26 North, Range 7 West.

This township, which is drained mainly by Elwha River, is rugged and mountainous, with the exception of a narrow strip of valley land along the Elwha. The soil is a clay in the Elwha Valley, but the uplands are rocky and gravelly. The underbrush is very dense except in the higher country, where it becomes sparse. The timber consists of red fir, hemlock, and lovely fir. The fir, which occurs chiefly in the river valley, is of good quality. Elsewhere the timber is poor.

Nearly all of the valuable timber in this township is in the immediate valley of Elwha River, and as this stream is not drivable it will be necessary to build a railroad or tramway up the valley in order to reach it.

Forest conditions in T. 26 N., R. 7 W.

Timbered area	acres	14,080
Rocky and barren area	do	4,480
Mountain meadows	do	4,480
Total stand of timber	feet B. M.	177,250,000
Average stand per acre	do	12,600
Depth of humus	inches	2
Litter		Light.

Statistics of forest trees in T. 26 N., R. 7 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	19½	136	32	31	2	7	174
Hemlock	61¾	79	17	13	4	26	127
Lovely fir	96	87	18	15	4	36	131

Township 26 North, Range 8 West.

This township has an extremely rugged and mountainous surface, and is drained mainly into Queets River. Nearly all of its area consists of open grass land lying at considerable elevation above sea, mainly above timber line, only about one-sixth of its area being timbered. The timber consists of cedar, lovely fir, and hemlock, all of alpine character, and of little value except for fuel.

The soil consists of rocks and gravel. The underbrush is dense along the river, but light upon the uplands. It consists of huckleberry, salmon berry, salal, yew, alder, vine maple, devil cane, and ferns.

All the timber of any value in this township stands along Queets River, and will be very expensive to handle, as the river is of no value for driving purposes.

Forest conditions in T. 26 N., R. 8 W.

Timbered area	acres	3,760
Rocky and barren area	do	2,560
Mountain meadows	do	16,720
Total stand of timber	feet B. M.	111,250,000
Average stand per acre	do	28,200
Depth of humus	inches	3
Litter		Light.

Statistics of forest trees in T. 26 N., R. 8 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	7¼	86	20	15	8	39	167
Hemlock	55½	111	24	20	7	24	161
Lovely fir	48½	108	24	20	6	18	158

Township 26 North, Range 9 West.

The surface of this township is, in the main, very steep, rugged, and mountainous. The timber consists mostly of lovely fir and hemlock, which is stunted and of little value, with the exception of that in the western part of the township, where it is of good quality.

The soil consists of plain gravel on the South Fork of Hoh River. The upland consists largely of bare rocks, with coarse gravel. The underbrush is dense along the river and creeks and light on the uplands. It consists of huckleberry, salmon berry, alder, salal, vine maple, yew, devil cane, and ferns.

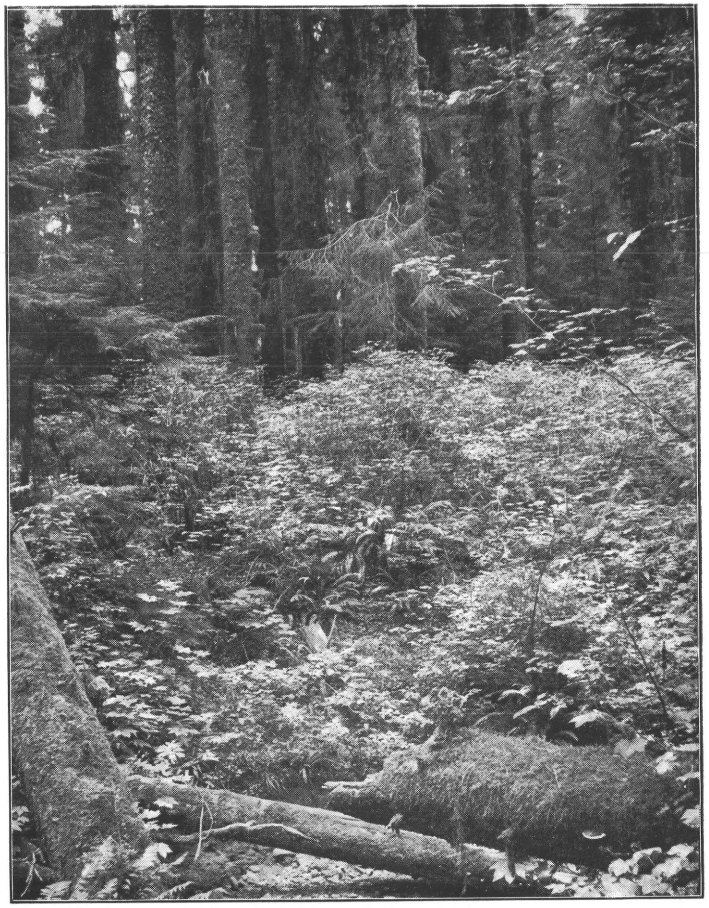
On the north side of the divide the timber can be logged to the South Fork of Hoh River. This, however, is of no value as a logging stream, but affords a good route for a logging railway. South of the divide the timber can be logged to Queets River, which is also a poor logging stream. A small portion of the timber on the west side can be logged down branches of Clearwater River.

Forest conditions in T. 26 N., R. 9 W.

Timbered area	acres	14,720
Rocky and barren area	do	782
Mountain meadows	do	7,538
Total stand of timber	feet B. M.	671,250,000
Average stand per acre	do	45,600
Depth of humus	inches	3
Litter		Light.

Statistics of forest trees in T. 26 N., R. 9 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	8½	192	33	32	4	8	202
Cedar	46¾	94	20	18	9	29	161
Hemlock	305	120	23	22	7	24	154
Lovely fir	311	126	24	24	6	20	155



A. FIR AND SPRUCE.

B. SMALL GROWTH IN MIXED FOREST.

Township 26 North, Range 10 West.

This township consists of rugged, mountainous country, drained on the north to Hoh River and on the south to the Clearwater. The timber consists chiefly of hemlock and lovely fir, four-fifths of which is of good quality, with very heavy stands. Red fir, cedar, and spruce are scattered over the township.

The soil consists of red shot clay, which becomes stony along the creeks. The underbrush consists of dense huckleberry, alder, vine maple, salmon berry, yew, arrowwood, and ferns.

The northern part of this township can be logged to Hoh River, which, however, is of no value as a logging stream, owing to the fact that its banks are low and its course interrupted by sand bars. On the south the timber can be taken to the Clearwater, which is also of no value; still each of these rivers affords excellent routes for logging railroads.

Forest conditions in T. 26 N., R. 10 W.

Timbered area	acres	23,040
Total stand of timber	feet B. M.	1,051,000
Average stand per acre	do	45,400
Depth of humus	inches	4
Litter		Heavy.

Statistics of forest trees in T. 26 N., R. 10 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	15½	201	42	49	4	7	219
Cedar	43	119	35	22	7	19	215
Hemlock	476	152	28	27	4	6	159
Spruce	8½	197	49	53	2	4	205
Lovely fir	508	162	30	37	2	4	165

Township 26 North, Range 11 West.

The surface of this township is steep, rugged, and broken, with the exception of a strip of gently sloping land along the north line. It is drained by Hoh River and small streams flowing directly into the Pacific. The timber consists mainly of hemlock and lovely fir, three-fourths of which is of good quality, the stand being very heavy along the dividing ridges. There are also scattering firs, cedars, and spruces, mostly of good quality.

The soil consists of red shot clay, which becomes gravelly along the streams. The underbrush consists of dense salal, vine maple, salmon berry, devil cane, huckleberry, yew, arrowwood, and ferns.

North of the divide this township can be logged to Hoh River, south of it to Clearwater. The latter, however, is of no value as a logging stream, but its valley affords an excellent route for a railroad, which can be built into the township from the south.

Forest conditions in T. 26 N., R. 11 W.

Timbered area	acres	22,720
Burned area	do	320
Total stand of timber	feet B. M.	937,250,000
Average stand per acre	do	41,200
Depth of humus	inches	5
Litter		Heavy.

Statistics of forest trees in T. 26 N., R. 11 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	9½	198	44	56	3	6	219
Cedar	88½	125	47	24	8	19	233
Hemlock	459	146	25	29	4	7	159
Spruce	24¾	198	52	52	2	4	204
Lovely fir	355½	160	28	35	3	5	132

Township 26 North, Range 12 West.

The eastern part of this township is mountainous and rugged; the western is gently sloping and rolling, with many cedar swamps. The soil is clay and loam along the river and in the swamps, while the upland has a red clay, gravelly soil. The underbrush is dense, except on the uplands, where it becomes sparse. The timber is mainly hemlock, with some cedar, lovely fir, and a little spruce. There is no red fir in the township. Hemlock, spruce, and lovely fir are of good quality, but the cedar is poor.

Most of the timber in this township can be logged to Hoh River, which is a good logging stream at all seasons. The western part of the township can be logged cheaply; the eastern part will be quite expensive to handle on account of the ruggedness of the surface.

Forest conditions in T. 26 N., R. 12 W.

Timbered area	acres	23,040
Total stand of timber	feet B. M.	682,500,000
Average stand per acre	do	29,600
Humus		Light.
Litter		Heavy.

Statistics of forest trees in T. 26 N., R. 12 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	106½	118	43	24	10	32	194
Hemlock	429	133	17	25	5	9	140
Spruce	42¼	195	54	53	3	5	198
Lovely fir	104¾	162	22	39	3	5	157

Township 26 North, Range 13 West.

This township lies along the Pacific Ocean, the coast line traversing in part the western tier of sections. It is mainly in the drainage basin of Hoh River. The surface is steeply rolling on the north, with level bottom land all along Hoh River. The southern part of the township, like the northern part, is rolling. The soil is clay and sandy loam. The underbrush is dense. The timber consists of hemlock and cedar, with some spruce and a little lovely fir. The spruce stands heavily along Hoh River and is very large. The lovely fir is of good quality, while the cedar and hemlock are poor.

With the exception of a few sections on the north of the township the timber can be logged to Hoh River, which is a good driving stream. Logging will be very cheap, excepting in the northern part of the township. As there is no harbor at the mouth of the river it will be necessary to saw the lumber at or near the coast and take it out by railroad.

Forest conditions in T. 26 N., R. 13 W.

Timbered area	acres	21,440
Total stand of timber	feet B. M.	697,000,000
Average stand per acre	do	32,500
Depth of humus	inches	4
Litter		Medium.

Statistics of forest trees in T. 26 N., R. 13 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	197½	100	49	24	9	42	223
Hemlock	372	124	21	23	4	7	153
Spruce	91½	175	50	47	2	4	171
Lovely fir	36	162	31	38	2	4	160

Township 26 North, Range 14 West.

This is a fractional township lying on the Pacific Ocean, comprising only about four sections. Its surface is steeply rolling, with a rocky bluff along the coast. The soil is red clay. The underbrush is dense. The timber consists of hemlock, cedar, and spruce. The last is of good quality, but the other species are of little value.

Forest conditions in T. 26 N., R. 14 W.

Timbered area	acres	2,560
Total stand of timber	feet B. M.	93,000,000
Average stand per acre	do	36,300

Statistics of forest trees in T. 26 N., R. 14 W.

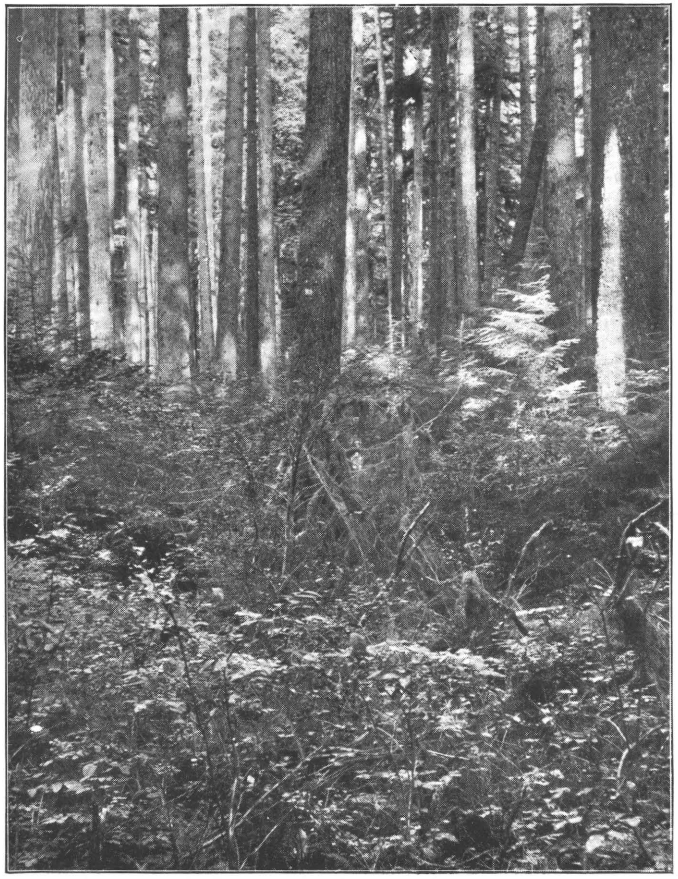
Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	21	110	58	27	9	40	226
Hemlock	60	124	19	21	5	9	150
Spruce	12	180	53	50	2	5	182

Township 27 North, Range 3 West.

This township is composed entirely of mountainous and rugged country. Quilcene River, which traverses it, has a narrow valley. The soil is very stony. The underbrush is dense along the streams, but light along the ridges. The timber consists of hemlock and red fir, with a little lovely fir. It is of good quality, excepting on the high divides, where it becomes small and knotty. Along Quilcene River red fir is very heavy.

Forest conditions in T. 27 N., R. 3 W.

Timbered area	acres	16,000
Rocky and barren area	do	1,280
Burned area	do	2,445
Mountain meadows	do	2,880
Total stand of timber	feet B. M.	511,500,000
Average stand per acre	do	32,000
Depth of humus	inches	2
Litter		Light.



A. HEMLOCK.

B. HEMLOCK AND LOVELY FIR.

Statistics of forest trees in T. 27 N., R. 3 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	167½	174	33	44	16	9	200
Cedar	8	95	26	17	16	24	184
Hemlock	240¾	119	18	19	14	11	124
Lovely fir	95¼	112	18	20	14	25	122

Township 27 North, Range 4 West.

The surface of this township is rugged and mountainous. It is drained mainly toward the northeast by Dungeness River. The southwest corner is drained by Dusewallips River. The soil is chiefly a clay derived from the underlying slates. The underbrush is dense along the rivers and light on the ridges. The timber, which is very light, consists of lovely fir and hemlock of little value.

Forest conditions in T. 27 N., R. 4 W.

Timbered area	acres	11,200
Rocky and barren area	do	5,440
Mountain meadows	do	7,040
Total stand of timber	feet B. M.	33,500,000
Average stand per acre	do	3,000
Litter		Light.

Statistics of forest trees in T. 27 N., R. 4 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	1½	120	20	20	2	8	140
Hemlock	12¾	72	16	12	2	21	124
Lovely fir	19¼	79	17	13	2	25	128

Township 27 North, Range 5 West.

This township is mountainous throughout. It has little soil, and what little there is is very stony. The underbrush is light. It contains little timber, consisting of lovely fir and hemlock of poor quality.

Forest conditions in T. 27 N., R. 5 W.

Timbered area	acres	2,560
Rocky and barren area	do	5,760
Burned area	do	7,040
Mountain meadows	do	7,680
Total stand of timber	feet B. M.	35,750,000
Average stand per acre	do	14,000
Depth of humus	inches	2
Litter		Light.

Statistics of forest trees in T. 27 N., R. 5 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	1½	95	19	18	2	7	135
Hemlock	14¼	72	16	11	3	22	124
Lovely fir	20	80	17	13	4	26	126

Township 27 North, Range 6 West.

With the exception of a narrow strip of bench land along Elwha River, the surface of this township is mountainous. The soil is clay and gravel. The underbrush is dense in the Elwha Valley, but light upon the ridges. The timber consists of red and lovely fir and hemlock. The red fir is of good quality, but the other species are of little value. The timber in this township can be logged most economically to Elwha River, although this is a poor logging stream, and it will be necessary to build a railroad or tramway up its valley.

Forest conditions in T. 27 N., R. 6 W.

Timbered area	acres	18,880
Rocky and barren area	do	1,280
Burned area	do	1,280
Mountain meadows	do	1,600
Total stand of timber	feet B. M.	425,000,000
Average stand per acre	do	22,500
Depth of humus	inches	2
Litter		Medium.

Statistics of forest trees in T. 27 N., R. 6 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	155½	176	29	37	3	5	207
Hemlock	146	91	18	17	5	12	122
Lovely fir	123½	88	17	18	5	12	120

Township 27 North, Range 7 West.

This township is mountainous throughout, with very thin, scanty soil and light underbrush. The timber, which is scanty, consists mainly of lovely fir and hemlock, with a little red fir, all of poor quality.

Forest conditions in T. 27 N., R. 7 W.

Timbered area	acres	14,720
Rocky and barren area	do	5,440
Mountain meadows	do	2,880
Total stand of timber	feet B. M.	49,250,000
Average stand of timber	do	3,300
Depth of humus	inches	2
Litter		Light.

Statistics of forest trees in T. 27 N., R. 7 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	8	98	18	16	2	7	132
Hemlock	17	72	15	11	3	23	125
Lovely fir	24¼	80	17	13	3	25	123

Township 27 North, Range 8 West.

This township is drained mainly by Hoh River, toward the north. Its surface is mountainous and rugged, with the exception of the valley of Hoh River. The mountainous country contains much snow and many glaciers. The soil is clay and in the upper country rocky. Underbrush is dense along the river, but sparser on the upland. The timber is mainly hemlock, lovely fir, and red fir, all of poor quality, being small and scrubby.

The timber in this township can be logged to Hoh River, although this is of no value as a logging stream, being very rapid with many deep canyons. Flumes can, however, be built for its transportation.

Forest conditions in T. 27 N., R. 8 W.

Timbered area	acres	6,080
Rocky area	do	13,440
Mountain meadows	do	3,520
Total stand of timber	feet B. M.	67,000,000
Average stand per acre	do	11,000
Depth of humus	inches	2
Litter		Light.

Statistics of forest trees in T. 47 N., R. 8 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	25	110	25	18	2	5	155
Hemlock	18¾	75	16	12	4	16	127
Lovely fir	23¼	79	17	13	4	20	131

Township 27 North, Range 9 West.

This township consists almost entirely of mountainous, rugged country. The north half drains to Hoh River, which flows across its northern edge in a narrow valley. The south half is drained by tributaries of the South Fork of Hoh River. Nearly three-fourths of the township lies above timber line and is open and grassy.

The timber consists mainly of hemlock and lovely fir, 40 per cent of which is of good quality. The remainder is small and stunted. There is along Hoh River a little good red fir and cedar.

The soil consists of clay and gravel. The underbrush is dense along Hoh River, consisting of huckleberry, salal, salmon berry, vine maple, and alder.

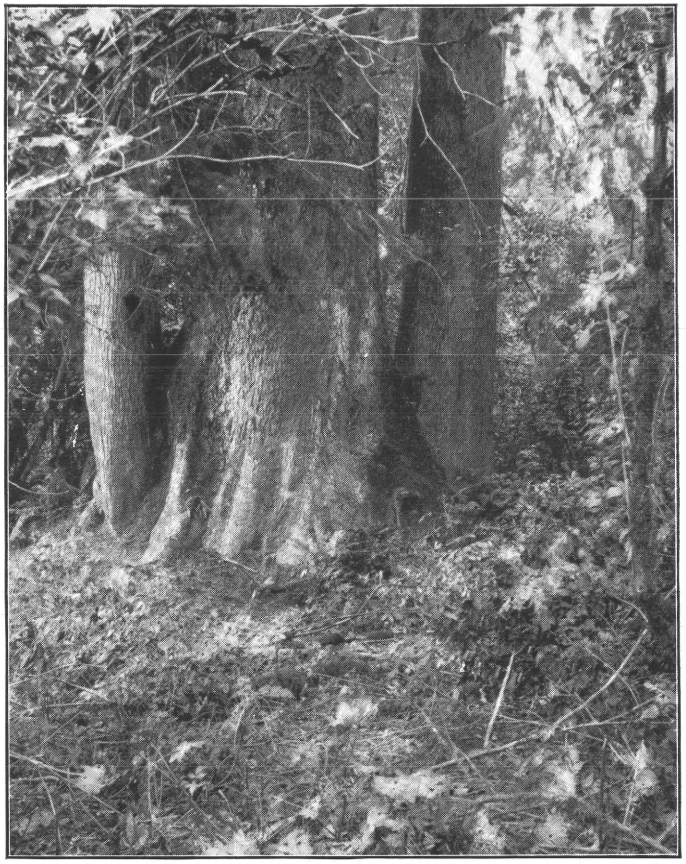
The timber, which lies almost entirely upon the portion sloping to Hoh River, can all be logged to that stream, which is, however, of no value as a logging stream, on account of its low banks and many sand bars; still, along its bank there is an easy grade for a railroad, which can be cheaply built.

Forest conditions in T. 27 N., R. 9 W.

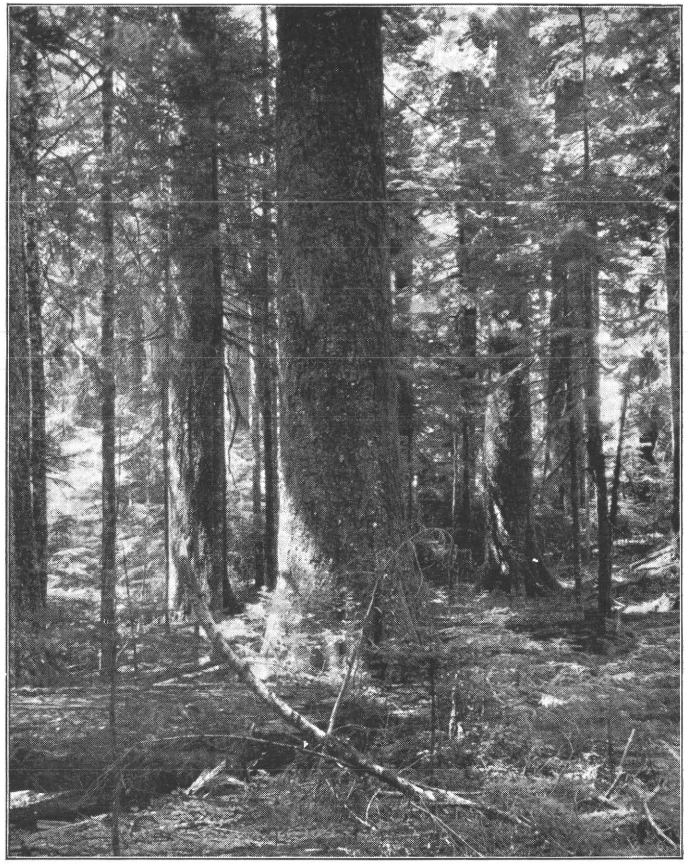
Timbered area	acres	10,560
Rocky and barren area	do	9,364
Mountain meadows	do	7,916
Total stand of timber	feet B. M.	273,000,000
Average stand per acre	do	25,800
Depth of humus	inches	3
Litter		Light.

Statistics of forest trees in T. 27 N., R. 9 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	45	117	35	28	2	9	157
Cedar	16	66	19	16	8	35	130
Hemlock	129	91	22	19	5	22	137
Lovely fir	83	89	21	18	5	19	131



A. SPRUCE AND HEMLOCK GROWING FROM ONE STUMP.



B. LOVELY FIR.

Township 27 North, Range 10 West.

This township is drained mainly by Hoh River. Its surface is steep and mountainous, with the exception of a tract of bench land at the forks of Hoh River. The soil is clay and gravel, and the underbrush is dense. The timber consists mainly of hemlock, red fir, and lovely fir, with a little spruce and a trifling amount of cedar. The fir and spruce are of excellent quality. The hemlock and lovely fir are of little value, being very scrubby, especially on the divides.

The timber in this township, with the exception of a small tract along the north line, can be logged to Hoh River, which here is a poor logging stream with low banks and many sand bars. A railroad can, however, be extended up Hoh River with easy grades and thus serve as an outlet.

Forest conditions in T. 27 N., R. 10 W.

Timbered area	acres	22,685
Mountain meadows	do	355
Total stand of timber	feet B. M.	994,250,000
Average stand per acre	do	43,800
Depth of humus	inches	3
Litter		Medium

Statistics of forest trees in T. 27 N., R. 10 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	295	186	48	51	1	3	242
Cedar	6¾	100	20	16	4	14	200
Hemlock	386	122	19	20	1	3	126
Spruce	60½	202	55	41	1	3	220
Lovely fir	246	108	16	24	1	3	129

Township 27 North, Range 11 West.

This township slopes on the north to the valley of the Bogachiel and on the south to that of Hoh River. Its surface is steeply rolling and broken, with some bottom land along Hoh River. The soil is clay, gravel, and loam. The underbrush is dense. The timber, consisting of hemlock, lovely fir, and red fir, with a little cedar and spruce, is of excellent quality, excepting the cedar, which is small. That on the southern part of the township can be logged to Hoh River, a good driving stream. The northern part should go to the valley of the Bogachiel. This stream is of no value for driving, and the lumber will have to be taken out by rail.

Forest conditions in T. 27 N., R. 11 W.

Timbered area	acres	23,040
Total stand of timber	feet B. M.	843,000,000
Average stand per acre	do	36,200
Depth of humus	inches	3
Litter		Light.

Statistics of forest trees in T. 27 N., R. 11 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	134	187	52	56	2	4	230
Cedar	36½	121	43	23	4	21	231
Hemlock	383	119	16	22	3	5	138
Spruce	64¼	200	65	40	2	4	213
Lovely fir	225¼	108	15	25	2	4	127

Township 27 North, Range 12 West.

The northern part of this township is drained by Bogachiel River and the southern part by Hoh River. The surface is steeply rolling, with bottom land along the rivers. The soil is clay and loam, and the underbrush is dense. The timber, all of good quality, consists chiefly of hemlock, cedar, and lovely fir, with a little spruce and red fir intermixed. The fir and spruce in the immediate valleys of the rivers are exceptionally large and fine.

The timber in the southern part of this township can be logged to Hoh River, which is a good driving stream. That in the northern part can be logged to the valley of the Bogachiel, but will have to be taken out by rail, as the stream is not drivable.

Forest conditions in T. 27 N., R. 12 W.

Timbered area	acres	23,040
Total stand of timber	feet B. M.	738,000,000
Average stand per acre	do	32,000
Depth of humus	inches	3
Litter		Heavy.

Statistics of forest trees in T. 27 N., R. 12 W.

Species	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	32	209	48	57	5	4	227
Cedar	146½	121	49	29	7	31	239
Hemlock	413	138	16	28	4	4	141
Spruce	37½	193	56	51	8	4	218
Lovely fir	109	162	25	36	4	4	140

Township 27 North, Range 13 West.

The surface of this township is rolling and broken, comprising an alternation of steep ridges and deep valleys. The soil is loam and clay. The underbrush is dense. The timber consists of hemlock, cedar, and lovely fir, with a little spruce. The cedar is of poor quality. The other species are excellent.

With the exception of a small area in the northeast corner, which can be logged into Bogachiel River, the timber on this township should be logged westward down the valleys of the creeks toward the coast, but as there is no harbor on this coast it will be necessary to build a railroad from some inland point to carry out the timber or the sawed lumber.

Forest conditions in T. 27 N., R. 13 W.

Timbered area	acres	23,040
Total stand of timber	feet B. M	1,015,500,000
Average stand per acre	do	44,100
Depth of humus	inches	3
Litter		Heavy.

Statistics of forest trees in T. 27 N., R. 13 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	306	109	52	24	7	43	222
Hemlock	493	131	21	24	5	8	150
Spruce	65	175	46	48	3	5	175
Lovely fir	151½	158	33	40	3	15	160

Township 27 North, Range 14 West.

This township lies in the western part of the reserve, on the Pacific coast, and comprises the equivalent of 24½ sections. Its surface is rolling and broken, with a bluff, rocky coast. Its soil is clay and loam. The underbrush is dense. The timber is chiefly hemlock, with some spruce and cedar. The spruce is large and excellent, but the other species are second class. Owing to the rocky character of the coast and the absence of any harbor, it will be necessary to ship this timber by railroad from some point in the interior.

Forest conditions in T. 27 N., R. 14 W.

Timbered area	acres	15,680
Total stand of timber	feet B. M	634,750,000
Average stand per acre	do	40,500
Depth of humus	inches	3
Litter		Heavy.

Statistics of forest trees in T. 27 N., R. 14 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	83	145	53	28	8	22	205
Hemlock	464	134	21	23	5	8	148
Spruce	87¾	191	51	53	2	4	187

Township 27 North, Range 15 West.

This is a fractional township, lying on the north Pacific coast, comprising less than a square mile.

Forest conditions in T. 27 N., R. 15 W.

Timbered area	acres	600
Total stand of timber	feet B. M.	13,750,000
Average stand per acre	do	22,900

Statistics of forest trees in T. 27 N., R. 15 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	¾	100	44	22	8	40	200
Hemlock	12	125	20	22	6	10	140
Spruce	1	175	44	40	4	6	177

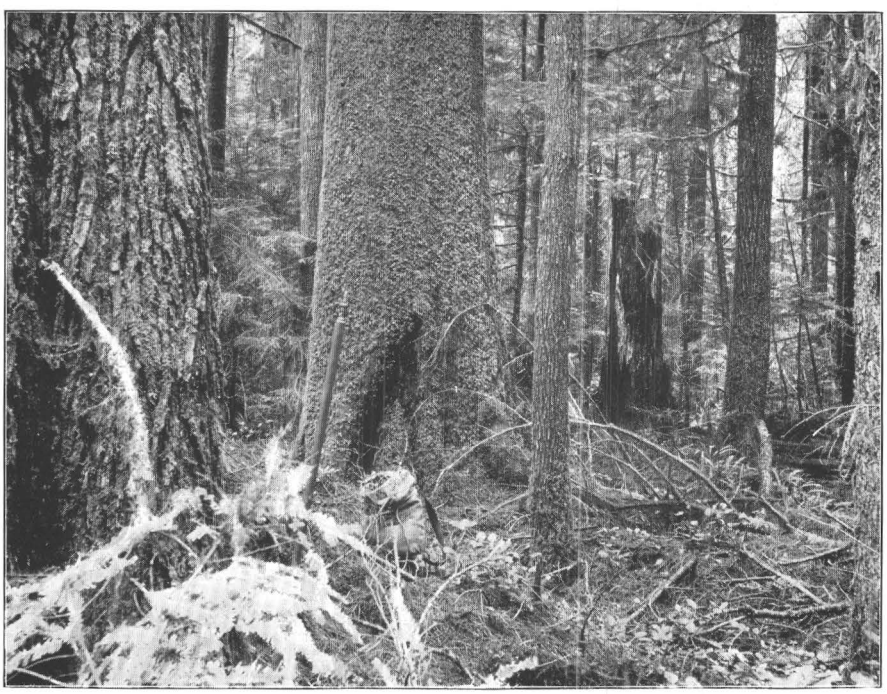
Township 28 North, Range 3 West.

This township is situated on the eastern border of the reserve. It is drained in part by Dungeness River and in part by the Little Quilcene. Its surface is mountainous and rugged. The soil is clayey and sandy, being derived from underlying slates and sandstones. The underbrush is scanty. This township is well timbered with a good quality of fir, hemlock, and lovely fir, with a little cedar. The timber from the eastern part of it can be logged to Quilcene River by means of skid roads; that from the western part to Dungeness River in a similar manner.

Forest conditions in T. 28 N., R. 3 W.

Timbered area	acres	16,420
Rocky and broken area	do	640
Burned area	do	5,970
Mountain meadows	do	640
Total stand of timber	feet B. M.	641,250,000
Average stand per acre	do	39,000
Depth of humus	inches	2
Litter		Light.

A. FOREST ON RANGE ABOVE HEAD OF WEST FORK OF SATSOP RIVER.



B. LOVELY FIR 5 FEET IN DIAMETER.

Statistics of forest trees in T. 28 N., R. 3 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	155	179	30	44	14	8	198
Cedar	32¼	128	25	27	32	22	151
Hemlock	266	143	20	24	28	15	122
Lovely fir	188	137	21	29	34	19	125

Township 28 North, Range 4 West.

This township is situated in the eastern part of the reserve and is drained by Dungeness River. The surface of the township is mountainous and rugged. The soil is clay and sand, being derived from underlying slates and sandstones. The underbrush is scanty. The township is sparsely timbered with hemlock and lovely fir. The timber in the township can be logged to Dungeness River by means of skid roads.

Forest conditions in T. 28 N., R. 4 W.

Timbered area	acres	13,120
Rocky and broken area	do	3,840
Burned area	do	3,200
Mountain meadows	do	2,880
Total stand of timber	feet B. M.	50,500,000
Average stand per acre	do	4,000
Depth of humus	inches	2
Litter		Light.

Statistics of forest trees in T. 28 N., R. 4 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Hemlock	19	60	16	11	7	28	101
Lovely fir	31½	63	16	14	7	26	103

Township 28 North, Range 5 West.

This township, situated in the eastern part of the reserve, is drained by Dungeness River and its branches. Its surface is entirely mountainous and broken. Its soil is derived from sandstones and slates. Underbrush is light. The timber consists of a scrubby growth of hemlock and lovely fir, much of which on the east side of the township has been burned. The timber can be logged to the valleys of the branches of Dungeness River, up which skid roads or tramways may be built.

Forest conditions in T. 28 N., R. 5 W.

Timbered area	acres	17,000
Rocky area	do	1,920
Burned area	do	640
Mountain meadows	do	4,480
Total stand of timber	feet B. M.	83,500,000
Average stand per acre	do	4,900
Depth of humus	inches	2
Litter		Light.

Statistics of forest trees in T. 28 N., R. 5 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Hemlock	30	62	16	11	5	30	111
Lovely fir	53½	69	18	14	4	28	118

Township 28 North, Range 6 West.

This township, situated in the eastern part of the reserve, is mainly composed of high mountains drained by Elwha River and its branch, Lillian Creek. The soil is chiefly clay derived from underlying slates. The underbrush is light, and along Elwha River has been mainly burned away. Over large areas the timber as well as the underbrush has been destroyed by fire. The timber consists of fir, hemlock, and lovely fir, nearly all of poor quality.

This timber can in the main be logged to the valley of Elwha River, but as that river and its branch, Lillian Creek, are of no value for driving purposes, it will be necessary to handle the timber with chutes or flumes; consequently, it will be expensive to log this township.

Forest conditions in T. 28 N., R. 6 W.

Timbered area	acres	13,760
Rocky area	do	960
Burned area	do	3,840
Mountain meadows	do	4,480
Total stand of timber	feet B. M.	143,000,000
Average stand per acre	do	10,900
Depth of humus	inches	2
Litter		Light.

Statistics of forest trees in T. 28 N., R. 6 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	49	128	26	28	5	6	150
Hemlock	52	65	17	14	7	16	103
Lovely fir	42	64	17	15	7	16	105

Township 28 North, Range 7 West.

This township is drained by Elwha River and Cat Creek. Its surface is mountainous throughout. Its soil is clay and gravel. Underbrush is light. The timber, which is very light, consists of hemlock, fir, and lovely fir, all of poor quality, having to a large extent been destroyed by fire.

The timber can be logged to Elwha River, although that is a poor logging stream, with low banks and many canyons and gravel bars. It is probable that flumes would have to be constructed along the river to carry the timber out.

Forest conditions in T. 28 N., R. 7 W.

Timbered area	acres	16,000
Barren area	do	1,280
Burned area	do	3,840
Mountain meadows	do	1,920
Total stand of timber	feet B. M.	177,500,000
Average stand per acre	do	11,100
Humus	inches	2
Litter		Medium.

Statistics of forest trees in T. 28 N., R. 7 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	59½	159	29	22	13	6	185
Hemlock	71	113	17	16	13	8	124
Lovely fir	47	108	18	15	10	9	121

Township 28 North, Range 8 West.

This township is all rugged and mountainous. It is drained on the south by Hoh River, on the north by Cat Creek and the Soleduck, whose headwaters it includes. The soil is mainly coarse and gravelly. Underbrush is dense along the rivers, while on the uplands it is light, the high divides consisting of open grass land. The timber is chiefly fir, with some hemlock and lovely fir, and a few scattering cedars. It is in the main of poor quality.

The timber in the southern part of this township can be logged to Hoh River; on the east it can be sent down Cat Creek to the Elwha, and on the west to the Soleduck, but owing to the mountainous character of the township logging will be extremely expensive.

Forest conditions in T. 28 N., R. 8 W.

Timbered area	acres	15,552
Rocky area	do	2,400
Grazing area	do	4,960
Burned area	do	128
Total stand of timber	feet B. M.	207,750,000
Average stand per acre	do	13,400
Humus	inches	2
Litter		Medium.

Statistics of forest trees in T. 28 N., R. 8 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	112	157	32	38	3	4	198
Cedar	4	51	18	14	7	29	104
Hemlock	53¼	68	16	13	5	38	106
Lovely fir	38½	63	17	14	5	39	102

Township 28 North, Range 9 West.

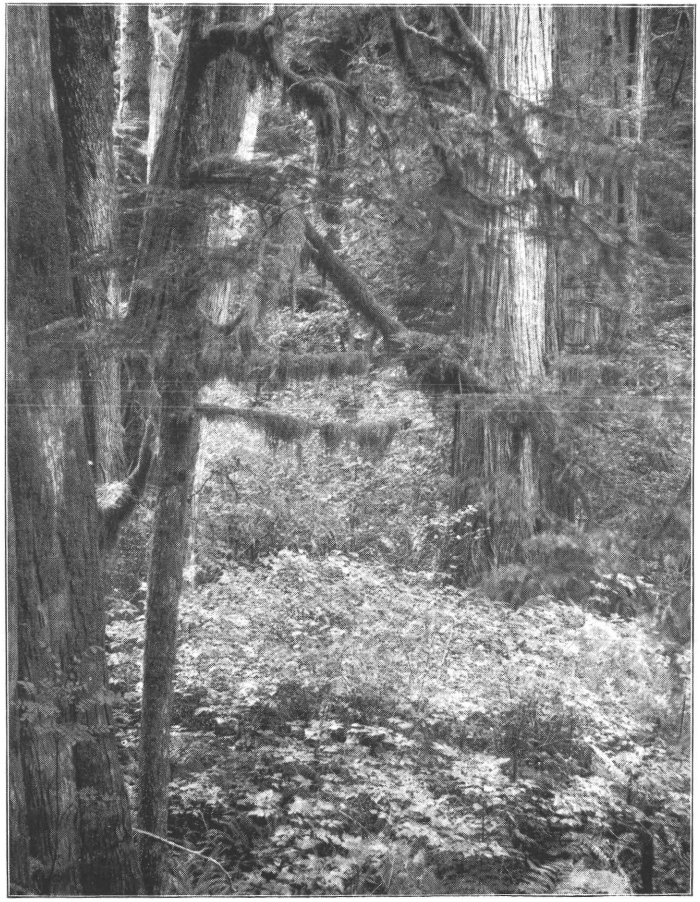
This township is drained by Soleduck, Hoh, and Bogachiel rivers. Most of it lies very high and it is all mountainous and broken. The soil is stony. Underbrush is scanty on the uplands, but dense in the narrow river valleys.

The timber consists mainly of hemlock and lovely fir, with a trifling amount of red fir. The latter is of good quality, but the hemlock and lovely fir are scrubby and of no value.

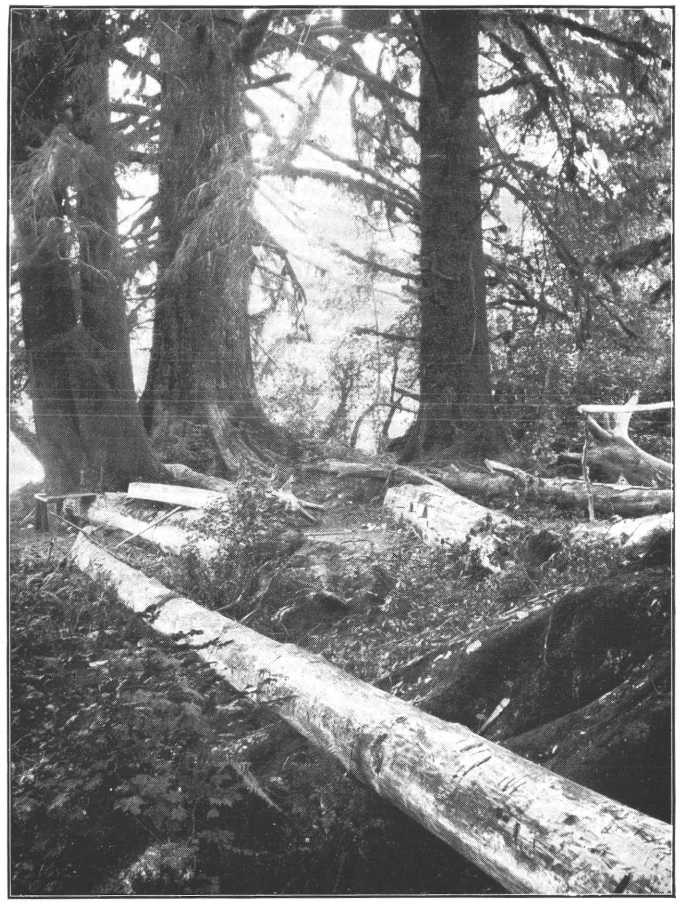
The timber can be logged to the rivers by which the township is drained. They are, however, poor logging streams, and it is not probable that the small amount of timber in the township will ever tempt lumbermen to bring a railroad into it.

Forest conditions in T. 28 N., R. 9 W.

Timbered area	acres	25,778
Rocky area	do	128
Mountain meadows	do	1,742
Burned area	do	192
Total stand of timber	feet B. M.	266,750,000
Average stand per acre	do	10,300
Depth of humus	inches	2
Litter		Light.



A. CEDAR 6 FEET IN DIAMETER.



B. SPRUCE NEAR LAKE QUENIULT.

Statistics of forest trees in T. 28 N., R. 9 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	18	84	24	19	2	9	133
Cedar	1	45	13	8	3	40	100
Hemlock	137¾	66	19	15	4	12	103
Lovely fir	110	68	17	14	5	15	105

Township 28 North, Range 10 West.

This township is drained by Bogachiel River and the South Fork of the Kalawa. It is nearly all a mountainous region, sloping to the west, with narrow valleys along the rivers. The soil is clay and gravel. The underbrush is dense in the valleys but sparse upon the ridges. The timber is mainly hemlock and lovely fir, most of it being of good quality. There is a little red fir also, of fine quality.

This township, with the exception of a small tract in the northwest corner which can be logged to Kalawa River, can be logged to the Bogachiel, although this is a poor logging stream, with low banks and not sufficient water for driving. The valley, however, furnishes an excellent route for a railroad, which will probably be the method employed for clearing the township.

Forest conditions in T. 28 N., R. 10 W.

Timbered area	acres	23,040
Total stand of timber	feet B. M.	539,500,000
Average stand per acre	do	23,400
Depth of humus	inches	3
Litter		Medium.

Statistics of forest trees in T. 28 N., R. 10 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	40½	104	21	20	3	4	133
Hemlock	262	113	19	15	3	5	126
Spruce	7	129	36	26	3	5	144
Lovely fir	230	115	19	14	3	5	127

Township 28 North, Range 11 West.

This township is drained to the westward by the Bogachiel and Kalawa rivers. It consists of mountainous spurs running nearly east and west, with narrow valleys along the streams. The soil is red clay in the upland and loam along the rivers.

The underbrush is dense in the valleys and sparse upon the ridges. The timber consists mainly of hemlock, red and lovely fir, with a little spruce and cedar.

The timber can be logged to the Bogachiel and Kalawa rivers, but as they are poor driving streams it is probable that it will be necessary to construct railroads to get the lumber out. It will be an expensive township to log on account of the steepness and ruggedness of the ridges.

Forest conditions in T. 28 N., R. 11 W.

Timbered area	acres..	23,040
Total stand of timber	feet B. M..	811,500,000
Average stand per acre	do...	35,300
Depth of humus	inches..	3
Litter		Medium.

Statistics of forest trees in T. 28 N., R. 11 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	140	177	37	35	2	3	203
Cedar	10½	100	38	21	5	17	206
Hemlock	428	126	21	22	2	3	132
Spruce	27	175	44	30	2	5	190
Lovely fir	206	144	28	34	2	3	150

Township 28 North, Range 12 West.

This township is drained by the Kalawa and Bogachiel rivers, and consists almost entirely of rugged mountain ridges. The soil is mainly clay. The underbrush, as everywhere else, is dense in the valleys and sparse upon the ridges. The timber is chiefly hemlock and lovely fir, with some red fir, spruce, and cedar scattered through it. The stand is extremely heavy and the timber of all kinds is of good quality.

The timber may be logged to the rivers, but as they are poor driving streams it is probable that it will be found necessary to build railroads up their valleys for the purpose of getting the lumber out.

Forest conditions in T. 28 N., R. 12 W.

Timbered area	acres..	23,040
Total stand of timber	feet B. M..	1,050,500,000
Average stand per acre	do...	45,600
Depth of humus	inches..	3
Litter		Medium.

Statistics of forest trees in T. 28 N., R. 12 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	98	199	40	49	3	5	229
Cedar	27	128	45	26	6	15	209
Hemlock	555	141	24	34	2	4	151
Spruce	43½	215	56	56	2	4	213
Lovely fir	327	147	28	41	2	4	151

Township 28 North, Range 13 West.

Tnis township, lying toward the western part of the reserve, is made up in considerable part of low bottom land along Kalawa and Bogachiel rivers, rising to the south in somewhat broken ridges. The soil is clay and sandy loam, and gravel on the ridges. The underbrush is dense. The township has a heavy stand of timber, consisting in the main of hemlock, red fir, spruce, and lovely fir, with a little cedar. It is nearly all of good quality.

The timber can be logged to Kalawa and Bogachiel rivers, which are good driving streams, and the area can be logged quite cheaply.

Forest conditions in T. 28 N., R 13 W.

Timbered area	acres	21,580
Forks Prairie	do	1,460
Total stand of timber	feet B. M.	951,500,000
Average stand per acre	do	44,100
Depth of humus	inches	3
Litter		Light.

Statistics of forest trees in T. 28, N., R. 13 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	131	219	44	46	5	7	223
Cedar	31½	129	40	24	8	25	179
Hemlock	512	125	21	27	5	7	115
Spruce	152	184	47	51	3	5	153
Lovely fir	125	148	30	43	3	4	157

Township 28 North, Range 14 West.

This township lies in the valley of Soleduck and Dickey rivers and consists in the main of gently rolling bench and bottom lands. The soil is commonly clay and loam, with clay and gravel in the uplands. The underbrush is dense everywhere. The

timber consists mainly of hemlock and spruce, with a little fir and scattering cedar, all of good quality. The spruce timber is found along the rivers and is large and valuable.

The timber can be logged to the rivers which traverse it, which are good logging streams at all seasons of the year, and timber can be gotton out very cheaply. This township contains considerable areas of prairie land lying between Soleduck and Dickey rivers. The largest of these areas is that known as Quillayute Prairie.

Forest conditions in T. 28 N., R. 14 W.

Timbered area	acres	21,370
Prairie area	do	1,670
Total stand of timber	feet B. M.	722,000,000
Average stand per acre	do	33,800
Depth of humus	inches	3
Litter		Light.

Statistics of forest trees in T. 28 N., R. 14 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Fir	50	192	45	47	5	6	205
Cedar	14½	131	28	21	7	23	174
Hemlock	350½	124	19	22	5	8	141
Spruce	307	183	55	58	3	5	188

Township 28 North, Range 15 West.

This fractional township lies upon the Pacific coast, at the mouth of Quillayute River. Its surface is in the main gently rolling, consisting of bottom and bench lands of the river. The soil is of clay and sandy loam. The underbrush is extremely dense. The timber consists mainly of hemlock, with some spruce and cedar. The spruce is good quality, but the cedar and hemlock are second rate.

The timber, with the exception of a small tract in the southeast corner of the township, can be logged to Quillayute River, which is a good logging stream; but as there is no harbor at its mouth it will be necessary to mill the timber within the township.

Forest conditions in T. 28 N., R. 15 W.

Timbered area	acres	13,765
Prairie area	do	235
Total stand of timber	feet B. M.	318,500,000
Average stand per acre	do	23,100
Depth of humus	inches	3
Litter		Heavy.

CEDAR.

Statistics of forest trees in T. 28 N., R. 15 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	14	111	44	22	8	24	200
Hemlock	251	126	21	24	7	9	135
Spruce	53½	159	41	33	4	7	183

TOWNSHIP 29 NORTH, RANGE 3 WEST.

This township, in the eastern part of the reserve, is composed of rolling bench land, which becomes steep on the west, sloping down to the valley of Dungeness River. The soil is mainly clay. The underbrush is dense. On the south and west of this township the timber has all been killed by fire and is standing in good condition. If cut immediately it will make excellent lumber, but is in constant danger of destruction by fire.

The timber consists chiefly of fir of excellent quality. With it there is some cedar and hemlock, but it is small and poor.

The timber, with the exception of a small part in the west sloping to Dungeness River, can be logged to Squim Bay, in the northeast corner of the township, and can be taken out very cheaply.

Forest conditions in T. 29 N., R. 3 W.

Timbered area	acres	15,150
Burned area	do	6,890
Total stand of timber	feet B. M.	739,250,000
Average stand per acre	do	48,700
Depth of humus	inches	3
Litter		Heavy.

Statistics of forest trees in T. 29 N., R. 3 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Fir	506	183	39	49	33	14	214
Cedar	24¾	123	31	26	50	22	209
Hemlock	208½	135	23	26	38	19	137

TOWNSHIP 29 NORTH, RANGE 4 WEST.

This township, situated in the northeastern part of the reserve, has been greatly burned over. It is drained by Dungeness River and McDonald Creek. It consists of high, rolling country sloping toward the north. The soil is clay and gravel on

the north, changing to a stony soil in the south. Underbrush is very dense. The timber on this township is mainly fir and cedar, with a little hemlock. The fir timber is small except in the eastern part of the township, where it is large and of good quality. Most of this township has been burned over, and the timber left standing is scattered in small bodies.

The timber in the eastern part of this township can be logged to Dungeness River, although this is a poor logging stream, with low banks and many gravel bars. A railroad could be built up its valley at slight expense, however. The timber in the western part can be logged by way of McDonald Creek, using skid roads.

The valley of Dungeness River has been to a large extent cleared and is thickly settled.

Forest conditions in T. 29 N., R. 4 W.

Timbered area	acres	9,280
Burned area	do	13,440
Grazing area	do	320
Total stand of timber	feet B. M.	217,750,000
Average stand per acre	do	23,400
Humus	inches	2
Litter		Light.

Statistics of forest trees in T. 29 N., R. 4 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Fir	132¾	161	35	38	27	9	193
Cedar	72¾	106	22	22	70	23	161
Hemlock	12¼	98	16	27	31	10	133

TOWNSHIP 29 NORTH, RANGE 5 WEST.

The southern part of this township is very steep and mountainous, descending northward into a rolling country. The soil in the northern and lower part is gravelly clay, while in the mountainous southern portion it is coarse gravel. The underbrush is dense on the north, becoming sparser southward. The timber consists mainly of fir and hemlock, with a little cedar and lovely fir. The fir is of good quality. The other timber is of little value.

The timber of this township can be logged northward by means of skid roads or tramways.

Forest conditions in T. 29 N., R. 5 W.

Timbered area	acres	15,360
Burned area	do	7,040
Rocky area	do	640
Grazing area	do	640

Total stand of timber	feet B. M..	360,250,000
Average stand per acre	do...	23,500
Depth of humus	inches..	2
Litter		Medium.

Statistics of forest trees in T. 29 N., R. 5 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	169	170	30	41	16	9	198
Cedar	20¼	125	23	23	30	23	188
Hemlock	119	109	15	19	20	11	144
Lovely fir	52	96	20	18	9	9	139

TOWNSHIP 29 NORTH, RANGE 6 WEST.

This township lies in the northeastern part of the reserve, and is made up entirely of mountainous and rugged country of little value except for grazing purposes. The soil is thin and stony. The underbrush is light, excepting in the immediate gorges of three or four creeks. The timber consists chiefly of fir and hemlock, with a little lovely fir and scattering cedars. The fir is of good quality, but the hemlock and lovely fir are poor.

The timber of this township can mainly be logged to Morse Creek on the east side.

Forest conditions in T. 29 N., R. 6 W.

Timbered area	acres..	13,749
Barren rocky area	do...	896
Burned area	do...	3,435
Mountain meadows	do...	4,960
Total stand of timber	feet B. M..	265,000,000
Average stand per acre	do...	19,000
Depth of humus	inches..	2
Litter		Medium.

Statistics of forest trees in T. 29 N., R. 6 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	107	174	31	48	9	8	204
Cedar	5½	.....	.....	.....	12	.....	200
Hemlock	93	88	17	16	10	8	130
Lovely fir	59½	83	19	18	7	8	133

Township 29 North, Range 7 West.

This township is steep and mountainous, with the exception of a narrow strip along Elwha River. The soil is clay and gravel and it is very stony. The underbrush is dense along the river, but on the uplands it is light. The timber is chiefly fir and hemlock and is of second quality.

Most of the timber can be logged to Elwha River. This is a poor logging stream, but along its valley a railroad could be built for the purpose of transporting logs.

Forest conditions in T. 29 N., R. 7 W.

Timbered area	acres	20,900
Rocky area	do	64
Burned area	do	980
Mountain meadows	do	1,100
Total stand of timber	feet B. M.	196,500,000
Average stand per acre	do	9,400
Depth of humus	inch	1
Litter		Light.

Statistics of forest trees in T. 29 N., R. 7 W.

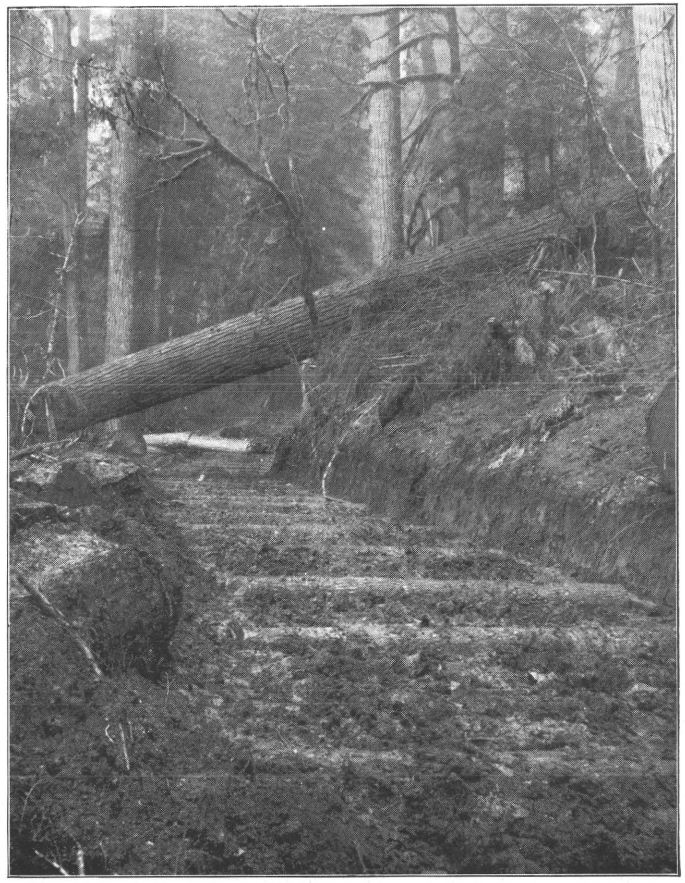
Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	109	140	30	29	8	9	181
Cedar	9	84	31	19	15	23	177
Hemlock	69½	78	18	17	7	9	134
Lovely fir	9	91	19	18	7	8	139

Township 29 North, Range 8 West.

This township, drained by Boulder and Barnes creeks, is entirely mountainous and broken. Parts of its area are rocky and without vegetation; other parts, lying above the limit of timber, are composed of high grass lands, while the timber is found on the slopes of the ridges and in the valleys of creeks. The underbrush is heavy in the valleys and becomes sparser on the ridges. The timber consists of lovely fir, hemlock, and a little red fir, all of poor quality.

The timber can be logged on the north to Lake Crescent by way of Barnes Creek, and on the south down Boulder Creek into Elwha River. It will be very expensive getting the timber out of this township, as, owing to the steepness of the ridges, it will have to be run down by chute to the streams.

A. CEDAR.



B. SKID ROAD.

Forest conditions in T. 29 N., R. 8 W.

Timbered area	acres	20,480
Rocky area	do	640
Mountain meadows	do	1,920
Total stand of timber	feet B. M.	288,500,000
Average stand per acre	do	14,100
Depth of humus	inches	2
Litter		Light.

Statistics of forest trees in T. 29 N., R. 8 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	18½	105	21	21	2	6	142
Hemlock	117½	76	18	14	3	9	122
Lovely fir	152½	84	19	17	3	8	128

TOWNSHIP 29 NORTH, RANGE 9 WEST.

This township is in the main drained by Soleduck River and its north fork. Its area is mountainous, steep, and very rugged. The soil is clay and gravel. The underbrush in the river valleys is dense, but on the uplands is light. The timber is chiefly made up of fir, with considerable hemlock and a trifling amount of other species. The fir is of good quality, except on the high divides, where it becomes small. The hemlock and fir are of poor quality.

The timber can be logged to Soleduck River, with the exception of that in a few sections in the north, which can be logged direct to Lake Crescent. The Soleduck, however, is not a drivable stream, and it will be necessary to construct a railroad up its valley. Outside of the timber in the immediate valley of the Soleduck, this township will be expensive to log, owing to the steepness of the slopes and the ruggedness of the country.

Forest conditions in T. 29 N., R. 9 W.

Timbered area	acres	27,200
Mountain meadows	do	640
Total stand of timber	feet B. M.	555,000,000
Average stand per acre	do	20,400
Depth of humus	inches	2
Litter		Light.

Statistics of forest trees in T. 29 N., R. 9 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	306½	125	23	27	3	6	160
Cedar	1½	85	20	12	8	15	140
Hemlock	165	83	16	17	5	7	125
Spruce	3	175	40	49	2	4	180
Lovely fir	79	88	18	17	4	6	125

Township 29 North, Range 10 West.

This township is drained almost entirely by Soleduck River. Its surface is nearly all steep, broken, and rugged, rising to a great elevation in the south part. Soil is clay and gravel. Underbrush is dense. The timber is chiefly fir and hemlock, with a trifling amount of lovely fir. It is all of good quality, and stands very heavy in the northern part of the township.

The timber can be logged to Soleduck River, with the exception of a few sections in the southwest corner, which can best be logged to the Kalawa. It will be expensive to transport the lumber down to the river, owing to the steepness and ruggedness of the country, but it can be done by building skid roads up the main branches of the river and chutes down the hillsides.

Forest conditions in T. 29 N., R. 10 W.

Timbered area	acres	23,040
Total stand of timber	feet B. M.	862,000,000
Average stand per acre	do	37,400
Depth of humus	inches	2
Litter		Light.

Statistics of forest trees in T. 29 N., R. 10 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	345	180	27	32	3	6	198
Cedar	4	100	25	22	8	15	156
Hemlock	418	130	18	25	4	6	134
Spruce	2	180	48	43	2	4	180
Lovely fir	93	138	19	29	3	7	130

Township 29 North, Range 11 West.

This township is drained mainly by the North Fork of Kalawa River. Its surface is nearly all steep and rolling and broken in the south. The soil is clay and gravel. The underbrush is heavy. It is heavily timbered with hemlock and red fir, some lovely fir, and a trifling amount of spruce and cedar. The timber is good, excepting on the high divides, where the elevation has prevented its development.

This timber can be logged to the North Fork of Kalawa River, with the exception of an area on the south line, which can be logged to the South Fork of Kalawa River.

Forest conditions in T. 29 N., R. 11 W.

Timbered area	acres	22,440
Burned area	do	600
Total stand of timber	feet B. M.	889,250,000
Average stand per acre	do	39,600
Depth of humus	inches	3
Litter		Medium.

Satistics of forest trees in T. 29 N., R. 11 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	255½	215	42	48	7	5	235
Cedar	8	101	29	24	8	19	161
Hemlock	456	133	26	51	11	8	151
Spruce	9¾	207	53	57	15	5	200
Lovely fir	160	141	31	37	4	6	158

Township 29 North, Range 12 West.

This township is drained in the main by the North Fork of Kalawa River. Its surface is very steep and broken, with the exception of the north tier of sections, which consist of gently rolling land. Soil is clay and gravel along the creeks and rivers, while on the uplands it is stony. Underbrush is dense. The timber consists mainly of hemlock and red fir, with some lovely fir and spruce and a little cedar, all of good quality.

This timber, with the exception of that in the northern portion, can be logged into the North Fork of Kalawa River, although this is a poor logging stream, with low banks and insufficient water for driving. A better plan for logging the township would be to construct a railroad in the valley of this stream. The timber would, however, in any case be expensive to handle, requiring chutes to transport it to the railroad or the river.

Forest conditions in T. 29 N., R. 12 W.

Timbered area	acres	22,240
Burned area	do	800
Total stand of timber	feet B. M.	1,152,500,000
Average stand per acre	do	51,800
Depth of humus	inches	3
Litter		Medium.

Statistics of forest trees in T. 29 N., R. 12 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	387	219	45	59	5	8	221
Cedar	22½	134	43	25	9	18	204
Hemlock	519	137	22	29	7	10	143
Spruce	99	211	66	69	7	5	214
Lovely fir	125	140	26	35	3	5	149

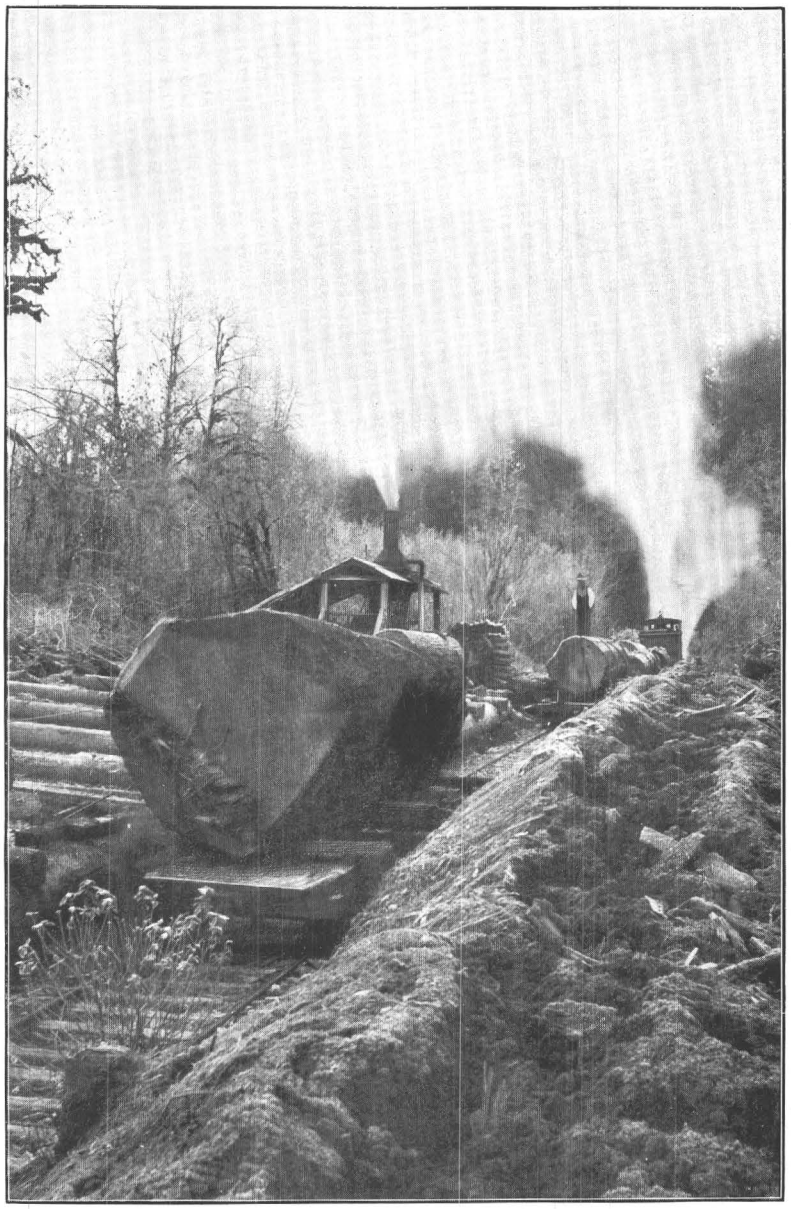
Township 29 North, Range 13 West.

This township is drained mainly by Soleduck River, which flows through the middle. A small part in the southeast is drained by the Kalawa and in the northwest by Dickey River. The valley of the Soleduck contains much timbered bottom land and two small prairies, Shuwah and Maxfield, and considerable areas of the township have been burned. The country between the rivers is steep, rolling, and broken in the eastern part of the township, while in the western part it is gently sloping. The soil is clay and loam on the bottom lands, while the uplands are gravelly. Underbrush is everywhere dense. The timber is chiefly fir, spruce, and hemlock, all of good quality. The fir stands very heavily along Soleduck and Kalawa rivers. The hemlock is found mostly in the eastern part of the township, on the high ridges. Cedar is very scattering in this township and is of poor quality.

The timber can be logged into Soleduck River, with the exception of a small tract in the northwest corner, from which the timber should be taken to the East Fork of Dickey River, and another small portion in the southeast, which should go to the Kalawa River. The last is a good logging stream during winter season.

Forest conditions in T. 29 N., R. 13 W.

Timbered area	acres	21,960
Burned area	do	800
Prairie area	do	280
Total stand of timber	feet B. M.	1,086,000,000
Average stand per acre	do	49,500
Depth of humus	inches	3
Litter		Medium.



LOADING LOGS ON RAILWAY.

Statistics of forest trees in T. 29 N., R. 13 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	384	206	46	57	6	9	220
Cedar	4	122	46	30	9	34	211
Hemlock	454	120	19	22	5	9	147
Spruce	196½	195	57	61	3	5	193
Lovely fir	47½	151	28	32	3	5	158

TOWNSHIP 29 NORTH, RANGE 14 WEST.

This township is drained by the East and West forks of Dickey River. Along the east streams and other branches is some timbered bottom land, while between them the country is steep and rugged. The soil is clay and loam along the rivers and in the swamps, while the uplands have gravel and clay soils. Underbrush is everywhere dense.

The timber is mainly hemlock, spruce, and cedar, more than half being hemlock. This and the spruce are of good quality. The cedar is large but overripe, most of it having dead tops. There is a small amount of fir in the township, mainly in the east tier of sections.

The timber can all be logged to Dickey River, which is a good logging stream below the forks in winter. It can also be logged cheaply with tramways and railroads built up the valleys of the river and its branches.

Forest conditions in T. 29 N., R. 14 W.

Timbered area	acres	23,000
Total stand of timber	feet B. M.	788,000,000
Average stand per acre	do	34,300
Humus	inches	4
Litter		Heavy.

Statistics of forest trees in T. 29 N., R. 14 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Fir	19	211	48	53	5	8	215
Cedar	78½	142	47	23	9	23	195
Hemlock	471½	127	20	22	5	9	150
Spruce	219	189	57	65	2	5	190

Township 29 North, Range 15 West.

This township borders on the Pacific coast, the coast line running through the west tier of sections. It also contains the south end of Ozette Lake. The surface is rolling and the banks of some of the creeks are steep. It contains numerous swamps covered with a thick growth of cedar. The soil is a deep, red clay loam.

The timber consists of hemlock, cedar, and spruce of second-class quality. The cedar is in the main very large, but has hollow trunks, and most of the trees are dead at the top. Hemlock is mostly small. Spruce is rough and knotty and stands mostly along the coast, although in some cases along the banks of the creeks. The timber in the eastern part of this township can be logged to Dickey River, that in the northern to Ozette Lake, and that in the western to the Pacific.

Forest conditions in T. 29 N., R. 15 W.

Timbered area	acres	19,200
Total stand of timber	feet B. M.	744,750,000
Average stand per acre	do	38,800
Depth of humus	inches	3
Litter		Heavy.

Statistics of forest trees in T. 29 N., R. 15 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	228¾	107	46	22	9	28	210
Hemlock	367	123	19	20	5	9	152
Spruce	149	180	51	50	3	5	149

Township 30 North, Range 9 West.

This township, lying in the northern part of the reserve, includes nearly all of Lake Crescent. The surface of the township is rugged and mountainous, the only exception being along the north line and the valley of Lyre River. The soil is clay in the lowlands and gravel upon the mountains. Underbrush is very dense. This township is heavily timbered, mainly with fir and hemlock, with a little cedar and spruce.

The timber can all be logged to Lake Crescent and Lyre River, with the exception of a small tract in the western part, which is tributary to the East Twin River. At present the Seattle Logging Company has a logging railroad built from Port Crescent, on the Strait of Juan de Fuca, to a point near the north line of this township, its intention having been to continue this road along Lyre River to the outlet of the lake, when all the timber tributary to the lake can be logged into Lake Crescent and hence towed in rafts to the end of the railroad.

Forest conditions in T. 30 N., R. 9 W.

Timbered area	acres	22,336
Lake area	do	4,352
Burned area	do	1,115
Total stand of timber	feet B. M.	876,250,000
Average stand per acre	do	40,000
Depth of humus	inches	3
Litter		Light.

Statistics of forest trees in T. 30 N., R. 9 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	549¾	170	36	45	5	7	194
Cedar	48½	115	31	24	9	25	162
Hemlock	203½	122	16	23	6	9	138
Spruce	16½	174	45	54	2	5	192
Lovely fir	58	163	34	47	2	6	166

Township 30 North, Range 10 West.

This township is in the northern tier of the reserve. Its surface is steep and mountainous, with the exception of a strip of bench land in the southern part along Soleduck River. The soil consists of gravel and clay, while the high divides are very stony. Underbrush is dense.

Timber consists mostly of fir and hemlock. The fir is all of good quality, and in the western part of the township is all large. Most of the hemlock is small in size and of second class. Along the south line of this township is a small amount of western white pine of good quality. More than half of this township, including the entire northwestern portion, has been burned over, destroying nearly all the timber.

The timber in this township can in the main be logged to Soleduck River, which is a good logging stream during the winter season, while the northern part of it can be logged by means of a railroad to be built from Lake Crescent.

Forest conditions in T. 30 N., R. 10 W.

Timbered area	acres	8,685
Burned area	do	14,355
Total stand of timber	feet B. M.	397,500
Average stand per acre	do	45,800
Depth of humus	inches	2
Litter		Heavy.

Statistics of forest trees in T. 30 N., R. 10 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Fir	228	213	46	52	19	5	236
Cedar	9	104	34	22	6	7	200
Hemlock	160½	128	23	30	26	6	145

Township 30 North, Range 11 West.

This township lies in the northern part of the reserve. Its surface is broken and very rugged, excepting in the southern part, along Soleduck River, which is gently rolling. Its soil is clay or gravel along the river, while the upland is very rugged. Underbrush is dense everywhere.

The timber consists chiefly of fir of good quality. The cedar and hemlock are scattering and of poor quality, having been to a large extent destroyed by fire. The spruce is good and is found only in small amounts along Soleduck River and Bear Creek.

The timber in this township can all be logged into Soleduck River, with the exception of a small tract in the northern part of the township which can be logged into Pysht River. The timber in that part of the township which can be logged into the Soleduck can be gotten out very cheaply; that along Bear Creek, however, just to the north, will be somewhat expensive, as it will be necessary to build a railroad or tramway to the timber.

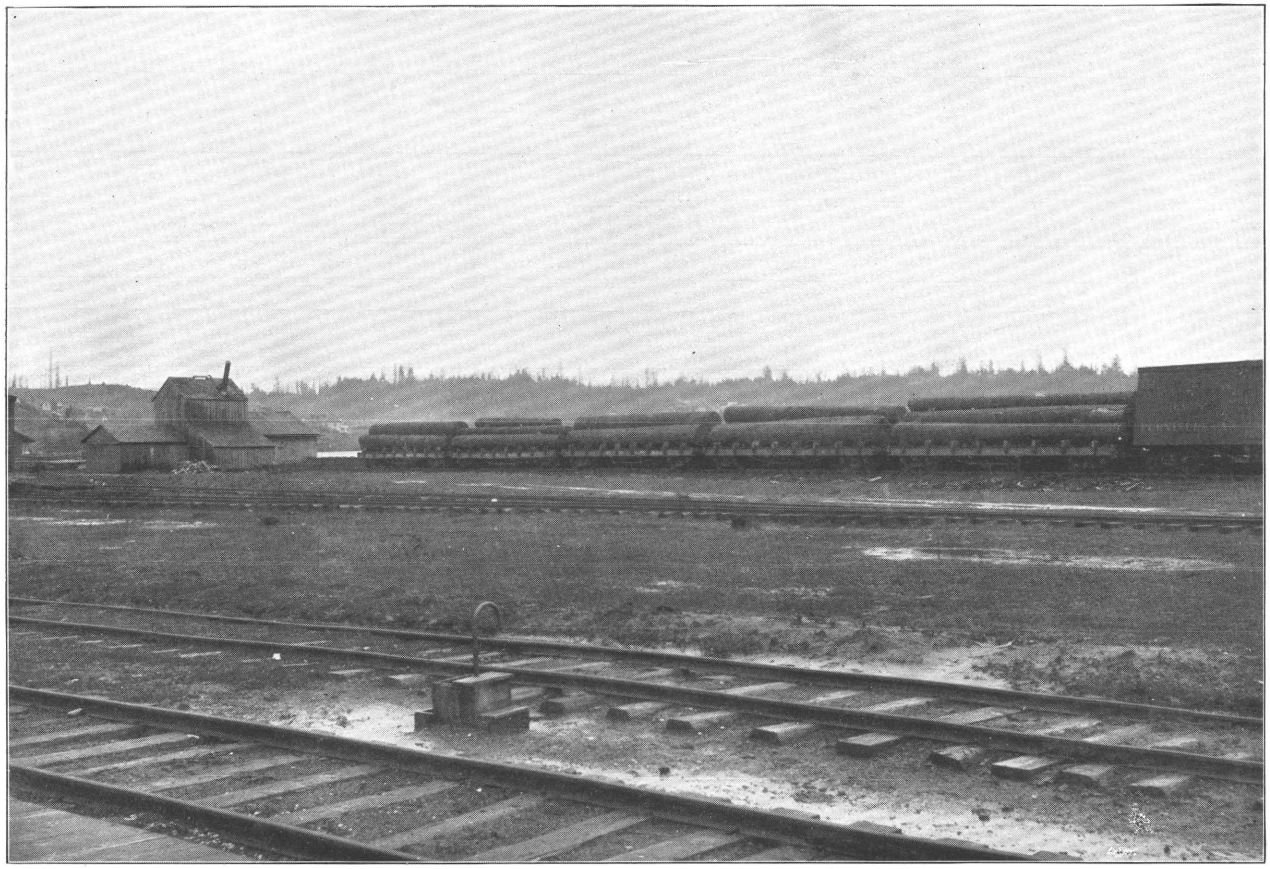
Two-thirds of the area of this township, including practically all of the high land outside of the immediate valley of the Soleduck, has been burned, being part of one of the great burns of this region.

Forest conditions in T. 30 N., R. 11 W.

Timbered area	acres	7,935
Burned area	do	15,105
Total stand of timber	feet B. M.	375,250,000
Average stand per acre	do	47,400
Depth of humus	inches	
Litter		Heavy.

Statistics of forest trees in T. 30 N., R. 11 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Year.*
Red fir	216	218	41	73	10	8	217
Cedar	19¼	127	41	28	11	19	199
Hemlock	104	128	21	25	15	11	145
Spruce	22	198	59	59	12	6	201
Lovely fir	14	137	19	30	8	7	147



TRAIN OF LOGS ON NORTHERN PACIFIC RAILWAY.

Township 30 North, Range 12 West.

The northern part of this township, which is one of the northern tier of townships of the reserve, is steep, broken, and rocky, descending southward to the valley of Soleduck River, which is mostly level bench land. The underbrush is dense and varied in character. The timber consists mainly of red fir, hemlock, and spruce, with but little cedar or lovely fir. The fir and spruce are of good quality, but have to a large extent been destroyed by fire. The hemlock is small and poor. The cedar is very scattering, and found mostly along the streams.

The timber in this township can all be logged to Soleduck River, which is a good logging stream during the winter season. The work of moving the timber from the northern part of the township will, however, be somewhat expensive, owing to the rugged character of the country.

Forest conditions in T. 30 N., R. 12 W.

Timbered area	acres	17,165
Burned area	do	5,750
Prairie area	do	125
Total stand of timber	feet B. M.	746,000,000
Average stand per acre	do	43,400
Depth of humus	inches	3
Litter		Medium.

Statistics of forest trees in T. 30 N., R. 12 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	413	238	51	70	29	10	231
Cedar	15½	129	45	28	22	20	180
Hemlock	191½	126	20	31	24	9	139
Spruce	84	218	54	72	36	7	211
Lovely fir	42	164	26	47	7	6	165

Township 30 North, Range 13 West.

This township comprises the headwaters of the East Fork of Dickey River and Hoko River, also a small part of the drainage basin of the Soleduck, including Lake Pleasant. In the eastern part of the township is a heavy ridge, rising to an altitude of 2,540 feet, which is very steep and broken. In the northwestern part the township is also composed of high hills, rising to an altitude of 1,700 feet. The divide separating the East Fork of Dickey River from the Hoko is low, the valleys of the two streams being practically one. About Lake Pleasant in the southeast corner is much level land, including two patches of prairie.

The soil is clay and loam along the rivers, with red clay on the ridges. The prairie land, however, about Lake Pleasant is very gravelly and stony. The underbrush is dense.

The timber consists of fir, cedar, hemlock, and spruce. The fir is abundant in the eastern part of the township and is all of good quality. The cedar, though large, is poor. Hemlock is all good except along the streams, where it is small and poor. The spruce, all of first-class quality and very large, is found near the rivers and about Lake Pleasant.

The timber on the north of the divide, between Hoko and Dickey rivers, can be logged down the valley of Hoko River by means of a railroad, since the river is not large enough to float logs. The southern part of the township can be similarly logged by means of a railroad up the valley of the Dickey. In the southeast corner about Lake Pleasant the timber can be logged directly into the Soleduck, which is a drivable stream.

Forest conditions in T. 30 N., R. 13 W.

Timbered area	acres	21,760
Burned area	do	3,150
Prairie area	do	410
Total stand of timber	feet B. M.	894,750,000
Average stand per acre	do	41,100
Depth of humus	inches	3
Litter		Medium.

Statistics of forest trees in T. 30 N., R. 13 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	74½	243	54	77	14	9	223
Cedar	42¾	144	51	30	20	19	202
Hemlock	394½	105	21	29	17	9	142
Spruce	236½	226	62	81	24	6	209
Lovely fir	146½	143	24	36	5	5	150

Township 30 North, Range 14 West.

This township lies in the northwestern part of the reserve and contains Dickey Lake near the center, in secs. 9 and 16.

The surface is steeply rolling on the east, rising to a height of 1,500 feet. The western and much the greater part of the township is gentle rolling land, with much level bottom land heavily timbered near the foot of Dickey Lake. The soil is clay and loam in the bottom lands, while the uplands are composed of red clay. Underbrush is very dense.

The timber is chiefly cedar, hemlock, and spruce, more than half the timber on the township being composed of hemlock. This stands heavily in the eastern part of the township and is of good quality, while that on the west is small and poor. The cedar is very large, but poor, being of value only for shingle bolts. The spruce, which is found mainly near Dickey Lake and along the streams, is of good quality. The general outlet for this timber is to the south, down the West Fork of Dickey River. This, however, is not large enough for driving logs, but shingle bolts and small timber can be driven during the winter season. A better outlet, however, would be by way of a railroad crossing the divide above Dickey Lake and going down Hoko River to the Strait of Juan de Fuca.

Forest conditions in T. 30 N., R. 14 W.

Timbered area	acres	16,000
Burned area	do	160
Timbered bottom lands	do	830
Total stand of timber	feet B. M.	883,500,000
Average stand per acre	do	55,200
Depth of humus	inches	3
Litter		Light.

Statistics of forest trees in T. 30 N., R. 14 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	6	228	54	55	3	6	240
Cedar	200	129	51	24	9	30	216
Hemlock	485	125	21	23	6	9	152
Spruce	132½	182	51	52	3	5	190
Lovely fir	60	157	34	40	2	4	165

Township 30 North, Range 15 West.

This township, in the northwestern part of the reserve, contains most of Ozette Lake, which comprises approximately the equivalent of eleven sections in the middle of the township. Aside from this lake the area of the township is entirely forested.

The surface is in the main gently rolling, sloping toward the lake on both sides. The soil is clay and loam on the bottom land and on the upland it is red clay. The underbrush is dense.

The timber consists of hemlock, cedar, and spruce; mainly of the first two species. On the east side of the lake the hemlock is of good quality; that on the west is poor and small. The cedar is of poor quality in all parts of the township, though large east of the lake. The trunks are commonly short and hollow at the base, but can be used for shingles. Spruce is of good quality and very large. It is found mainly on the bottom lands bordering the lake.

The timber can be logged to Ozette Lake, which can be reached by a railroad up Hoko River from the Strait of Juan de Fuca, or it could be milled at the lake and carried out as lumber.

Forest conditions in T. 30 N., R. 15 W.

Timbered area	acres	14,080
Timbered bottom lands	do	1,695
Total stand of timber	feet B. M.	591,250,000
Average stand per acre	do	42,000
Depth of humus	inches	3
Litter		Medium.

Statistics of forest trees in T. 30 N., R. 15 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	223	109	41	23	9	37	199
Hemlock	278	114	19	21	4	7	145
Spruce	90¼	173	47	46	3	5	177

Township 30 North, Range 16 West.

This is a fractional township, consisting of parts of the eastern tier of sections along the Pacific coast. The total area of the township does not exceed two sections. Its surface is gently rolling, dropping to the coast by a rocky bluff ranging in height from 60 to 160 feet. The underbrush is dense.

The timber consists of cedar, hemlock, and spruce, and is all of poor quality. It can be logged to the eastward into Ozette Lake.

Forest conditions in T. 30 N., R. 16 W.

Timbered area	acres	1,280
Total stand of timber	feet B. M.	31,000,000
Average stand per acre	do	24,200
Depth of humus	inches	2
Litter		Light.

Statistics of forest trees in T. 30 N., R. 16 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	13¾	92	40	22	8	39	200
Hemlock	9½	103	20	19	5	8	143
Spruce	7¾	163	40	37	2	5	163

Township 31 North, Range 14 West.

This township is in the northwestern part of the reserve. The northern part of it rises to an altitude of 2,000 feet above sea level, from which the land descends southward to the broad valley of Big River, a tributary of Ozette Lake, and eastward to Hoko River. Most of the area is rolling land, with low ridges. The soil is clay and loam on the bottom lands, while the uplands are also clay, but quite stony in places, especially in the northern part of the township. The underbrush is very dense.

The timber consists of hemlock, cedar, and spruce, with considerable silver fir and a little red fir. The total stand is very heavy, this being one of the most heavily timbered townships of the State. The hemlock is mainly of good quality and with a heavy stand, especially in the northern part of the township. The spruce also is very large and of good quality, being found mainly on the bottom lands in the south half of the township. The cedar timber is large, but of poor quality. It can, however, be used for shingles.

With the exception of a small tract in the northwest corner, the timber in this township can all be logged into Hoko River, which is a good logging stream, with good banks and sufficient water during the winter season for driving. Another outlet is by railroad from the Strait of Juan de Fuca up Hoko River and across a low divide to the valley of Big River. The southern part of the township can be logged very cheaply, but the northern part, being hilly, will be more expensive. It is probable that in this part of the township chutes will have to be employed for the transportation of timber.

Forest conditions in T. 31 N., R. 14 W.

Timbered area	acres	23,040
Timbered bottom land	do	3,945
Total stand of timber	feet B. M.	1,171,750,000
Average stand per acre	do	50,860
Depth of humus	inches	3
Litter		Medium.

Statistics of forest trees in T. 31 N., R. 14 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	31	219	56	71	4	7	230
Cedar	291¾	116	54	30	10	33	219
Hemlock	539	127	26	31	4	9	148
Spruce	181	188	53	63	2	5	198
Lovely fir	129	147	35	40	2	.....	159

Township 31 North, Range 15 West.

This full township lies in the northwestern part of the reserve, near the coast. The land rises at the summit to an altitude of over 1,000 feet, from which it descends on all sides and is drained by several small streams to the Pacific Ocean and to Ozette Lake to the south. In the southern part is considerable bottom and swamp land.

The underbrush is very dense, being made up of a great variety of plants.

The entire area, with the exception of a few acres burned, is timbered with a heavy stand, consisting mainly of cedar and hemlock, with some spruce and a little lovely fir. The cedar is very large, but of poor quality, and makes a heavy stand in the southern part of the township. The hemlock, which is mainly in the northern part of the township, is of good quality. The spruce timber is very large and excellent. It has a heavy stand on the bottom lands in the southern part of the township.

The timber in the northern part of this township will have to be logged to Ozette River; that in the southern part of it to Ozette Lake, or by railroad from Hoko River through a low divide. It can be logged very easily and cheaply.

Forest conditions in T. 31 N., R. 15 W.

Timbered area	acres	23,040
Burned area	do	60
Timbered bottom land	do	2,800
Total stand of timber	feet B. M.	982,000,000
Average stand per acre	do	42,600
Depth of humus	inches	4
Litter		Heavy.

Statistics of forest trees in T. 31 N., R. 15 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	370½	111	48	30	10	35	219
Hemlock	429	122	23	26	5	8	144
Spruce	128	184	49	54	3	5	195
Lovely fir	54½	149	33	38	2	5	159

Township 31 North, Range 16 West.

This is a fractional township upon the Pacific coast, consisting of secs. 24, 25, and 36 and fractional secs. 1, 12, 13, 23, 26, and 35, together with Flattery Rocks, in sec. 21, and Ozette Island, in secs. 28 and 33. The township includes Ozette Indian Reservation, which comprises parts of secs. 23, 24, 25, and 26.

The surface is mainly a gentle slope toward the sea, dropping off on the coast

line by a steep, rocky bluff ranging in height from 100 to 200 feet. The underbrush is very dense.

The timber consists of cedar, hemlock, and spruce, all of poor quality. It can all be logged to Ozette River, which flows through the township and is a good logging stream. There is, however, no harbor at its mouth; consequently it will be necessary to manufacture the timber on the spot or ship it out by railroad.

Forest conditions in T. 31 N., R. 16 W.

Timbered area	acres	3,520
Burned area	do	55
Total stand of timber	feet B. M.	96,750,000
Average stand per acre	do	27,500
Depth of humus	inches	3
Litter		Medium.

Statistics of forest trees in T. 31 N., R. 16 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	53½	101	34	19	10	40	208
Hemlock	26½	98	18	20	6	10	141
Spruce	16¾	160	39	38	2	4	178

Township 32 North, Range 14 West.

This township, in the northwestern part of the reserve, has a broken, hilly surface drained to the eastward by Sekiu River. In the northern part of the township the land rises to an altitude of 1,000 feet, and in the southern part to a height of 1,800 feet. The soil is red clay and sandy, and stony on the divides and on the banks of the creeks. The underbrush is very dense.

The timber can all be logged to the Sekiu River, with the exception of that in a small tract in the southwest corner of the township, which can be logged down the Suez. Sekiu River is a poor logging stream, not having sufficient water for driving large logs, although shingle bolts can be driven during the winter season. The valley along the river affords a good route for a railroad, which can be built very cheaply into this township.

This is the most heavily timbered township in the reserve, and one of the most heavily timbered in the State of Washington. The timber consists chiefly of hemlock and lovely fir, of large size and excellent quality. The cedar timber, though large, is poor. Spruce is very scattering, being found only on the creeks and along the Sekiu River. Fir timber is limited to a small area, most of it being in the northeast corner of the township.

Forest conditions in T. 32 N., R. 14 W.

Timbered area	acres	23,040
Total stand of timber	feet B. M.	1,360,000,000
Average stand per acre	do	59,000
Depth of humus	inches	3
Litter		Medium.

Statistics of forest trees in T. 32 N., R. 14 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	37¾	205	45	50	4	7	218
Cedar	286½	119	50	30	9	28	220
Hemlock	669	134	28	33	4	7	152
Spruce	34¾	187	41	53	2	4	195
Lovely fir	332	155	33	42	3	5	163

Township 32 North, Range 15 West.

This is a fractional township, consisting of secs. 19 to 36, inclusive, and the south half of secs. 13 to 18, the remainder of the township being included in the Makah Indian Reservation. Secs. 18 and 19 are fractional, as they extend to the Pacific Ocean.

The surface is very steep and broken in the northeast and southeast corners. The balance of the area is rolling, with level bottom land along the Suez River. The soil is a clayey loam on the bottom lands, with red clay and sand on the uplands. The underbrush is very dense.

The timber on this township can all be logged to the Suez River. This has good banks and sufficient water in the winter season for driving logs, but as there is no harbor south of Cape Flattery on this coast it will be necessary to build a road of some kind from Neah Bay to the mouth of Suez River.

The hemlock and cedar timber in the east and south parts of this township are of good quality, but on the west they are very small and poor. The spruce timber is large and of good quality. It is found along the rivers and in the bottom lands.

Forest conditions in T. 32 N., R. 15 W.

Timbered area	acres	12,800
Timbered bottom lands	do	1,195
Total stand of timber	feet B. M.	579,000,000
Average stand per acre	do	45,000
Depth of humus	inches	4
Litter		Light.

Statistics of forest trees in T. 32 N., R. 15 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	221	107	42	24	10	30	210
Hemlock	241½	117	21	26	4	8	141
Spruce	78½	175	45	50	2	5	191
Lovely fir	38	150	32	41	2	4	161

Township 32 North, Range 16 West.

This is a small fraction of a township, comprising parts of secs. 25 and 26 only, with a total area of less than one square mile, immediately on the Pacific coast. The surface is steep and rolling, with a sharp bluff on the coast line. The underbrush is very dense. The timber consists mainly of cedar, very large and of poor quality. It can be gotten out easily to the coast.

Forest conditions in T. 32 N., R. 16 W.

Timbered area	acres..	640
Total stand of timber	feet B. M..	16,500,000
Average stand per acre	do...	25,800

Statistics of forest trees in T. 32 N., R. 16 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Cedar	10	105	48	24	10	40	210
Hemlock	5	100	17	22	9	12	130
Spruce	1½	160	40	44	2	6	180

Township 33 North, Range 14 West.

This is a fractional township, bordering on the Strait of Juan de Fuca. It comprises secs. 19 and 28 to 35, together with fractional secs. 17, 18, 20, 21, 22, 26, 27, and 36, with a total area of approximately 14 square miles. The surface is steep and broken with many canyons, the land rising to a height of 1,060 feet. The soil is clay or sand. The underbrush is very dense everywhere.

The timber on this township can all be logged to the strait very cheaply by means of roads built up the creeks, but as there are no good harbors along this part of the coast it will be necessary to make small booms of the logs and tow them to some safe harbor up the coast.

The timber is chiefly hemlock and lovely fir of good quality. The cedar though large is of inferior quality. The spruce timber, found merely along the strait, is excellent. The fir timber is found mainly in the southern part and is of excellent quality.

Forest conditions in T. 33 N., R. 14 W.

Timbered area	acres	8,960
Total stand of timber	feet B. M.	395,750,000
Average stand per acre	do	44,200
Depth of humus	inches	3
Litter		Medium.

Statistics of forest trees in T. 33 N., R. 14 W.

Species.	Stand.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Million ft. B. M.	*Feet.*	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	7½	213	47	49	4	6	225
Cedar	20¾	115	48	30	9	28	218
Hemlock	236	138	29	33	4	8	155
Spruce	32	196	53	55	3	5	212
Lovely fir	99½	154	34	41	3	6	167

SUMMARIES.

The following table summarizes the classification of lands by townships:

Classification of lands in Olympic Forest Reserve.

Township.	Range.	Timbered area.	Burned area.	Cut area.	Timberless area.	Barren area.
		Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*
21 north	5 west	16,920	4,480	1,640	.....	.....
21 north	6 west	15,600	.....	7,440	.....	.....
21 north	7 west	23,000	50	.....	.....	.....
21 north	8 west	23,040	.....	.....	.....	.....
21 north	9 west	21,809	200	1,031	.....	.....
21 north	10 west	22,560	480	.....	.....	.....
21 north	11 west	7,095	.....	.....	.....	.....
22 north	5 west	22,080	960	.....	.....	.....
22 north	6 west	23,040	.....	.....	.....	.....
22 north	7 west	22,425	615	.....	.....	.....
22 north	8 west	22,940	100	.....	.....	.....
22 north	9 west	22,870	170	.....	.....	.....
22 north	10 west	10,260	1,240	.....	.....	.....
23 north	5 west	19,105	2,560	.....	735	640
23 north	6 west	20,736	192	.....	448	1,664

Classification of lands in Olympic Forest Reserve—Continued.

Township.	Range.	Timbered area.	Burned area.	Cut area.	Timberless area.	Barren area.
		Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*
23 north	7 west	19,900			1,860	1,280
23 north	8 west	23,040				
23 north	9 west	22,955	85			
23 north	10 west	10,200	380			
23 north	11 west	3,650				
24 north	4 west	21,917	213			550
24 north	5 west	17,600	640			1,600
24 north	6 west	17,920			4,480	640
24 north	7 west	19,965	35		2,560	480
24 north	8 west	20,907	320		1,493	320
24 north	9 west	15,200	640		7,200	
24 north	10 west	22,900	140			
24 north	11 west	20,780	2,260			
24 north	12 west	19,736	124			
24 north	13 west	8,280				
25 north	3 west	19,182		178	3,680	
25 north	4 west	16,622	178		4,480	1,760
25 north	5 west	12,480			4,800	5,760
25 north	6 west	16,547			4,680	1,830
25 north	7 west	16,440			4,680	1,920
25 north	8 west	17,601			4,586	853
25 north	9 west	24,876			2,964	
25 north	10 west	23,040				
25 north	11 west	23,040				
25 north	12 west	23,040				
25 north	13 west	15,120				
26 north	3 west	17,780	1,680		1,920	1,660
26 north	4 west	16,960			3,520	2,560
26 north	5 west	9,950			7,040	6,050
26 north	6 west	14,686			4,408	3,946
26 north	7 west	14,080			4,480	4,480
26 north	8 west	3,760			16,720	2,560
26 north	9 west	19,520			7,536	728
26 north	10 west	23,040				
26 north	11 west	22,720	320			
26 north	12 west	23,040				
26 north	13 west	21,440				
26 north	14 west	2,560				
27 north	3 west	16,000	2,445		2,880	1,280
27 north	4 west	11,200			7,040	5,440
27 north	5 west	2,560			7,680	5,760

Classification of lands in Olympic Forest Reserve—Continued.

Township.	Range.	Timbered area.	Burned area.	Cut area.	Timberless area.	Barren area.
		Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*
27 north	6 west	18,880	1,280	.....	1,600	1,280
27 north	7 west	14,720	.....	.....	2,800	5,440
27 north	8 west	6,080	.....	.....	3,520	13,440
27 north	9 west	10,560	.....	.....	7,916	9,364
27 north	10 west	22,685	.....	.....	355	.....
27 north	11 west	23,040	.....	.....	.....	.....
27 north	12 west	23,040	.....	.....	.....	.....
27 north	13 west	23,040	.....	.....	.....	.....
27 north	14 west	15,680	.....	.....	.....	.....
27 north	15 west	600	.....	.....	.....	.....
28 north	3 west	16,420	5,970	.....	640	640
28 north	4 west	13,120	3,200	.....	2,880	3,840
28 north	5 west	17,000	640	.....	4,480	1,920
28 north	6 west	13,760	3,840	.....	4,480	960
28 north	7 west	16,000	3,840	.....	1,920	1,280
28 north	8 west	15,552	128	.....	4,960	2,400
28 north	9 west	25,778	192	.....	1,742	128
28 north	10 west	23,040	.....	.....	.....	.....
28 north	11 west	23,040	.....	.....	.....	.....
28 north	12 west	23,040	.....	.....	.....	.....
28 north	13 west	21,580	.....	.....	1,460	.....
28 north	14 west	21,370	.....	.....	1,670	.....
28 north	15 west	13,765	.....	.....	235	.....
29 north	3 west	15,150	6,890	.....	.....	.....
29 north	4 west	9,280	13,440	.....	320	.....
29 north	5 west	15,360	7,040	.....	640	640
29 north	6 west	13,749	3,435	.....	4,960	896
29 north	7 west	20,900	980	.....	1,100	64
29 north	8 west	20,480	.....	.....	1,920	640
29 north	9 west	27,200	.....	.....	640	.....
29 north	10 west	23,040	.....	.....	.....	.....
29 north	11 west	22,440	600	.....	.....	.....
29 north	12 west	22,240	800	.....	.....	.....
29 north	13 west	21,960	800	.....	280	.....
29 north	14 west	23,000	.....	.....	.....	.....
29 north	15 west	19,200	.....	.....	.....	.....
30 north	9 west	22,336	1,115	.....	.....	.....
30 north	10 west	8,685	14,355	.....	.....	.....
30 north	11 west	7,935	15,105	.....	.....	.....
30 north	12 west	17,165	5,750	.....	125	.....
30 north	13 west	21,760	3,150	.....	410	.....

Classification of lands in Olympic Forest Reserve—Continued.

Township.	Range.	Timbered area.	Burned area.	Cut area.	Timberless area.	Barren area.
		Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*
30 north	14 west	16,000	160			
30 north	15 west	14,080				
30 north	16 west	1,280				
31 north	14 west	23,040				
31 north	15 west	23,040	60			
31 north	16 west	3,520	55			
32 north	14 west	23,040				
32 north	15 west	12,800				
32 north	16 west	640				
33 north	14 west	8,960				
Total		1,845,984	113,332	10,289	162,923	96,693

The following table summarizes the stand of timber, by total stand and by species, in each township:

Stand and classification of timber in Olympic Forest Reserve.

Township.	Range.	Total stand.	Average stand.	Red fir.	Cedar.	Hemlock.	Spruce.	Lovely fir
		M feet B. M.	*Feet B. M.*	*Million ft. B. M.*	*Million ft. B. M.*	*Million ft. B. M.*	*Million ft. B. M.*	*Million ft. B. M.*
21 north	5 west	814,250	48,100	742	11	61¼		
21 north	6 west	749,500	48,000	531	39	179½		
21 north	7 west	1,211,750	52,600	747	121¾	324	3	16
21 north	8 west	1,165,500	50,600	792½	68	253		52
21 north	9 west	1,159,250	53,100	741½	36½	313	49¾	18½
21 north	10 west	1,058,500	47,000	446	226	336	50½	
21 north	11 west	253,250	35,700	19½	145½	77	11¼	
22 north	5 west	768,750	34,800	672½	23¾	70½		2
22 north	6 west	631,250	27,400	355½	32¾	224		19
22 north	7 west	1,022,500	45,600	430	101	364		127½
22 north	8 west	1,077,500	46,900	133	65½	528		351
22 north	9 west	926,500	40,300	17½	152	475	22	260
22 north	10 west	429,000	42,000	58½	119	215¾	35¾	
23 north	5 west	542,250	28,400	287¾	71¾	116½		66¼
23 north	6 west	383,500	18,500	161	42¼	96¼		84
23 north	7 west	369,750	19,000	53	36¾	167½		112½
23 north	8 west	481,500	20,900		38	233½		210
23 north	9 west	590,500	25,600	119¼	52	334¾	18½	66
23 north	10 west	457,000	45,000	40	16¼	240¾	28	132
23 north	11 west	179,250	49,000		14¼	97		68

Stand and classification of timber in Olympic Forest Reserve—Continued.

Township.	Range.	Total stand.	Acreage stand.	Red fir.	Cedar.	Hemlock.	Spruce.	Lovely fir.
		M feet B. M.	*Feet B. M.*	*Million ft. B. M.*	*Million ft. B. M.*	*Million ft. B. M.*	*Million ft. B. M.*	*Million ft. B. M.*
24 north	4 west	566,750	25,800	306¼	62½	167	.....	31
24 north	5 west	485,500	27,600	137¼	76½	140¾	1¾	129¼
24 north	6 west	359,250	20,000	59¼	55¾	113½	6¼	124½
24 north	7 west	358,500	18,000	27	29¾	184¾	.....	117
24 north	8 west	748,250	36,000	187½	75¼	321	42	122½
24 north	9 west	539,750	34,200	13	28¼	246½	8	244
24 north	10 west	910,750	40,000	6¼	62½	459	12	371
24 north	11 west	788,250	37,500	7½	160¾	355	37	228
24 north	12 west	505,500	25,000	2	166	221	56	60½
24 north	13 west	240,000	29,000	.....	84	135	14	7
25 north	3 west	604,000	31,000	458¼	34¾	102½	.....	8½
25 north	4 west	340,000	20,400	171	6½	91	.....	71½
25 north	5 west	206,000	16,500	30¾	16¼	72	½	86½
25 north	6 west	196,750	12,000	11¼	9½	92	.....	84
25 north	7 west	399,750	24,300	8½	31¼	206	.....	154
25 north	8 west	444,000	25,200	½	32½	220	.....	191
25 north	9 west	881,500	35,400	112	75	402	82½	210
25 north	10 west	1,001,250	43,500	31½	65½	466	64¼	374
25 north	11 west	860,750	37,400	.....	61½	482	24¼	293
25 north	12 west	676,750	29,400	¼	38½	438	73	127
25 north	13 west	533,500	35,300	.....	218	287	27	1½
26 north	3 west	606,000	34,100	332	11	225	.....	38
26 north	4 west	516,000	30,400	119	13½	186	.....	197½
26 north	5 west	101,750	12,300	15½	3¼	38	.....	45
26 north	6 west	296,000	20,100	64	5	101	.....	126
26 north	7 west	177,250	12,600	19½	.....	61¾	.....	96
26 north	8 west	111,250	28,200	.....	7¼	55½	.....	48½
26 north	9 west	671,250	34,400	8½	46¾	305	.....	311
26 north	10 west	1,051,000	45,400	15½	43	476	8½	508
26 north	11 west	937,250	41,200	9½	88½	459	24¾	355½
26 north	12 west	682,500	29,600	.....	106½	429	42¼	104¾
26 north	13 west	697,000	32,500	.....	197½	372	91½	36
26 north	14 west	93,000	36,300	.....	21	60	12	.....
27 north	3 west	511,500	32,000	167½	8	240¾	.....	95¼
27 north	4 west	33,500	3,000	1½	.....	12¾	.....	19¼
27 north	5 west	35,750	14,000	1½	.....	14¼	.....	20
27 north	6 west	425,000	22,500	155½	.....	146	.....	123½
27 north	7 west	49,250	3,300	8	.....	17	.....	24¼
27 north	8 west	67,000	11,000	25	.....	18¾	.....	23¼
27 north	9 west	273,000	25,800	45	16	129	.....	83

Stand and classification of timber in Olympic Forest Reserve—Continued.

Township.	Range.	Total stand.	Average stand.	Red fir.	Cedar.	Hemlock.	Spruce.	Lovely fir.
		M feet B. M.	*Feet B. M.*	*Million ft. B. M.*	*Million ft. B. M.*	*Million ft. B. M.*	*Million ft. B. M.*	*Million ft. B. M.*
27 north	10 west	994,250	43,800	295	6¾	386	60½	246
27 north	11 west	843,000	36,200	134	36½	383	64¼	225¼
27 north	12 west	738,000	32,000	32	146½	413	37½	109
27 north	13 west	1,015,500	44,100	.....	306	493	65	151½
27 north	14 west	634,750	40,500	.....	83	464	87¾	.....
27 north	15 west	13,750	22,900	.....	¾	12	1	.....
28 north	3 west	641,250	39,000	155	32¼	266	.....	188
28 north	4 west	50,500	4,000	.....	.....	19	.....	31½
28 north	5 west	83,500	4,900	.....	.....	30	.....	53½
28 north	6 west	143,000	10,900	49	.....	52	.....	42
28 north	7 west	177,500	11,100	59½	.....	71	.....	47
28 north	8 west	207,750	13,400	112	4	53¼	.....	38½
28 north	9 west	266,750	10,300	18	1	137¾	.....	110
28 north	10 west	539,500	23,400	40½	.....	262	7	230
28 north	11 west	811,500	35,300	140	10½	428	27	206
28 north	12 west	1,050,500	45,600	98	27	555	43½	327
28 north	13 west	951,500	44,100	131	31½	512	152	125
28 north	14 west	722,000	33,800	50	14½	350½	307	.....
28 north	15 west	318,500	23,100	.....	14	251	53½	.....
29 north	3 west	739,250	48,700	506	24¾	208½	.....	.....
29 north	4 west	217,750	23,400	132¾	72¾	12¼	.....	.....
29 north	5 west	360,250	23,500	169	20¼	119	.....	52
29 north	6 west	265,000	19,000	107	5½	93	.....	59½
29 north	7 west	196,500	9,400	109	9	69½	.....	9
29 north	8 west	288,500	14,100	18½	.....	117½	.....	152½
29 north	9 west	555,000	20,400	306½	1½	165	3	79
29 north	10 west	862,000	37,400	345	4	418	2	93
29 north	11 west	889,250	39,600	255½	8	456	9¾	160
29 north	12 west	1,152,500	51,800	387	22½	519	99	125
29 north	13 west	1,086,000	49,500	384	4	454	196½	47½
29 north	14 west	788,000	34,300	19	78½	471½	219	.....
29 north	15 west	744,750	38,800	.....	228¾	367	149	.....
30 north	9 west	876,250	40,000	549¾	48½	203½	16½	58
30 north	10 west	397,500	45,800	228	9	160½	.....	.....
30 north	11 west	375,250	47,400	216	19¼	104	22	14
30 north	12 west	746,000	43,400	413	15½	191½	84	42
30 north	13 west	894,750	41,100	74½	42¾	394½	236½	146½
30 north	14 west	883,500	55,200	6	200	485	132½	60
30 north	15 west	591,250	42,000	.....	223	278	90¼	.....
30 north	16 west	31,000	24,200	.....	13¾	9½	7¾	.....

Stand and classification of timber in Olympic Forest Reserve—Continued.

Township.	Range.	Total stand.	Average stand.	Red fir.	Cedar.	Hemlock.	Spruce.	Lovely fir.
		M feet B. M.	*Feet. B. M.*	*Million ft. B. M.*	*Million ft. B. M.*	*Million ft. B. M.*	*Million ft. B. M.*	*Million ft. B. M.*
31 north	14 west	1,171,750	50,860	31	291¾	539	181	129
31 north	15 west	982,000	42,600	.....	370½	429	128	54½
31 north	16 west	96,750	27,500	.....	53½	26½	16¾	.....
32 north	14 west	1,360,000	59,000	37¾	286½	669	34¾	332
32 north	15 west	579,000	45,000	.....	221	241½	78½	38
32 north	16 west	16,500	25,800	.....	10	5	1½	.....
33 north	14 west	395,750	44,200	7½	20¾	236	32	99½
Total	.....	60,998,250	33,000	14,521¾	6,390¼	25,837¼	3,492½	10,756½

The following table summarizes for the entire area examined the characteristics and condition of the several species of timber trees.

Average statistics of forest trees in Olympic Forest Reserve.

Species.	Height.	Diameter.	Clear.	Dead.	Diseased.	Age.
	Feet.	*Inches.*	*Feet.*	*Per cent.*	*Per cent.*	*Years.*
Red fir	176	37	41	6	8	200
Cedar	106	34	21	10	24	185
Hemlock	117	20	21	7	12	139
Spruce	187	48	49	4	5	190
Lovely fir	122	23	26	5	13	143

It is to be noted that the Sitka spruce is the largest tree upon the peninsula, both in height and diameter, and that its proportion of dead and deceased is the smallest. Next to this species comes the red fir, while the cedar is a comparatively small tree and has a high percentage of dead and diseased individuals.

Percentages of species in Olympic Forest Reserve, by townships.

Township.	Range.	Red fir.	Cedar.	Hemlock.	Spruce.	Lovely fir.
21 north	5 west	91	1	8	.....	.....
21 north	6 west	71	5	24	.....	.....
21 north	7 west	62	10	27	.....	1
21 north	8 west	68	6	22	.....	4
21 north	9 west	65	3	27	4	1
21 north	10 west	42	21	32	5	.....
21 north	11 west	8	58	30	4	.....
22 north	5 west	88	3	9	.....	.....

Percentages of species in Olympic Forest Reserve, by townships—Continued.

Township.	Range.	Red fir.	Cedar.	Hemlock.	Spruce.	Lovely fir.
22 north	6 west	56	5	36	.....	3
22 north	7 west	42	9	36	.....	13
22 north	8 west	12	6	49	.....	33
22 north	9 west	2	17	51	2	28
22 north	10 west	13	27	52	8	.....
23 north	5 west	53	13	21	.....	13
23 north	6 west	42	11	25	.....	22
23 north	7 west	14	10	45	.....	31
23 north	8 west	.....	8	48	.....	44
23 north	9 west	20	9	57	3	11
23 north	10 west	9	3	53	6	29
23 north	11 west	.....	8	54	.....	38
24 north	4 west	54	11	30	.....	5
24 north	5 west	28	16	29	.....	27
24 north	6 west	16	15	32	2	35
24 north	7 west	7	8	52	.....	33
24 north	8 west	25	10	43	6	16
24 north	9 west	2	5	46	2	45
24 north	10 west	.....	7	50	2	41
24 north	11 west	1	20	45	5	29
24 north	12 west	.....	33	44	11	12
24 north	13 west	.....	35	56	6	3
25 north	3 west	76	6	17	.....	1
25 north	4 west	50	2	27	.....	21
25 north	5 west	15	8	35	.....	42
25 north	6 west	6	5	46	.....	43
25 north	7 west	2	8	52	.....	38
25 north	8 west	.....	8	49	.....	43
25 north	9 west	13	8	46	9	24
25 north	10 west	3	7	47	6	37
25 north	11 west	.....	7	56	3	34
25 north	12 west	.....	5	65	11	19
25 north	13 west	.....	41	54	5	.....
26 north	3 west	55	2	37	.....	6
26 north	4 west	23	3	36	.....	38
26 north	5 west	15	3	37	.....	44
26 north	6 west	22	2	34	.....	42
26 north	7 west	11	.....	35	.....	54
26 north	8 west	.....	6	50	.....	44
26 north	9 west	1	7	46	.....	46
26 north	10 west	1	4	45	1	49
26 north	11 west	1	9	49	3	38

Percentages of species in Olympic Forest Reserve, by townships—Continued.

Township.	Range.	Red fir.	Cedar.	Hemlock.	Spruce.	Lovely fir.
26 north	12 west	.....	16	63	6	15
26 north	13 west	.....	28	53	13	6
26 north	14 west	.....	23	64	13	.....
27 north	3 west	33	2	47	.....	18
27 north	4 west	4	.....	38	.....	58
27 north	5 west	4	.....	40	.....	56
27 north	6 west	37	.....	34	.....	29
27 north	7 west	16	.....	35	.....	49
27 north	8 west	37	.....	28	.....	35
27 north	9 west	16	6	48	.....	30
27 north	10 west	30	1	39	6	24
27 north	11 west	16	4	46	7	26
27 north	12 west	4	20	56	5	15
27 north	13 west	.....	30	49	6	15
27 north	14 west	.....	13	73	14	.....
27 north	15 west	.....	5	88	7	.....
28 north	3 west	24	5	41	30	.....
28 north	4 west	.....	.....	38	62	.....
28 north	5 west	.....	.....	36	64	.....
28 north	6 west	34	.....	36	30	.....
28 north	7 west	33	.....	40	.....	27
28 north	8 west	54	2	26	.....	18
28 north	9 west	7	.....	52	.....	41
28 north	10 west	7	.....	49	1	43
28 north	11 west	17	1	53	3	26
28 north	12 west	9	3	53	4	31
28 north	13 west	14	3	54	16	13
28 north	14 west	7	2	48	43	.....
28 north	15 west	.....	4	79	17	.....
29 north	3 west	69	3	28	.....	.....
29 north	4 west	61	33	6	.....	.....
29 north	5 west	47	6	33	.....	14
29 north	6 west	40	2	35	.....	23
29 north	7 west	55	5	35	.....	5
29 north	8 west	6	.....	41	.....	53
29 north	9 west	55	.....	30	1	14
29 north	10 west	40	.....	49	.....	11
29 north	11 west	29	1	51	1	18
29 north	12 west	33	2	45	9	11
29 north	13 west	35	.....	42	18	5
29 north	14 west	2	10	60	28	.....
29 north	15 west	.....	31	49	20	.....

Percentages of species in Olympic Forest Reserve, by townships—Continued.

Township.	Range.	Red fir.	Cedar.	Hemlock.	Spruce.	Lovely fir.
30 north	9 west	63	5	23	2	7
30 north	10 west	57	2	41	.....	.....
30 north	11 west	58	5	28	6	3
30 north	12 west	56	2	26	11	5
30 north	13 west	8	5	44	27	16
30 north	14 west	1	22	55	15	7
30 north	15 west	.....	38	47	15	.....
30 north	16 west	.....	44	31	25	.....
31 north	14 west	3	25	46	15	11
31 north	15 west	.....	37	45	13	5
31 north	16 west	.....	55	28	17	.....
32 north	14 west	3	21	49	3	24
32 north	15 west	.....	38	42	13	7
32 north	16 west	.....	61	30	9	.....
33 north	14 west	2	5	60	8	25

INDEX.

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[Professional Paper No. 7.]

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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5. The forests of Washington, a revision of estimates, by Henry Gannett. 1902. 38 pp., 1 pl.

6. Forest conditions in the Cascade Range, Washington, between the Washington and Mount Rainier forest reserves, by Fred G. Plummer. 1902. 42 pp., 11 pls.

7. Forest conditions in the Olympic Forest Reserve, Washington, from notes by Arthur Dodwell and Theodore F. Rixon. 1902. 110 pp., 20 pls.

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