PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF LANDS AND FORESTS

HON. E. T. KENNEY, *Minister* C. D. ORCHARD, *Deputy Minister of Forests*

REPORT

of

THE FOREST SERVICE

YEAR ENDED DECEMBER 31ST

1949

VICTORIA, B.C.:
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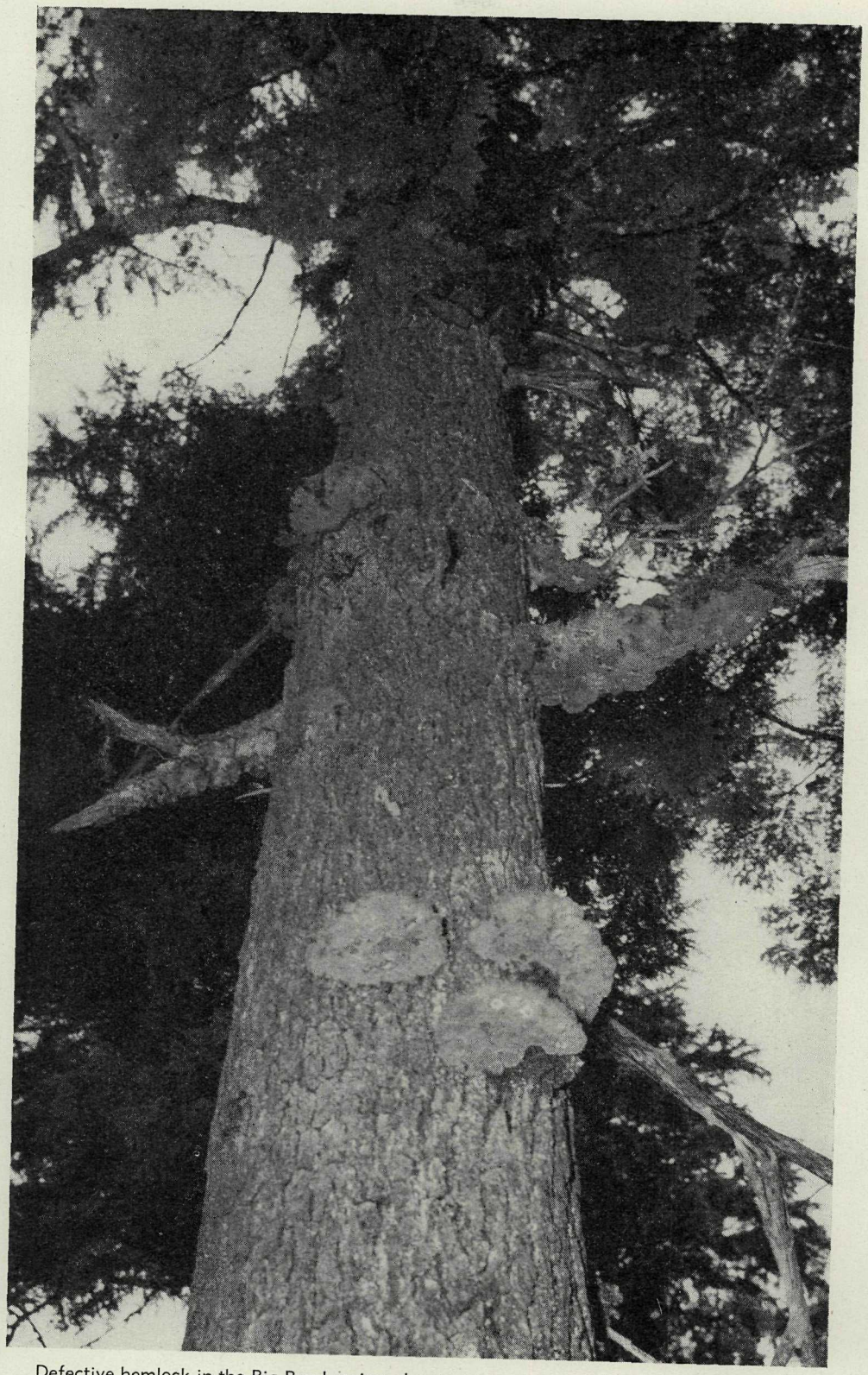

Defective hemlock in the Big Bend region, showing sporophores of the Indian-paint fungus (**Echinodomtrium tinctorium** Ell. & Ever).

VICTORIA, B.C., March 1st, 1950.

To His Honour COLONEL C. A. BANKS, C.M.G.,
Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

Herewith I beg respectfully to submit the Annual Report of the Forest Service of the Department of Lands and Forests for the calendar year 1949.

E. T. KENNEY,
Minister of Lands and Forests.

The Honourable E. T. Kenney,
Minister of Lands and Forests, Victoria, B.C.

SIR,—There is submitted herewith the Annual Report on activities of the Forest Service during the calendar year 1949.

C. D. ORCHARD,
Deputy Minister and Chief Forester.

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REPORT OF THE FOREST SERVICE.

The year 1949 was marked by a return to normalcy in respect to available personnel, both technical and non-technical, equipment, and materials. For the first time in almost a decade it was possible to carry out the planned programme of the Forest Service comparatively unhampered by shortages of these three vital elements.

One amendment of note was made to the "Forest Act" at the 1949 Session of the Legislature, through the addition of a section to control log-salvage operations. The sum of $2,000,000 was allotted to the Forest Protection Fund.

The administrative organization of the Service was developed further by the establishment of an eighth division charged with direction of grazing administration. The services of a forest counsel were secured, the officer in question holding degrees in both forestry and law.

Work on forest surveys was stepped up, with five field parties completing 6,544 square miles during the year. Reports on the Sayward region and Quadra Island were published. Five new forest reserves—four on the Lower Coast and one in the North-Central Interior—were created, bringing the total to fifty-nine, comprising 37,912 square miles.

Studies in forest-nursery fertility were maintained, and a number of properties examined in the East Kootenays as prospective sites for a nursery there. A land-use survey was made of the Bella Coola Valley. Site-type studies were continued.

Silvicultural studies included a determination of the most favourable time for collection of Douglas fir seed and a study of repellents to protect direct seeding from rodents. During the year the Aleza Lake Experiment Station was reopened and a resident research forester appointed. Re-examination of all permanent growth-study plots was maintained, and numerous growth-and-yield and volume tables were developed.

Adverse weather during the early months of the year caused heavy losses of forest nursery stock. In the spring, beds were sown to produce 10,000,000 trees for planting in the spring of 1951. Sowing of hemlock seed, earlier root-pruning, and work on soil-fertility were undertaken on an experimental basis. An experimental nursery was established at Elko.

A conveyer-belt was installed at Green Timbers Nursery to expedite sorting and counting of seedlings.

The cone-crop on Douglas fir was almost a complete failure. White-grub infestation continued a serious problem at Quinsam Nursery.

Heavy snow and a tardy spring deferred planting until late in March. Planting terminated on May 6th. Suitable labour was difficult to obtain at the outset, but this situation remedied as the season progressed. A total of 7,785 acres was planted, with slightly less than 7,000,000 trees; the industry planted 1,010 acres with 855,000 trees.

One plantation was fire-damaged to the extent of 19 acres. A total of 170,000 snags, on 12,500 acres, was felled; 160 miles of forest road maintained; 4.5 miles of new road constructed; and 37 miles of old logging-railroad grade converted to truck-trails.

A large increase in personnel was essential to meet the increasing demand for development of the Provincial park system. Men were trained to serve as recreational officers for the Vancouver, Kamloops, and Nelson Forest Districts.

Expenditure of available funds was concentrated largely on six widely separated areas: Little Qualicum Falls, Peace Arch, Manning, Mount Seymour, and Wells Gray Parks received attention, and a workshop was constructed at Langford, V.I.

Reconnaissance and inventory of the recreational resource was continued with seventy-five reserves or proposed reserves being examined and classified. At the end of the year there were fifty-nine Provincial parks, comprising 9,006,209 acres.

Both production of forest products and the estimated value of same fell short of comparative figures for 1948. The total cut was 4,050,000 M board-feet, a drop of approximately one-quarter billion feet, and the value totalled $331,590,000—some $30,000,000 less than the estimate for the previous year. Paper production was higher, as were the lumber export figures.

Douglas fir again headed the species cut, more than doubling the figure for hemlock, which ranked second in volume. Cedar, spruce, balsam, lodgepole pine, white pine, yellow pine, and cottonwood followed in that order.

There was a slight lowering in the weighted average price bid for stumpage of all species, amounting to 30 cents per thousand. The total number of existing timber sales was reduced from 6,500 to 6,200, but the total number of sales awarded during the year was on a parity with 1948. Log exports fell from 164,000,000 feet in 1948 to 146,000,000 in 1949.

There were noteworthy advances in the forest management licence field. Two licences were in effect at the end of the year, one of which had been signed during the period. Three other contracts have entered the final stages, and six more have been approved in principle, and a reserve established over the areas under consideration. Progress has been made in the organization of technical staffs to deal with farm-woodlot and public working-circles management.

A full programme of forest-cover mapping and the revision or replacement of existing maps was accomplished. Successful projects under the Silvicultural Fund were launched in four forest districts—Prince Rupert, Fort George, Kamloops, and Nelson.

Revenue collections reached a record figure of $8,181,860.97. The mechanical tabulation of scale and royalty accounts for the Vancouver Forest District, which was initiated late in 1948, has now been in operation for one complete calendar year and has proven its value in the rapid compilation of accurate records.

Although conditions on several occasions pointed to a serious and costly fire season, and the number of fires was more than double that of 1948, intermittent rains periodically reduced the hazard build-up and relieved the situation. July and August were the two bad months.

Of the 1,701 fires, smokers caused 29 per cent., lightning 28 per cent., and railways 19 per cent. The cost to the Forest Service of direct fire-fighting during the year was $94,600—34 per cent. less than the average over the past ten years. Total acreage burned over was 145,549.

Two visibility-mapping crews were placed in the field, and these examined sixty-four possible lookout-sites and submitted complete maps and reports on each. The lookout photography project was revived, and fourteen lookout points completed. Four crews were engaged on trail and road traverses for fire-control planning, and these completed surveys of 364 miles of roads. A total of 179 miles of new road and trail construction was completed, and 1,336 miles maintained.

A forest meteorologist was engaged, and fire-weather investigations renewed, with an intensive study of past projects. Thirteen fire-suppression crews were organized and in the field up to 100 days in mid-fire season. A two-year contract was signed with Central B.C. Airways, Ltd., to supply three floatplanes for fire-detection and suppression work. A floatplane was stationed in each of the three Interior districts. Air-to-ground transmitter-receivers were installed in each aircraft. Supplies were parachuted successfully to ground crews on a number of occasions when waterways for landing were not available.

A serious fire at the Forest Service Marine Station in Vancouver in mid-May handicapped the work of boat overhaul and construction and the regular programme of pump and engine overhaul. The loss was almost completely covered by insurance. By the end of the year the plant was nearly in full production once more. The mechanical staff of the Division designed two mobile cooking-dining cars—one self-propelled and the other a trailer type. A very large and diversified building programme was undertaken, and excellent progress made.

Developments in the Radio Section included installation of new types of transmitter-receiver units on Assistant Ranger and Ranger launches and remote-control units at many district and Ranger headquarters. Intensive developments in the FM field were undertaken, with one network nearly at operating stage. A total of 397 sets were in use at year's end. The total messages handled by all stations numbered 18,647.

There was a total of twelve forest closures imposed during the year. Operators in the Vancouver and Fort George Districts co-operated on occasion by voluntary closures or by going on early shift, and thus a general closure was avoided.

In British Columbia all basic research in forest entomology and forest pathology is conducted by the Dominion Government. The assistance and unfailing co-operation of the two Dominion services charged with the study of these problems in this Province are herein recognized and acknowledged.

Through the courtesy and co-operation of the Victoria offices of Forest Insect Investigations and Forest Pathology Investigations, Science Service, Dominion Department of Agriculture, it is possible to include reports on the situation in British Columbia with respect to forest insect pests and fungous diseases.

Of particular interest during the year were the study of deterioration in hemlock-looper-killed timber, investigation of ambrosia-beetle damage, and studies of bark-beetle damage to white and lodgepole pine and Engelmann spruce.

Research on pathological problems included decay in mature and overmature Douglas fir, decay in Western hemlock and Amabilis fir in the Prince Rupert District, an analysis of Western hemlock in the Big Bend area, and Northern black cottonwood on the Upper Fraser River. Studies were also carried on in plantations of Douglas fir on Vancouver Island and the Lower Mainland and of blister-rust occurrence in white-pine stands.

In January the fourth class, of twenty-one students this time, was enrolled at the Ranger School at Green Timbers. The course was extended from two three-month terms to three three-month terms. As might be expected, the present group is younger and less experienced than students in earlier courses. A one-week special course was given at the termination of the spring term to lookout-men of the Vancouver Forest District.

The new school building was completed by early summer, and the new dormitory and services buildings completed and officially opened by the Chief Forester in early autumn.

The press-advertising programme of the Division was increased by the initiation of a series of pre-fire-season advertisements in the daily and weekly papers. In addition, a comprehensive schedule of brief radio messages was broadcast over all stations in the Province for the first time.

There was an increase of over 41,000 in the total audience record of the film library. Three new motion-picture projection units were acquired and placed in district offices. Three film subjects were photographed and readied for sound-tracking.

Twelve publications of various types were produced in addition to six personnel news-letters, the annual calendar, and numerous other printing projects. Two portable exhibits were in circulation in the Interior during the Fall Fair season.

The winter of 1948–49 was long and severe and entailed heavy feeding until an unusually late date. Subsequently, however, there was an excellent growth of forage,

and summer and fall ranging conditions were generally good, with the exception of the alpine ranges. Meadow-hay was abundant but of inferior quality, and in some sections quantities were lost as a result of wet weather persisting until late in the summer.

Forty-two live-stock associations are active in the Province, and their co-operation was invaluable in assisting in proper range management. The Division collaborated with the Game Department in the study of game-livestock relationships on the range and with the Live Stock Branch of the Department of Agriculture in establishing bull-control and disease-free areas.

A total of 691,912 acres was covered by the range-reconnaissance programme. An all-time record number of grazing permits were issued, although the number of stock covered was slightly lower than in the previous year. Two men were employed on predator-control during four and one-half months of the winter season with limited success.

Statistical details of much of the Service's work are embodied in tabular form in the Appendix to this Report.

FOREST ECONOMICS.

FOREST SURVEYS.

The programme of forest surveys continues to expand as technically trained personnel become available, and it is now evident that there will be no difficulty in reaching the objective of surveying 8,000 square miles annually, commencing in 1951. A total of sixty persons was employed on forest surveys throughout the 1949 field season. Five parties were maintained, and surveys were completed on 6,544 square miles, distributed by project as follows:—

	Acres.
Lower Skeena survey	1,789,877
Upper Fraser survey	818,560
Resurvey of Sechelt Forest	678,800
Princeton survey	896,800
Whiteswan Lake survey	4,300
Total	4,188,337

The finished maps, timber estimates, and reports for the above surveys are in the process of compilation and will be available to the public in due course.

KYUQUOT REGION.

The estimates and forest-cover maps for the Kyuquot region have been completed and are available upon request. This heavily timbered region is now estimated to carry more than nineteen billion board-feet of merchantable timber, which compares with the 1937 inventory of eight and one-half billion board-feet. The reason for the large increase is that the early estimate was not based on a detailed survey but was made up from scattered commercial cruises of private timber holdings, scattered timber-sale cruises, and reconnaissance by Forest Service officers. In addition, technological advances in logging and towing methods, during the interval between estimates, have revolutionized West Coast utilization standards.

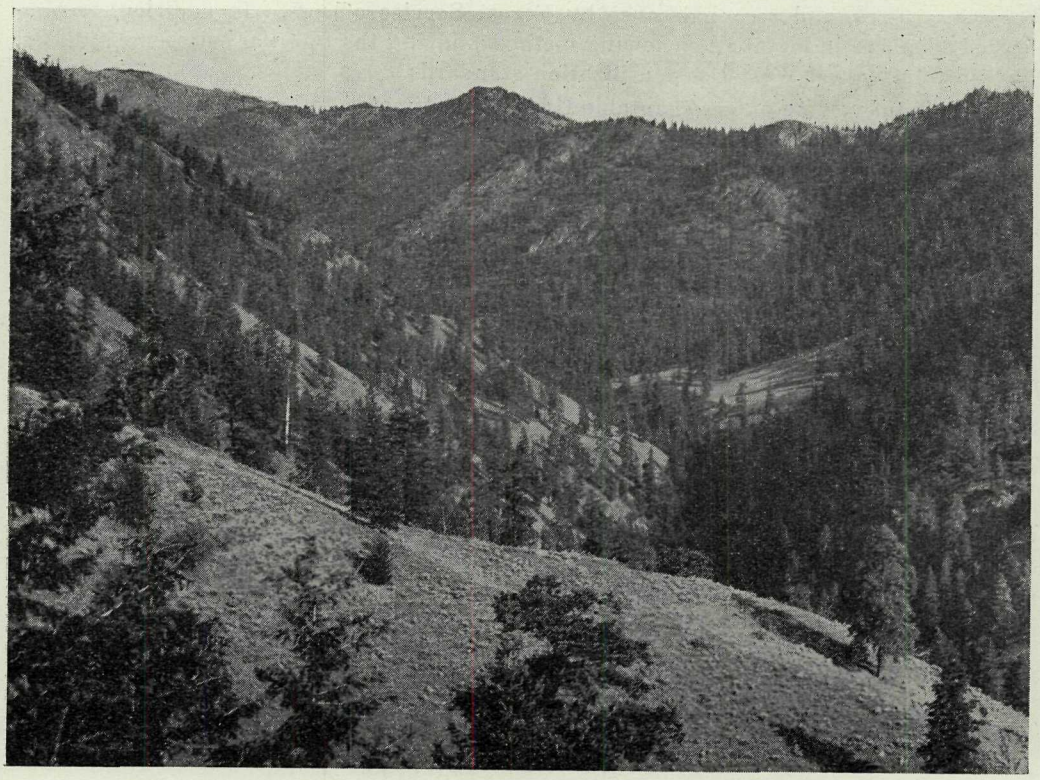
The total volume of merchantable timber is estimated to be 19,405,930,000 board-feet, of which 91 per cent. is considered physically and economically accessible. The details of timber volumes (over 11 inches D.B.H.) are as follows:—

(Thousands of feet, board measure.)

Species.	Crown granted.	Timber Leases and Licences.	Vacant Crown Land.	Total.
Douglas fir	199,650	959,700	1,276,640	2,435,990
Western red cedar	60,200	765,550	2,666,560	3,492,310
Western hemlock	170,210	1,414,040	6,922,840	8,507,090
Sitka spruce	4,930	153,630	241,920	400,480
Balsam	46,450	513,040	3,516,740	4,076,230
Western white pine	2,190	15,240	71,670	89,100
Yellow cedar	2,390	21,170	381,170	404,730
Totals	486,020	3,842,370	15,077,540	19,405,930

It is worthy of note that in the Kyuquot region only 22 per cent. of the merchantable timber has been alienated under the various forms of private tenure. This ownership pattern is in contrast with average conditions on the Coast, where 60 per cent. of the merchantable timber has been alienated.

Mature yellow-pine type, west of Princeton.



Ollala Creek valley, showing typical open-stocked stands of Keremeos region.

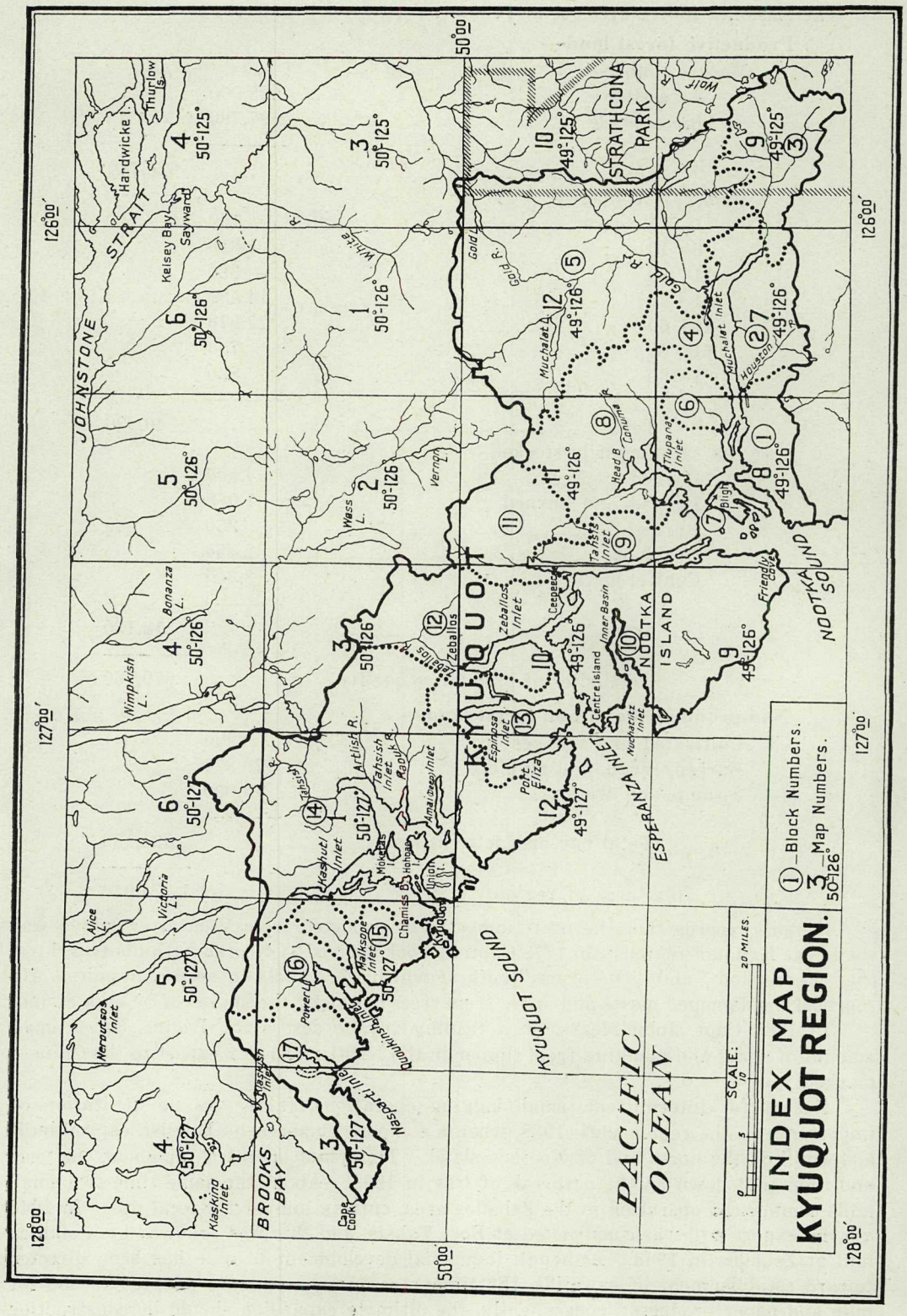
The classification of areas is as follows:—

	Acres.	Acres.
Productive forest land—		
Mature timber—		
Accessible	528,960	
Inaccessible	97,780	
Total		626,740
Immature timber—		
1– 5 years	160	
6– 10 „	1,310	
11– 20 „	320	
21– 40 „	14,530	
41– 60 „	22,970	
61– 80 „	780	
81–100 „	820	
Total		40,890
Not satisfactorily stocked—		
Logged	4,990	
Logged and burned	1,080	
Burned	250	
Deciduous	2,450	
Coniferous	3,360	
Total		12,130
Total sites of productive quality		679,760
Non-productive and non-forest land—		
Cultivated and villages	290	
Barren, scrub, and alpine	579,870	
Swamp and water	14,990	
Total non-productive sites		595,150
Total area of region		1,274,910

History records that the first timber to be exported from Vancouver Island was cut in the Kyuquot region. In 1778 Captain Cook arrived at Nootka with his two ships, the "Resolution" and "Discovery," both of which were badly in need of repairs. He replaced the damaged masts and spars from trees cut along the shores of Nootka Sound.

In 1788 Capt. John Mears, on a trading voyage across the Pacific, cut a small amount of spars and planking from timber in the Nootka area for export to the Chinese market.

Except for intermittent, small logging operations, there was no utilization of importance in the region until 1938, when a company financed by English capital built a sawmill on the north end of Nootka Island. This plant operated for about one year and then shut down on the outbreak of war in 1939. About the same time two small mills commenced operation in the Zeballos area, cutting lumber for local use. In 1946 a large export mill was constructed at Port Tahsis, and this was followed by a similar mill at Zeballos in 1948. Although industrial development to date has been directed toward establishment of sawmills, the timber resources are more adapted to use for pulp and paper products; consequently, the ultimate expansion should be construction of a pulp-mill.


INDEX MAP
KYUQUOT REGION.
① — Block Numbers.
3 — Map Numbers.
SCALE:
0 5 10 20 MILES.
PACIFIC
OCEAN
KYUQUOT SOUND
ESPERANZA INLET
NOOTKA ISLAND
NOOTKA SOUND
KYUQUOT
STRATHCONA PARK
JOHNSTONE STRAIT
BROOKS BAY
Hardwicke I.
Thurlow I.
Kelsey Bay
Sayward
Nimpkish L.
Bonanza L.
Alice L.
Victoria L.
Nerutsa Inlet
Klaskino Inlet
Cape Cook
Nasparti Inlet
Quatsino Sound
Power L.
Matsoose Inlet
Klaskish Inlet
Kashutl Inlet
Tahsish
Artlish R.
Tahsish Inlet
Raft R.
Amai (Deep) Inlet
Mokwinis
Hohoam
Chamis
Union
Zeballos
Espinosa Inlet
Port Eliza
Centre Island
Inner Basin
Nuchatlitz Inlet
Ceepeecee
Zeballos Inlet
Tahsis Inlet
Head B.
Conuma
Muchalat
Muchalat Inlet
Houston
Tlupana Inlet
Bligh
Friendly Cove
Gold R.
Cold R.
Wass L.
Vernon L.
White
Wolf
50°00′
126°00′
127°00′
128°00′

Hemlock-balsam stand, 129 years old, on Zeballos River. Average diameter, 26 inches; maximum diameter, 34 inches; maximum height, 178 feet.

QUADRA ISLAND.

The timber estimates and forest-cover maps for Quadra Island have been finished and are available upon request. The classification of areas is as follows:—

Productive forest land—

	Acres.	Acres.
Mature timber—		
Accessible	9,400	
Inaccessible	*Nil*	
Total		9,400
Immature timber—		
1– 5 years	1,680	
6–10 ,,	230	
11–20 ,,	20,140	
21–40 ,,	9,890	
41–60 ,,	830	
61–80 ,,	120	
Total		32,890

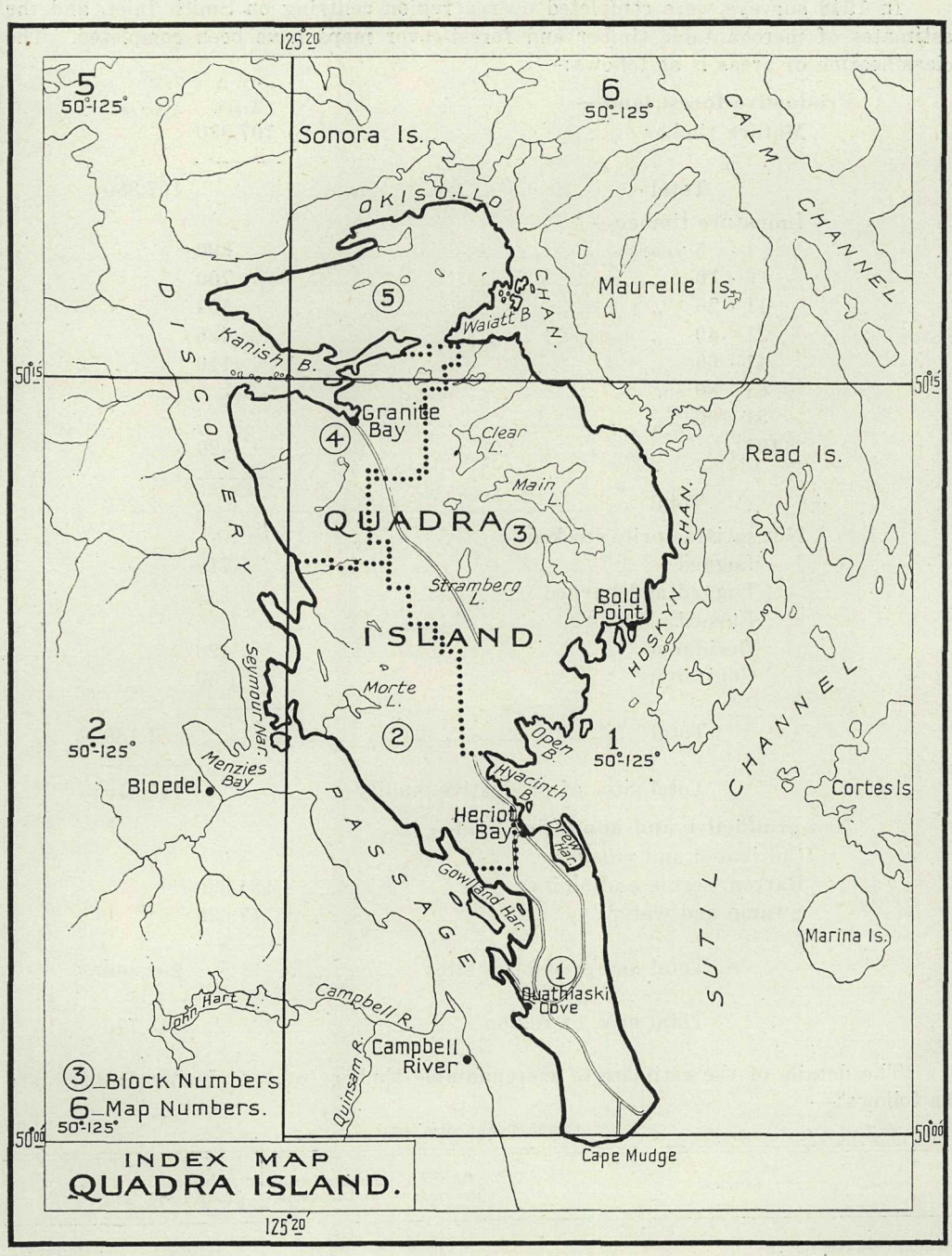
Not satisfactorily stocked—		
Logged	1,950	
Logged and burned	2,510	
Burned	1,860	
Deciduous	10	
Coniferous	220	
Total		6,550
Total sites of productive quality		48,840
Non-productive and non-forest land—		
Cultivated and villages	830	
Barren, scrub, and alpine	15,470	
Swamp and water	3,050	
Total non-productive sites		19,350
Total area of region		68,190

The details of the estimate of merchantable timber (over 11 inches D.B.H.) are as follows:—

(Thousands of feet, board measure.)

Species.	Crown granted.	Timber Leases and Licences.	Vacant Crown Land.	Total.
Douglas fir	6,080	26,980	105,430	138,490
Western red cedar	90	3,930	17,990	22,010
Western hemlock	3,920	15,180	69,020	88,120
Sitka spruce	2,820	70	1,400	4,290
Balsam	1,330	220	1,260	2,810
Western white pine	90	500	1,900	2,490
Alder	840	.....	150	990
Broad-leaf maple	300	.....	40	340
Totals	15,470	46,880	197,190	259,540

Quadra Island was surveyed previously in 1930, and, although little new industrial development has taken place in the interval between surveys, forest conditions in general show considerable improvement. The 1930 survey found that 15,670 acres were understocked. However, subsequent regeneration has been exceptionally good, and the present examination showed that 84 per cent. of the cut-over land was satisfactorily stocked. Further, a large part of the area currently understocked may be expected to restock naturally; consequently, Quadra Island is one area on the Lower Coast where there is no problem in regeneration.


125°20'
5
50°-125°
6
50°-125°
Sonora Is.
CALM CHANNEL
OKISOLLO CHAN.
Maurelle Is.
Waiatt B.
Kanish B.
DISCOVERY PASSAGE
50°15'
Granite Bay
Clear L.
Read Is.
Main L.
QUADRA ISLAND
Stramberg L.
Bold Point
HOSKYN CHAN.
Seymour Nar.
Morte L.
2
50°-125°
Menzies Bay
Bloedel
Open B.
1
50°-125°
Hyacinth B.
Cortes Is.
SUTIL CHANNEL
Heriot Bay
Drew Har.
Gowlland Har.
Marina Is.
Quathiaski Cove
John Hart L.
Campbell R.
Campbell River
Quinsam R.
3 Block Numbers
6 Map Numbers.
50°-125°
50°00'
Cape Mudge
INDEX MAP
QUADRA ISLAND.
125°20'

SMITH INLET REGION.

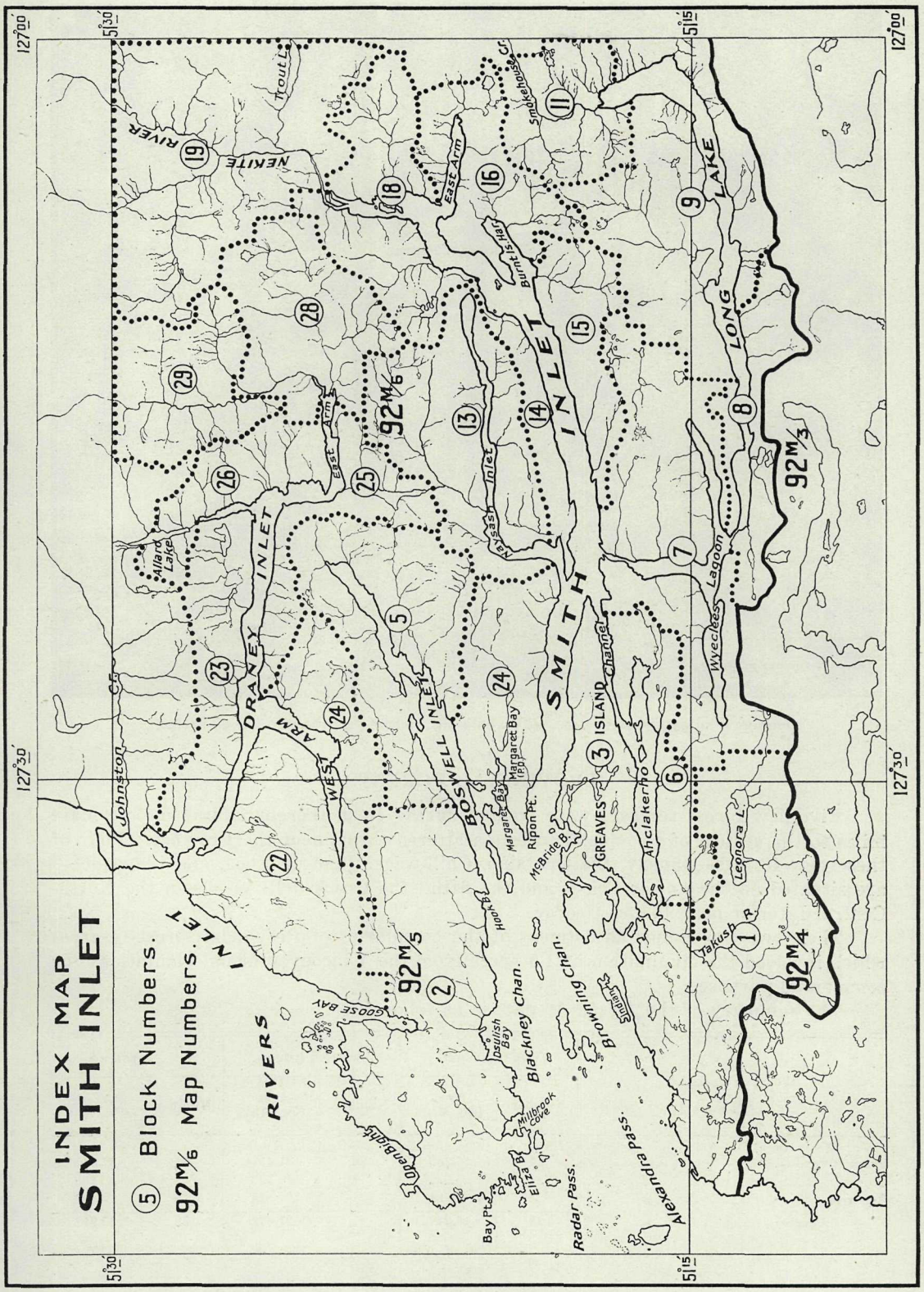
In 1948 surveys were completed over a region centring on Smith Inlet, and the estimates of merchantable timber and forest-cover maps have been completed. The classification of areas is as follows:—

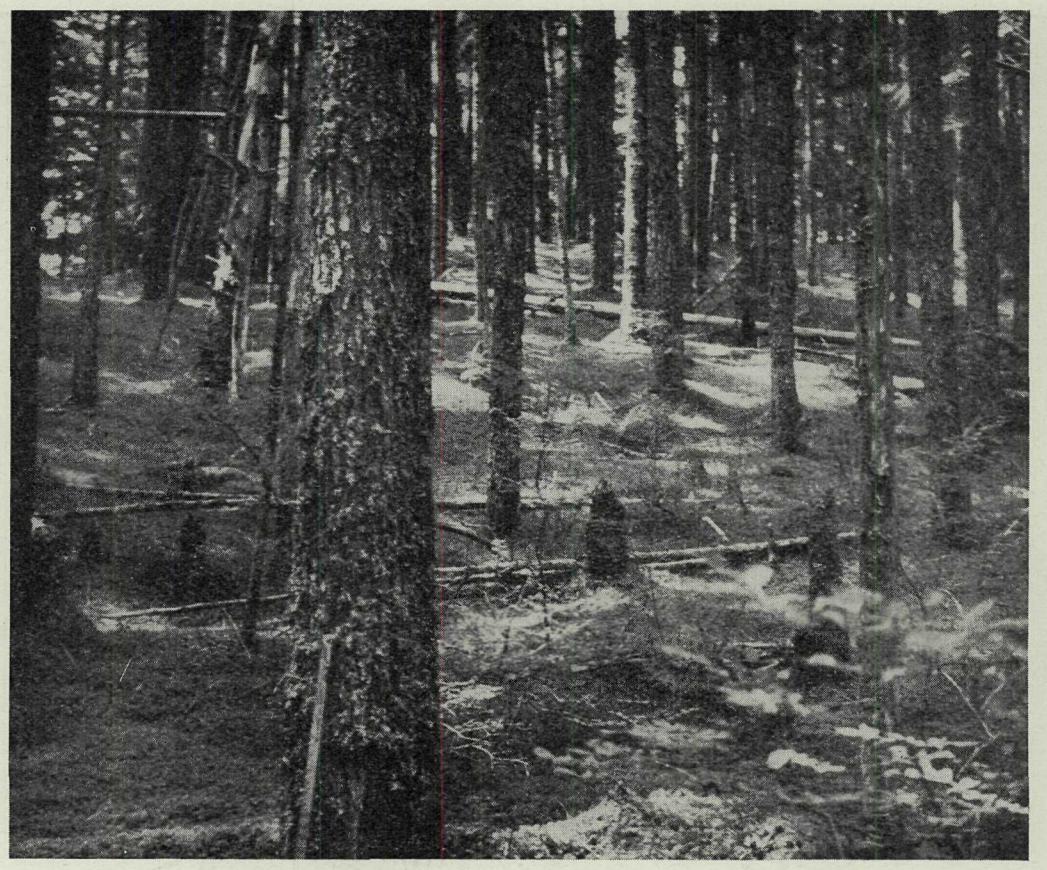
	Acres.	Acres.
Productive forest land—		
Mature timber	107,880	
Total		107,880
Immature timber—		
1– 5 years	390	
6– 10 „	700	
11– 20 „	550	
21– 40 „	480	
41– 60 „	110	
61– 80 „	.....	
81–100 „	.....	
101 „	20	
Total		2,250
Not satisfactorily stocked—		
Logged	710	
Logged and burned	.....	
Burned	.....	
Deciduous	420	
Coniferous	50	
Total		1,180
Total sites of productive quality		111,310
Non-productive and non-forest land—		
Cultivated and villages	*Nil*	
Barren, scrub, and alpine	184,830	
Swamp and water	17,630	
Total non-productive sites		202,460
Total area of region		313,770

The details of the estimate of merchantable timber (over 11 inches D.B.H.) are as follows:—

(Thousands of cubic feet.)

Species.	Crown granted.	Timber Leases and Licences.	Vacant Crown Land.	Total.
Western red cedar	2,843	12,214	225,428	240,485
Western hemlock	735	10,714	96,628	108,077
Sitka spruce	211	4,747	26,611	31,569
Balsam	556	8,885	70,110	79,551
Western white pine	3	.....	53	56
Yellow cedar	415	741	24,569	25,725
Alder	.....	.....	110	110
Totals	4,763	37,301	443,509	485,573
Acres	1,310	8,630	97,940	107,880


INDEX MAP
SMITH INLET
5 Block Numbers.
92M/6 Map Numbers.
127°00'
127°30'
51°30'
51°15'
SMITH INLET
LONG LAKE
DRANEY INLET
WEST ARM
BOSWELL INLET
NEKITE RIVER
Trout L.
Johnston Cr.
Millard Lake
East Arm
Neysash Inlet
Burnt Is. Hat
Smokehouse Cr.
Wyeclees Lagoon
ISLAND
Channel
GREAVES
Anclakerno
McBride B.
Ripon Pt.
Margaret Bay
Hoonah B.
Dsulish Bay
Blackney Chan.
Browning Chan.
Smuggler
Millbrook Cove
Eliza B.
Bay Pt.
Radar Pass.
Alexandra Pass.
Goose Bay
Greenblight
RIVERS
INLET
Takush
Leonora L.
92M/5
92M/6
92M/4
92M/3



Hemlock-lodgepole pine type, 250 years old, near Kitsumgallum Lake, Terrace.

PROVINCIAL FORESTS.

Five new forest reserves were created during 1949, thereby adding 5,578 square miles to the system of Provincial forests scattered throughout the Province. Four of these new forests—namely, the Quatsino, Chilliwack, Juan de Fuca, and Clayoquot—are situated on the Lower Coast, and the fifth—the Crooked River—is in the North-Central Interior near Prince George.

There was one minor adjustment of the boundaries of Provincial forest reserves which involved the elimination of 1.5 acres from the Vancouver Island plantations for commercial purposes.

The summary of the forests to date is as follows:—

Class of Forest.	Coast Region.		Interior Region.		Total.	
	Number.	Area (Sq. Mi.).	Number.	Area (Sq. Mi.).	Number.	Area (Sq. Mi.).
Productive	24	16,236	28	21,411	52	37,647
Scenic	....	.....	2	233	2	233
Research	4	4	1	28	5	32
Totals	28	16,240	31	21,672	59	37,912

FOREST RESEARCH.

NURSERY FERTILITY STUDIES.

As in previous years, an inventory was made of seedling growth at each of the three nurseries in order to check on soil-fertility and possible soil deterioration with successive cropping. The following data were obtained on Douglas fir:—

Nursery.	Length of Top (in Cm.).	Diameter of Stem (in 64th Inches).	Dry Weight (in Gms.).	Number of Primary Roots.	Top-Root Ratio by Dry Weight.	Number of Samples.
Green Timbers	10.2±0.34	4.2±0.11	0.66±0.05	8.5±0.26	1.7±0.11	28
Quinsam	9.6±0.54	4.8±0.16	0.72±0.05	6.2±0.42	1.2±0.06	25
Duncan	19.7±1.27	6.3±0.50	1.80±0.24	10.0±1.10	2.6±0.11	17

The largest stock was produced at the Duncan Nursery. The seedlings are thrifty and have well-developed roots. Considerable frost damage to the tops occurred during the winter of 1948. The seedlings are considerably smaller than those produced in 1947 and 1948, although all three crops are from land that has never produced nursery stock before. This may be due to seasonal differences, for the soil is very uniform.

The Quinsam stock was smaller than the Green Timbers stock. In previous years the reverse has been true. It will be noted in the above table that the top-to-root ratio appears very favourable, yet there are few primary roots. This condition was produced by an unusual root-development. The few primary roots tend to be long and non-branching. The tips tend to be thickened and covered with root-hairs which persist and appear as a brown tomentum covering the roots. According to a British Forestry Commission report, this condition on tree roots may depend upon the form in which nitrogen occurs in the soil. The Green Timbers stock was small but nicely balanced between top and root.

With this year's inventory, records are available for two successive crops, grown in a rotation on the same field at Green Timbers and at Quinsam. At Green Timbers the length of top produced in 1946 was 13.3±2.4 centimetres. This year a length of 10.2±0.34 was found, a decrease of 3.1 centimetres. This difference is statistically significant. The same is true at Quinsam, where the length of top in 1946 was 16.1±0.37 as compared to 9.6±0.54 in 1949. These differences, while significant, may be due to seasonal differences of temperature and rainfall; on the other hand, they may indicate soil depletion. Should this condition be repeated in the other fields in the next two years, serious consideration should be given to adopting a general programme to build up soil fertility.

In anticipation of the time when fertilizers will become a necessity, fertility studies were started in 1947. The first results were recorded in the Report of the Forest Service for 1948. A new series of plots were laid out in 1948 at Green Timbers but, unfortunately, seed germination was so poor that sufficient seedlings were not available for measuring seedling response to different fertilization. Further studies were laid out in 1949, but the results will not be available until 1950, when the seedlings will have completed two seasons' growth in the nursery.

SOIL AND LAND-USE SURVEYS.

Soil examinations were made on a number of properties in the East Kootenays for the purpose of selecting a nursery-site. A suitable location was finally found between Cranbrook and Kimberley. Two types of soil occur on the property. The lower benches consist of Oldtown Very Fine Sandy Loam. This soil would seem to be very satisfactory for seedling production. The soil is neutral in reaction, deep and well drained, free from stone, and of nearly level relief. The upper benches are a Mayook

Silt Loam. This soil is not quite so desirable, for the subsoil is strongly alkaline and somewhat compacted. The disadvantages are more than balanced by an adequate supply of irrigation-water.

A land-use survey was made of the Bella Coola Valley to delineate the arable soils. This constitutes the initial step in developing a plan of forest management for that area. The valley is some 40 miles long and varies from 1 to 2 miles in width. It is U-shaped, the floor being occupied by rich alluvial soil. The valley is flanked by precipitous rock walls that terminate in snow-capped peaks. No extensive foothills or upland benches separate the bottom-lands from the mountainsides.

The climate is temperate, being favourably modified by the protection afforded by the coastal islands separating the valley from the ocean.

View of Bella Coola Valley, looking east from near the mouth of the river. Note bottom-lands extending to the base of the mountains and absence of extensive forested foothills. (R.C.A.F. Photo.)

The valley is only partially developed with farms, of from 5 to 40 cleared acres, scattered along the 45 miles of road. It would seem that practically all crops suitable to a temperate climate can be successfully grown. For comparative purposes the Agassiz district of the Fraser Valley is quite similar in soil, topography, and climate.

The present development is no criterion of the agricultural potentialities. Practically the entire acreage of the valley-bottom is suitable for agricultural use if and when markets and transportation justify more intensive settlement.

Bella Coola occupies a strategic position on the coast of British Columbia, being midway between Vancouver and Prince Rupert. Furthermore, it is somewhat unique in that it is probably the only valley in the Central Coastal region containing a large acreage of potentially arable land. Although it is isolated at present, only 14 miles of new road-construction are necessary to link this valley with the roads of the Interior, thereby making Bella Coola a coastal port serving the Interior of the Province. Bella Coola is, therefore, favourably situated to respond to any new development that may

take place within a wide radius of this district. For these reasons, agricultural settlement is a logical development of the Bella Coola Valley that should parallel the establishment of primary and secondary industries in the Central Coastal region of British Columbia.

SITE-TYPE STUDIES.

Site-type studies in second-growth hemlock and hemlock-fir stands were continued in 1949. A number of areas were examined in Johnstone Strait. Progress in these studies is slow, for these mixed-forest types extend over the coastal region and areas are often accessible only by boat. The data collected has not been analysed as yet.

Some time was spent in the field with foresters of three large logging companies who were interested in the application of site classification by means of the indicator species of the natural vegetation. Some time was also spent with students at the University Forest at Haney. There appears to be a growing interest in the use of plant indicators for site-type identification.

SILVICULTURAL STUDIES.

A study was carried out during the year to determine the most favourable time for the collection of cones of Douglas fir. Tests were made to see if there was any relationship between the specific gravity of the developing cones and the germinative capacity of the seed. From July 5th to September 28th weekly cone collections were made from three trees. These trees were in the Robertson River valley, near Cowichan Lake, Vancouver Island, and were 17 to 18 years old and 25 to 30 feet high. Freshly picked sample cones were placed in solutions of common salt. The specific gravity of the solutions in which the cones floated was recorded. Germination tests were made on the seeds from each tree in each weekly collection. Two types of germination tests were carried out: (1) Biochemical method using sodium biselenite, and (2) incubator germination test. Part of the seed was stored, and germination tests will be made in the spring of 1950 to determine whether early collecting of the cones has any effect on the keeping qualities of the seed. The biochemical test and the incubator test both showed that, by the end of the first week in August, the seeds were capable of germination. One hundred field-run seeds were used in each test, but the low and varying number of filled seeds made the results inconclusive. Throughout August the cones had specific gravities represented by aqueous solutions of sodium chloride varying in strength from 8 per cent. for the lowest tree to 12 per cent. for the highest. The cones from two of the trees floated in water on September 6th and from the third tree on September 13th. Before these dates the specific gravity of the cones had shown no downward trend and gave no guide as to the degree of maturity of the seed, but these cones were not ready to open for two to three weeks after the stage of floating in water.

One experiment is under way to test the reliability of the bud-ratio index in forecasting cone-crops, and another to explore certain aspects of pollination.

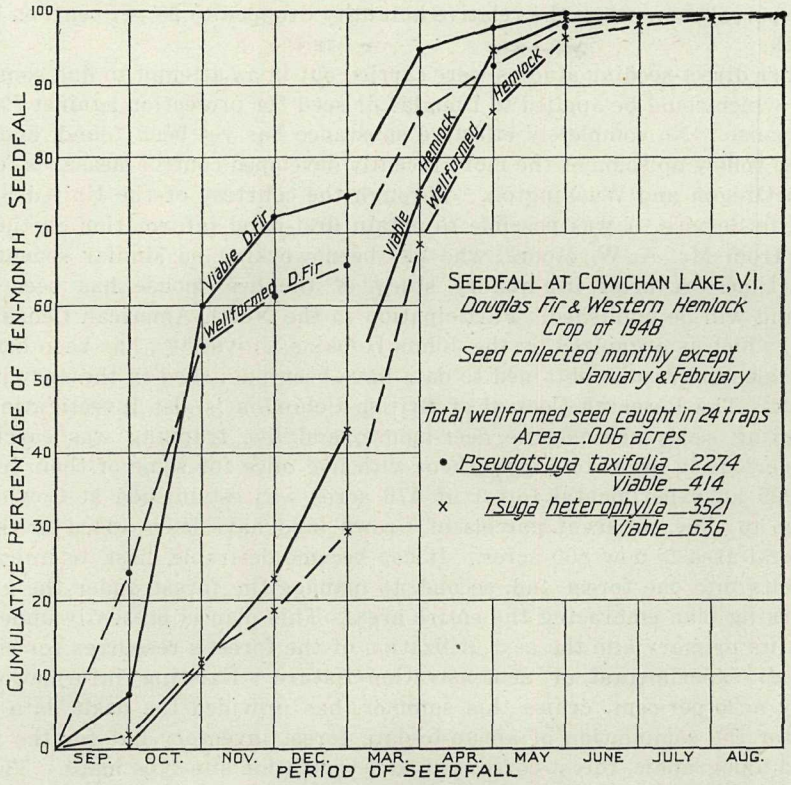
At Cowichan Lake 108 individual trees have been under observation for a number of years for the purpose of recording the annual fluctuations in cone production; some are 40 to 50 years old, some 70 to 90 years old, and the remainder are residual veterans from the original stand. Some of the trees are located on the margins of stands while the veterans are growing over a younger understory. In 1949 there was an intermediate-sized crop similar to the one in 1948. The best individual crop on a mature Douglas fir rated fair with a production of 1,700 cones; one 90-year-old tree had 1,160 cones, to be classed as a fair crop; and the best young trees had good crops of 1,800 cones on a 50-year-old individual and 1,060 cones on a 40-year-old tree. Sixty-five of a total of eighty-four Douglas fir trees bore cones in 1949, of which twenty had fair crops. The same number of trees had fair and good crops in 1948, but few trees bear in successive years. The exceptions to this rule were two thrifty 80-year-old trees

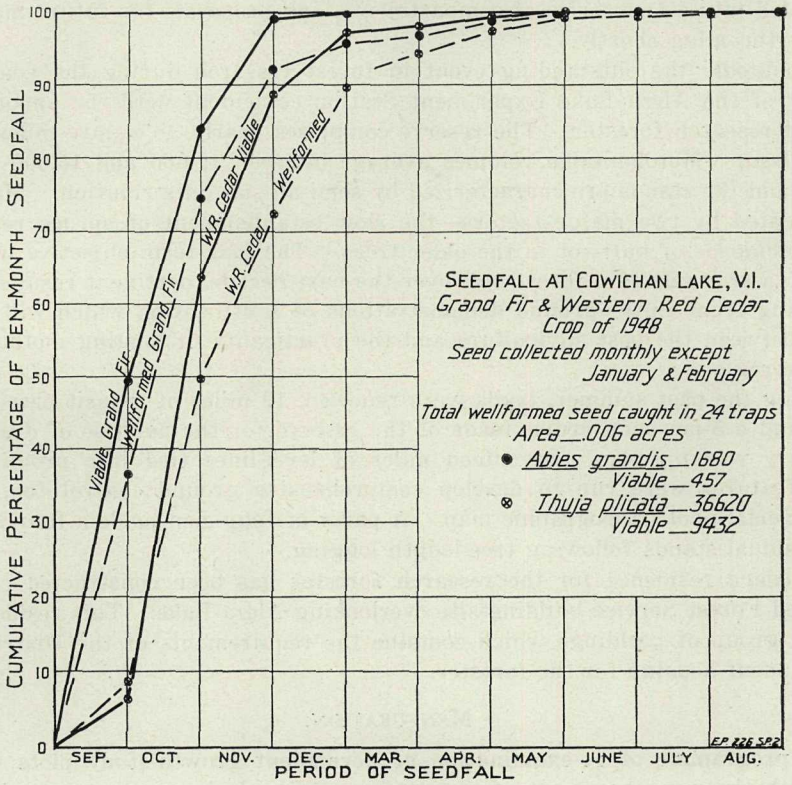
which had fair crops each season. Grand fir had a slightly lighter crop than in 1948, and half of the observation trees had fair to good crops. In the last fifteen years there have been six years when half of the trees of this species bore fair or better crops. The trees representing Grand fir and Western white pine are in the 90-year age-class. By contrast to the Grand fir, the white pines had no crop in 1949 and, over the same period of observation, on no occasion have half of the trees borne a fair or better crop.

In order to determine more definitely the monthly distributions of seedfall for the Coastal conifers, a study was made at the Cowichan Lake Station of the dissemination from a moderately good cone crop in 1948. A systematic pattern of twenty-four seed-traps (0.006 acre) was established in the central third of a 1-acre plot. The sample acre was about 1 chain inside the margin of a stand adjoining a clear-cutting made twenty years ago. Within the plot were eighty-nine trees, situated not farther than a half-chain on north and south sides and 1 chain on east and west sides from the traps. Sixty-six were potential seed-trees and twenty-one bore cones in 1948. Douglas fir ranged in size from 20 to 62 inches D.B.H., and cone-crops increased with diameter. Hemlock was small, with diameters from 12 to 18 inches. Western red cedar trees were 31 to 71 inches D.B.H., and Grand fir (*Abies grandis* Lindley) 15 to 42 inches. Probably contributing to the seed collected on the plot are two 400-year-old Douglas firs near the boundaries; one is 64 inches D.B.H., 214 feet high, and bore 15,000 cones in 1948. Details of the cone-crop on the plot follow:—

Species.	Number of Trees.	Type of Cone-crop.				Total.
		Excellent.	Good.	Fair.	Poor.	
Douglas fir	7	1	2	....	2	5
Hemlock	42	....	1	1	6	8
Cedar	5	....	....	3	1	4
Balsam	12	....	1	2	1	4
Totals	66	1	4	6	10	21

The accompanying graphs, showing the distribution of fall for this crop, indicate that dispersal was well maintained to the end of December from a start in early September for fir, balsam, and cedar, and late September for hemlock. Strong winds on eight days in November helped to keep up the rate of fall, despite an exceedingly wet month with relative humidity not lower than 80 per cent. on twenty days. As would be expected for a species with deciduous cones, balsam seed fell early in the season and had all fallen by December in the year of production. Cedar also fell early with 97 per cent. of viable seedfall in the same four-month period, compared to 75 per cent. for fir and the much slower dispersal of 43 per cent. for hemlock. Hemlock increased its rate of fall in March, and in April dissemination was at the same rate as in December. It will be noted that, despite a delay of one month in release of seed, cedar follows a similar course to balsam in making a rapid dispersal of the crop. The large fir-trees outside the plot must have had a considerable influence on seed-catch, as the catch of 380,000 per acre for fir is better than indicated by the cone-crop. The trap catches of 600,000 hemlock per acre and 6,100,000 cedar per acre roughly reflect the respective cone-crops. Apparently about 280,000 seeds to the acre of balsam can be expected from a fair cone-crop on these trees. Repetition of the experiment coincident with a good crop is needed. The same balsam-trees bore a light cone-crop in 1949. In following the course of seedfall in September by collections at intervals of four days, it was noted that seed-catch was extremely uniform at 1,200 per acre per day from the beginning, except for one period from September 4th to 8th when the rate increased to 4,750 per acre per day. Prior to the latter date the weather had been clear and calm for two weeks, with maximum temperatures between 80° F. and 89° F., but the sudden burst


SEEDFALL AT COWICHAN LAKE, V.I.
Douglas Fir & Western Hemlock
Crop of 1948
Seed collected monthly except
January & February
Total wellformed seed caught in 24 traps
Area .006 acres
• Pseudotsuga taxifolia 2274
Viable 414
× Tsuga heterophylla 3521
Viable 636
Viable D.Fir
Wellformed D.Fir
Viable Hemlock
Wellformed Hemlock
CUMULATIVE PERCENTAGE OF TEN-MONTH SEEDFALL
PERIOD OF SEEDFALL
SEP. OCT. NOV. DEC. MAR. APR. MAY JUNE JULY AUG.


SEEDFALL AT COWICHAN LAKE, V.I.
Grand Fir & Western Red Cedar
Crop of 1948
Seed collected monthly except
January & February
Total wellformed seed caught in 24 traps
Area .006 acres
• Abies grandis 1680
Viable 457
⊗ Thuja plicata 36620
Viable 9432
Viable Grand Fir
Wellformed Grand Fir
W.R. Cedar Viable
W.R. Cedar Wellformed
CUMULATIVE PERCENTAGE OF TEN-MONTH SEEDFALL
PERIOD OF SEEDFALL
SEP. OCT. NOV. DEC. MAR. APR. MAY JUNE JULY AUG.
EP 226 SP2

of seed-dispersal came when the relative humidity dropped to 20 per cent. on September 5th and 6th.

Further direct-seeding studies were carried out in an attempt to find some repellent substance which could be applied to Douglas fir seed for protection against *Peromyscus*, the deer-mouse. No completely effective substance has yet been found, and it is now intended to follow up some of the more recently developed control measures found satisfactory in Oregon and Washington. Through the courtesy of the United States Fish and Wildlife Service, it was possible to obtain first-hand information on these control measures from Mr. A. W. Moore, who has been working on similar rodent problems for some time. A brief life-history study of the deer-mouse has been completed recently and will be published. Participation in the North American Census of Small Mammals, which is organized by the Johns Hopkins University, has been continued on a larger scale, and results obtained to date have been published in the annual report of the project. The Research Council of British Columbia is also investigating methods for protecting seeds against the deer-mouse, and live trapping was carried out at different periods in order to supply them with live mice for some of their tests.

In 1929 an experimental forest of 476 acres was established at Cowichan Lake. From time to time, adjacent parcels of Crown land have been added to the reserve, and the total area is now 800 acres. It has become desirable, first, to integrate these several units into one forest and, second, to manage the forest under the guidance of a new working plan embracing the entire area. This plan is presently under preparation, with its primary aim the best utilization of the forest's resources for silvicultural work of an experimental or demonstration nature. Existing information, supplemented by a 20-per-cent. cruise this summer, has provided the basic data necessary, not only for the compilation of an up-to-date forest inventory but for the production of detailed topographic, forest-cover, soil, and vegetation site-type maps. The area has been divided into a new series of compartments, and proposals for future management will be forthcoming shortly.

Undoubtedly the outstanding event in forest research during the year was the reopening of the Aleza Lake Experiment Station coincident with the appointment of a resident research forester. The reserve comprises nearly 28 square miles of virgin spruce-balsam. Merchantable volumes average between 12,000 and 15,000 board-feet per acre, and the stands are characterized by semi-all-sized distribution. Management is complicated by two major factors—the slow establishment of spruce reproduction and the incidence of butt-rot in the older trees. The long-term objective will be conversion to a true selection forest but, over the next decade, pertinent results should be forthcoming from on-the-ground demonstrations of a utilization which will be a compromise between the best silviculture and the practicality of logging methods now in use in the region.

During the past summer, trails were renewed, 19 miles of transit base-lines were cut out, and a 5-per-cent. cruise made of the reserve for the purpose of drawing up a preliminary working-plan. Seventeen miles of level-lines tied into prominent topographic features were run to develop comprehensive ground control for a 20-foot-interval, aerial-photo, topographic map. A party of four men made a four-week study of the residual stands following tree-length logging.

A modern residence for the research forester has been constructed on a newly established Forest Service building-site overlooking Aleza Lake. This residence forms part of a group of buildings which combine the requirements of the District Ranger and permanent housing for the forester.

MENSURATION.

The programme of re-examination of permanent growth-study plots was maintained with the remeasurement of twenty-five standard plots. One party in the field

for three months established 140 line plots in nine series of the upper slope and plateau types east of Vernon and Kelowna.

Volume Tables.

During the year the following new site-class volume tables based on cubic feet were prepared: Lodgepole pine, yellow pine, and Western larch. Additional tables prepared were standard D.B.H.-total height table for Western white pine and Western larch. The following tables were also prepared, based on board-feet: Site-class volume table for lodgepole pine, Western white pine, yellow pine, Sitka spruce, Interior spruce, and Interior balsam. Site-class tables in board-feet and cubic feet are now completed for our mature commercial conifers.

Growth Studies.

An analysis of the data from permanent plots on the Coast and the Interior is being continued. The preparation of a yield table for Douglas fir based on vegetative site types has been started. Yield tables for hemlock and mixed Douglas fir-hemlock types will be completed next year. Volume tables for these types will also be prepared.

The following data were derived from the growth-and-yield permanent plots established in 1949:—

TABLE 1.—SUMMARY OF GROWTH AND YIELD PLOTS, ESTABLISHED 1949, KAMLOOPS FOREST DISTRICT.

(Empirical yield per acre.)

Plot No.	Basis Number of Sub-plots.	Type.	Total Age.	Site Index.*	Basal Area.	Average D.B.H.	Range D.B.H.	Volume.		Mean Annual Increase.		Total Volume per Cent. of Yield-table Volumes.
								Total.	Merch.	Total.	Merch.	
Plateau Types.					Sq. Ft.	In.	In.	Cu. Ft.	Cu. Ft.	Cu. Ft.	Cu. Ft.	
347	5	Pl	51	70	124	5.4	2–10	3,386	1,441	66	28	92
	8	Pl	51	80	123	5.2	2–10	3,566	1,418	70	28	86
	3	Pl-S	51	90	165	5.9	3–14	4,780	3,133	94	61	73
339	7	Pl	70	75	155	6.0	2–10	5,158	2,613	74	37	91
	9	Pl	70	85	179	6.8	2–14	6,547	4,718	94	67	107
345	16	Pl-S	100	85	217	8.5	2–17	8,785	7,563	88	76	120
346	8	Pl	102	80	196	7.7	3–13	8,142	6,691	80	66	100
	8	Pl	102	90	210	8.6	3–14	9,343	8,454	92	83	109
342	16	S-Pl	110	S-85 Pl-80	179	9.1	2–20	6,806	5,927	62	54	90
341	2	Pl	110	60	220	6.4	3–11	6,880	3,552	63	32	117
	9	Pl	110	70	221	7.9	3–14	8,087	6,095	74	55	106
	5	Pl	110	80	232	8.5	4–14	8,951	7,263	81	66	105
Lower Sidehill Types.				Average Max. Ht.								
338	16	F-L-Pl	68	95	120	8.4	2–16	3,821	3,002	56	44	.....
361	12	L-F	73	L-80 F-70	145	5.2	2–14	3,559	1,899	49	26	.....
360	9	Pl-L-F	75	80	143	6.1	2–13	4,788	3,622	64	48	.....
	7	Pl-L-F	75	90	168	8.2	2–16	5,800	4,400	77	59	.....

* Site Index Pl at 80 years; spruce at 100 years.

Total volume comprises entire peeled stem of all trees 1.6 inches and over. Merchantable volume includes all trees 7 inches plus; Pl—1-foot stump 3-inch top, S—1.5-foot stump 5-inch top, F—1-foot stump 6-inch top, and L—1-foot stump 4-inch top.

Lodgepole pine makes up 20 per cent. of the merchantable timber in board-feet, B.C. Log Rule, and a larger percentage by cubic feet, of the Okanagan Drainage. It ranks next to Douglas fir in abundance. The very extensive stands on the plateaux above 4,000 feet elevation are well stocked. The plots 100 years and older, laid out to give average stocking, have volumes equal to or greater than the yield tables. The merchantable mean annual increment in cubic feet is pleasingly high. The lower stocking of the 51-year-old stand may be partially due to a serious perennial canker prevalent on 25 per cent. of the trees. The present increase in diameter in the 100-year-old stand is very slow and height-growth is rapidly falling off. This table shows that these stands range from 3 to 14 inches D.B.H. at 100 years, and better than 80 per cent. of the total volume of wood is merchantable, allowing for a 1-foot stump and utilizing trees to a 4-inch top. Logs cut from these stands will be small.

A lodgepole pine along the Hope–Princeton Highway required forty-five years to grow 1.6 inches in diameter breast height before release and increased 3.1 inches in diameter in the last thirteen years. This indicates that, under favourable conditions, lodgepole pine will respond to intermediate cuttings. The object should be to have the potential wood production put on the fewest number of trees that will utilize the soil nutrients and moisture fully so as to obtain the largest-sized trees and, at the same time, utilize wood which is now lost through mortality. The upper limits of the range in diameters—namely, 14 inches at 100 years—may not be increased, but the lower limits can be moved up and larger average logs produced.

The upper sidehill Douglas fir-larch-lodgepole pine types are producing good yields. A large percentage of the larch, even in the 70-year-old stands, is badly infected with heart-rot. This is an abnormal condition for other species of this age. The Douglas fir and lodgepole pine associates appear sound. This type at present is being used for lumber and ties.

A plantation of Norway spruce established in May, 1939, has been reserved as a permanent plot. A check-plot occupied by indigenous spruce was established in the vicinity. During the last eight years the average dominant Norway spruce grew 7.7 feet, compared with 4.4 feet for the native spruce on the check-plot.

The number of years to grow to height of ring-count was determined for the lodgepole pine-spruce plots. The study was made on a seedling stand following fire. The largest lodgepole pine or spruce on each block of 0.005 acre was felled and the height-growth determined. Lodgepole pine required 3.2 years to grow 1 foot with a standard deviation for individual trees of 0.81 year. It required 8.7 years to grow 4.5 feet with a standard deviation of 1.00 year. The number of samples required for a given precision varies with the standard deviation. It would require fewer trees when counts were made at 1 foot than at 4.5 feet. Spruce required 4.4 years to reach 1 foot in height with a standard deviation of 1.14 years, compared with 13.0 years to reach 4.5 feet with a standard deviation of 1.92 years. It requires about three times the number of trees to obtain the same precision when ring-counts are made at breast height compared with stump height. Other studies with Douglas fir, Sitka spruce, and hemlock showed less variation at 1 foot than at 4.5 feet. For this reason all counts should be made at 1 foot where possible. Boring trees below 1-foot height is seldom practical. A further analysis of age data indicated that sufficient ring-counts should be made at 1 foot to give a standard error of the mean of one year instead of two years which was the previous standard.

The volumes of permanent plots are determined from total height curves and D.B.H.-total height volume tables. An analysis of the variation between height curves prepared by freehand method and by the formula $H=a+bD-cD^2$ is being studied. In the above formula a, b, and c are constants determined from the sample of D.B.H.-height measurements and D is the diameter at breast height. The analysis is not complete but the study indicates that, for extensive work such as the preparation of

height curves for temporary plots, height curves for cruising, and long-term calculations for permanent plots, the curves calculated by formula are satisfactory; but, for determining periodic growth over relatively short periods, well-balanced freehand curves are preferable because a difference of even 1 foot in a curve where the periodic growth is 8 feet in five years will make a difference of at least 12 per cent. in volume. The most precise means of determining volume in permanent plots would be based partially on the height of every tree. The degree of sampling necessary for high precision is being investigated.

An analysis of the relative accuracy of cruise data by 2-inch, 4-inch, 6-inch, and 8-inch diameter classes indicates that, for the spruce-balsam type, 4-inch diameter classes give a satisfactory result. A full discussion of this subject is being prepared in the form of a research note to be published in due course. There is also in progress an analysis of the variation in total cubic volume per acre in the uneven-aged spruce-balsam types to ascertain the intensity of examination necessary to estimate total volume of stand within prescribed limits of error. For example, a 1-per-cent. cruise of a 3,000-acre type or a 5-per-cent. cruise of a 600-acre type gives a result within an error of 10 per cent.

Annual growth percentage is usually based on changes in basal area, height, and form. The change in basal area is most important, and this is usually determined from the D.B.H. and number of rings in the last inch of radius. Owing to irregularities of growth this number varies with different positions around the bole of the tree at breast height.

An analysis of two borings on each of 255 hemlock, 314 balsam, and 299 spruce gave an average difference, disregarding sizes for individual trees, of 25, 25, and 37 per cent. respectively for the different species. This variation indicates that several borings on a tree are necessary to determine the average growth in radius within reasonable limits. The same principles apply where precise measurements are being made for weekly or monthly periods.

PRELIMINARY SITE-CLASS TABLE—MATURE WESTERN LARCH (*LARIX OCCIDENTALIS*).

(Gross Merchantable Cubic Feet.)

D.B.H.	Site Index.										Top D.I.B.	Number of Trees.
	40.		60.		80.		100.		120.			
	Average Maximum Height.											
	68.		95.		120.		145.		170.			
	Total Height.	Volume.	Total Height.	Volume.	Total Height.	Volume.	Total Height.	Volume.	Total Height.	Volume.		
8		4.1		5.5		6.9		8.2		9.6	5.7	5
10		8.5		11.2		14		16		19	6.0	5
12		14		19		23		26		30	6.3	5
14		21		28		34		38		43	6.6	5
16	62	29		38		45		52		60	6.9	5
18	66	38		49		60		69		81	7.2	6
20	68	49		63		76		88		104	7.5	5
22	68	59	91	78		95		110		127	7.8	5
24	68	70	94	95		115		134		155	8.1	5
26	68	82	95	112	116	137		160		185	8.4	5
28	68		95	129	118	160		187		218	8.7	5
30			**95**	146	120	184	140	215		254	9.0	6
32			95	164	120	208	142	242	165	291	9.3	5
34			95	184	120	232	144	275	167	328	9.6	5
36			95	203	120	257	145	310	167	365	9.9	5
38					**120**	283	145	344	168	405	10.2	6
40					120	310	145	377	168	450	10.5	2
42					120	338	145	410	169	492	10.8	2
44							**145**	444	169	538	11.1	4
46							145	479	169	584	11.4	1
48							145	515	170	625	11.7	0
50							145	553	170	670	12.0	0
52							145	592	170	715	12.3	3
54							145	633	**170**	760	12.6	2
56							145	674	170	810	12.9	0

Volume in cubic feet, allowing for 2-foot stump and top D.I.B.'s shown. Heights based on all available data from cruises by Forest Service prior to 1949. Site index based on report by Cummings Northern Rocky Mountain Experiment Station, U.S.F.S. Volumes based on measurements made by unknown personnel of B.C.F.S. and C.P.R. Figures in bold-face type mark maximum heights for site class found in basic data. No site 40 occurred in basic data. 1949.

PRELIMINARY SITE-CLASS TABLE—MATURE LODGEPOLE PINE (*PINUS MURRAYANA*).

(Gross Merchantable Cubic Feet.)

D.B.H.	Site Index.											
	40.		50.		60.		70.		80.		90.	
	Total Height.	Volume.	Total Height.	Volume.	Total Height.	Volume.	Total Height.	Volume.	Total Height.	Volume.	Total Height.	Volume.
6	48	4.5	53	5.0	59	5.6	64	6.1				
8	54	9.3	61	10.5	68	11.8	74	12.8	80	13.9		
10	56	14.8	66	17.5	75	20.0	83	22.2	90	24.1	97	25.9
12	56	20.6	69	25.6	80	29.8	89	33.2	98	36.6	106	39.6
14	56	26.9	69	33.5	82	40.0	93	45.5	104	51.0	114	56.0
16			69	41.6	82	49.7	96	58.4	108	65.9	120	73.3
18					82	57.8	96	67.9	110	78.1	123	87.5
20							96	75.1	111	87.2	125	98.5
22									111	93.9	126	106.9
24											126	114.0

Gross volumes—no deductions for defect.
Merchantable cubic feet—1-foot stump to a top D.I.B. of 3 inches.
Site index—average height of dominant and co-dominant trees at 80 years.

PRELIMINARY SITE-CLASS TABLE—MATURE WESTERN WHITE PINE (*PINUS MONTICOLA*).

(Gross Merchantable Cubic Feet.)

D.B.H.	Site Index at 100 Years.								D.B.H.
	70.	80.	90.	100.	110.	120.	130.	140.	
	Average Maximum Height.								
	97.	111.	125.	139.	153.	167.	180.	194.	
8	7.54	7.64	7.65	7.65	7.65	7.65	7.76	7.76	8
10	15.6	16.0	16.2	16.4	16.4	16.6	16.6	16.7	10
12	24.6	25.8	26.1	26.6	27.0	27.2	27.4	27.6	12
14	35.8	37.8	38.6	39.8	40.2	41.0	41.4	42.0	14
16	47.7	51.2	53.3	55.3	56.4	57.9	58.4	59.3	16
18	**60.5**	66.1	70.5	73.6	75.6	77.5	78.7	80.0	18
20	73.2	82.2	88.3	93.6	96.5	99.5	101	103	20
22	85.9	**98.2**	107	114	119	123	127	130	22
24	99.4	114	127	137	143	150	154	158	24
26		130	**146**	160	169	178	184	189	26
28			165	**183**	196	207	215	222	28
30			185	206	224	238	249	258	30
32				229	**252**	271	284	295	32
34					281	305	321	338	34
36					310	**339**	359	380	36
38					340	372	397	423	38
40						406	**435**	466	40
42							473	508	42
44							511	**551**	44
46							550	594	46
48								638	48
50								685	50

Gross merchantable volumes in cubic feet; 2-foot stump; top D.I.B.=4.5+0.15 D.B.H., O.B. No allowance for defect or breakage. Diameters at which average maximum heights occur are in bold-face type. Average site index for Interior stands, 100 feet at 100 years.

PERMANENT STUDY-PLOTS ESTABLISHED AND IN USE AS AT DECEMBER 31ST, 1949.

Description of Project.	Number of Plots. Project.	Gp.
Growth and yield studies—		
Coast forest types	559	
Southern Interior types	184	
Central Interior types	185	
		928
Silvicultural studies—		
On cut-over land—		
Seed dissemination from standing trees	8	
Survival of seed-trees	4	
Artificial seeding	5	
Growth of exotic trees	2	
Competition between broom and Douglas fir	1	
In young stands—		
Thinnings	10	
Prunings	7	
Christmas-tree cuttings	1	
In mature stands—		
Selective cutting	4	
Slash-disposal methods	6	
		48
Total number of plots		976

Regional studies—	Number of Plots.	Acres.
Natural regeneration in representative districts—		
Alberni, Vancouver Island	1,200	4.8
Cowichan Lake, Vancouver Island	600	6.0
Alouette Lake, Fraser Valley	500	5.0
Cumshewa Lake, Queen Charlotte Islands	80	0.1
Totals	2,380	15.9

REFORESTATION.

FOREST NURSERIES.

Weather conditions, which play such an important part in the production of planting stock, were directly responsible for heavy losses in our forest nurseries during the winter of 1948–49. Extending over a period of three months, temperatures were the lowest on record, and the resulting frost damage was most severe. Precipitation during the year was 10 inches below the ten-year average, but this did not materially affect seedling production.

High-pressure blow-torch burning off weeds.

Seed-beds were sown to produce 10,000,000 trees in the spring of 1951. Experimental work on soil-fertility was continued, and details are given in the Economics Section of this Report under "Nursery Fertility Studies." The pathological and entomological services of the Dominion Government also continued their work with damping-off fungus at Duncan and the white-grub problem at Campbell River.

Experimental sowing of hemlock seed was continued, but it will be several years before a definite technique has been established for this species.

At Green Timbers 3,035,500 trees were shipped to spring planting projects and an additional 3,000,000 will be available for planting in 1950. Frost-heaving was so severe in the 1–0 stock that root-pruning was impossible, and the seedlings were left

undisturbed. Four hundred seed-beds were sown to produce 4,000,000 trees in the spring of 1951. A conveyer-belt has been installed, to be used for sorting and counting the trees for shipping to the various planting projects. This is expected to improve the planting stock by establishing greater control over the culling of seedlings. Plantations adjoining the nursery were pruned to a height of 7 feet and bushed out, adding a great deal to the general appearance of the station.

At Campbell River 3,990,000 trees were shipped to planting projects in that area, and 3,500,000 seedlings will be available for planting in the spring of 1950. The white-grub infestation is still a serious problem at this nursery, and it will not be known for some time if the chemical controls attempted have been effective.

At Duncan 1,206,000 trees were shipped to the spring planting projects in the Cowichan Valley. One project planted 490,000 trees in the fall, which brings the total seedlings lifted at the nursery to 1,696,000. An experiment to induce earlier hardening-off of the planting stock was instituted by root-pruning a few of the seed-beds in July and August. The earlier pruning gave good results, with no apparent ill effects to the trees. This experiment will be continued on a larger scale this year and, if successful, it should increase the survival of planting stock in the field.

In the East Kootenay a few seed-beds were sown near Elko to yellow pine, Douglas fir, and white spruce on an experimental basis. The yellow-pine seed from three separate localities was sown and covered with sand and (or) soil. Germination was excellent in some beds, and growth through the summer was up to expectations.

SEED COLLECTIONS.

The cone-crop was practically a complete failure in 1949, except for a small area north of Campbell River where some 200 bushels of Douglas fir were collected for experimental work. Several pounds of Western-red-cedar seed were again collected by shaking trees. The nurseries continue to operate on seed collected during the bumper-crop year of 1945.

RECONNAISSANCE AND SURVEY WORK.

Only one reconnaissance was carried out in 1949 over a logged and burned area of 2,400 acres. Survey work consisted mainly of re-examining and preparing new maps for some 14,000 acres of logged and burned land.

PLANTING.

Heavy snow and a late spring again prevented planting until the latter part of March. The last project completed its quota on May 6th, which is five weeks later than in a normal year. Some 390 acres of Douglas fir were planted at Tahsis, on the West Coast of Vancouver Island, in a logged-off valley which had been burned the previous summer. This was done to ascertain whether Douglas-fir seedlings could compete with the rapidly growing brush which ordinarily takes over the better sites on the West Coast after logging.

The turn-over of planters was rapid at the beginning of the season, but a nucleus of steady men was built up after the first few weeks and most of these remained until planting was completed.

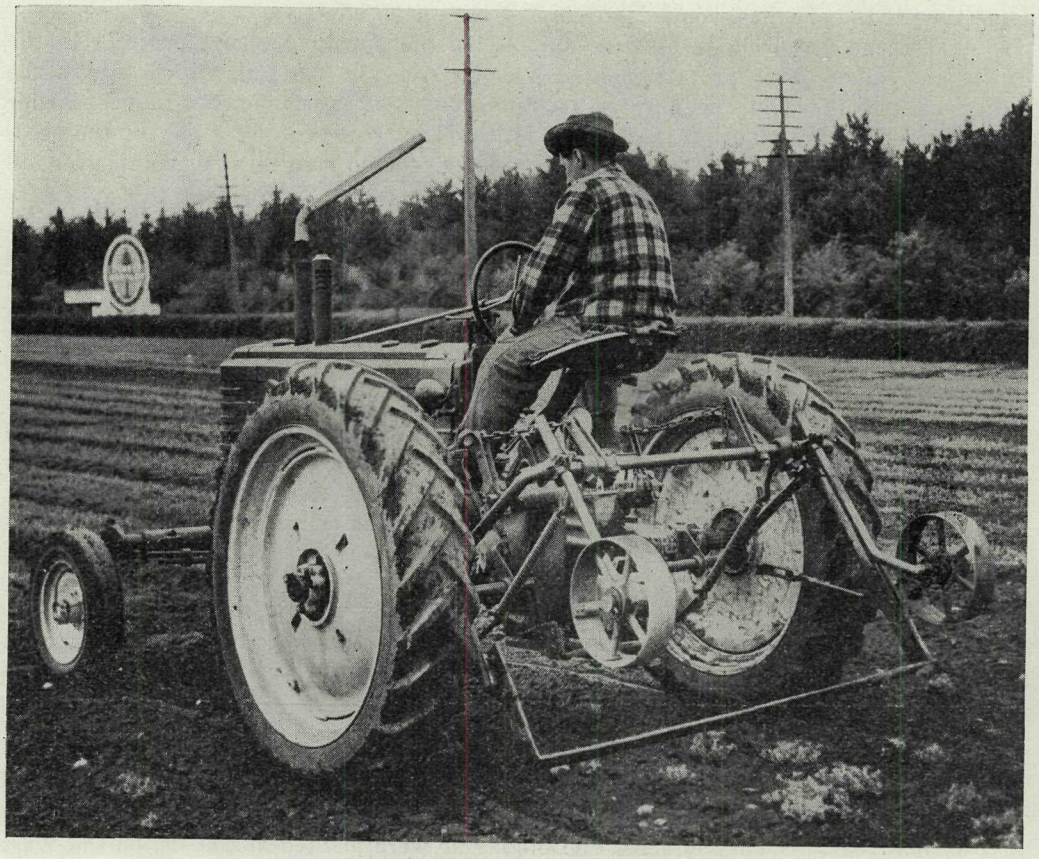
The spring planting programme was carried on from eight camps which planted 6,933,800 trees on 7,785 acres. One project operated during the fall, planting 490,000 trees, at an elevation of approximately 3,000 feet, before being stopped by snow at the end of November. Logging companies reforested another 1,010 acres of their logged-off lands with 855,000 trees.

One plantation suffered from fire damage over an area of 19 acres, bringing the total acreage destroyed by fire to date to 640 acres, which is still well under 1 per cent. of the total area planted. (*See* page 104 of Appendix for statistics of planting over the last ten years.)

PREPARATION OF PLANTING AREAS.

During the year, approximately 100 men were employed at eight projects on snag-falling and road-construction. To make the planting areas accessible, 4.5 miles of new road were constructed and 37 miles of old logging-railroad grade were converted to truck-trails. In addition, 160 miles of forest roads were maintained.

The felling of snags on and adjacent to plantable areas was carried on by hand sets and one power-saw contractor. During the year 170,000 snags were felled on 12,500 acres.



Root-pruner with blade in "up" position.

PLANTATIONS.

Survival examinations were made in the 1946 and 1948 plantations, and plots were established in the 1949 planting. This required 140 man-days of work by experienced personnel. Due to the lack of labour for planting in 1945, it was necessary to hold stock over in the nurseries for the next two years. The 3-year-old seedlings planted in 1946 suffered from six weeks of severe drought, and the average survival, three years after planting, was 63.3 per cent. Similar stock planted in 1947 was favoured by a more-or-less normal spring, and the indicated survival after three years is 72.5 per cent., only 2.5 per cent. lower than the average for all plantations to date. In 1948 the normal use of 2-year-old stock was resumed. The planting season was followed by a very wet spring, and survival after one year averaged 83.9 per cent., which is well above the average for 2-year-old seedlings. Browsing of seedlings by grouse and deer soon after planting showed a very noticeable decrease during 1949.

PARKS AND RECREATION.

INTRODUCTION.

For many years the emphasis on forest use in British Columbia was symbolized by the logging camp and sawmill. Gradually, the aspects of forest protection, reforestation, silviculture, and management were introduced to the public. But participation or interest in these various phases of forestry touched intimately only a relatively small proportion of residents and visitors. In contrast, forest recreation, a still more recent aspect, was quick to catch public attention. The importance of this activity was greatly accelerated by improved access and accommodation facilities for a rapidly increasing number of forest resorts. More leisure time and an awakening of public consciousness to æsthetic and conservation values were other important factors. The drawing power of unspoiled lakes and mountains, and of fish and wild life in relation to the valuable tourist industry, come clearly into focus as a major item to be protected to ensure a promising future.

ADMINISTRATION AND DEVELOPMENT.

ADMINISTRATION.

Increased public interest in parks and forests, coupled with the various projects it has been possible to undertake, has forced a rapid expansion in office and field personnel. The organization of this personnel is complicated by the specialization required on a variety of projects, thus necessitating close supervision. The training of men to assume positions as recreational officers in the Vancouver, Kamloops, and Nelson Forest Districts will materially ease administration problems. The urgency with which facilities are required in Manning and Mount Seymour Parks to serve the great number of visitors brought in through recent highway-construction has led to an accelerated pace in design and development work.

DEVELOPMENT.

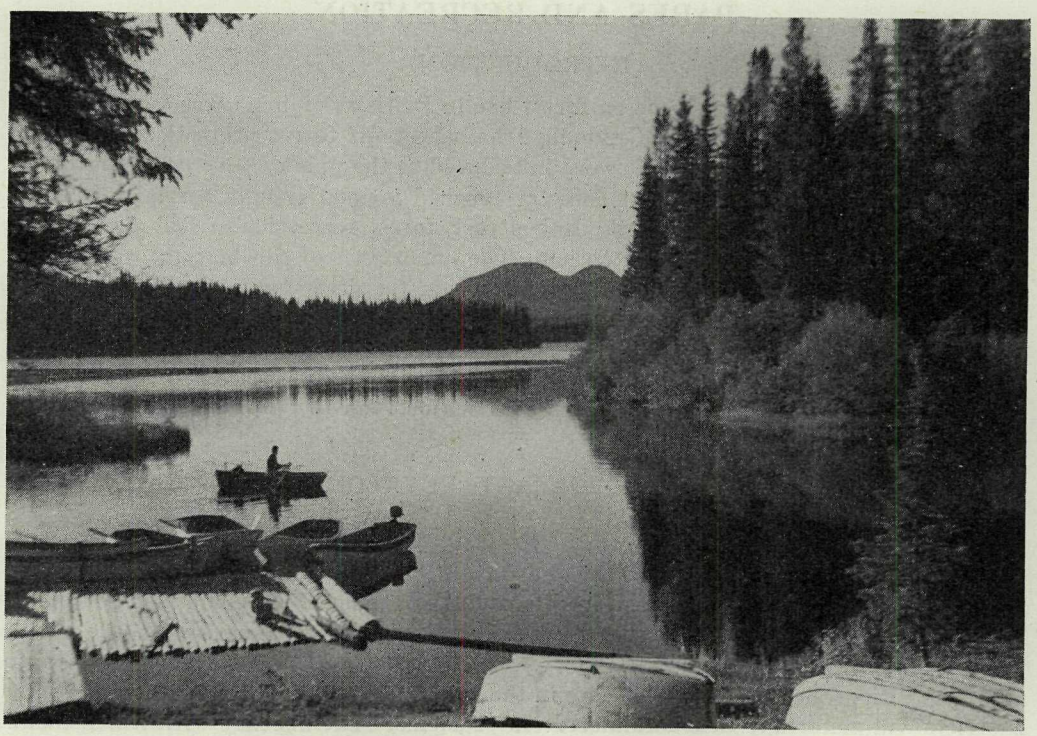
Although, in comparison to previous years, a considerable sum of money was available for development work, it was only possible to utilize it on a relatively small number of urgent and costly projects. This resulted in work being concentrated in the same six widely separated areas as the previous year.

Little Qualicum Falls Park.

Construction of the park-entrance road begun the previous year was completed during the early part of 1949. This involved the moving of approximately 5,000 cubic yards of material to prepare a subgrade and the hauling of 1,000 cubic yards of crushed gravel for surfacing. During the latter part of July, a 2-inch-thick and 20-foot-wide asphalt surface was laid over this road. A parking-lot 100 by 200 feet was also hard-surfaced. A water system was constructed and put in operation. This project required approximately 600 cubic yards of excavation and the placement of approximately 50 cubic yards of reinforced concrete, together with the installation of 3,000 feet of 3-inch wooden pipe and 2,000 feet of galvanized pipe. Construction of the toilet building, with septic tank and disposal pit, required 175 cubic yards of excavation and placement of 25 cubic yards of concrete.

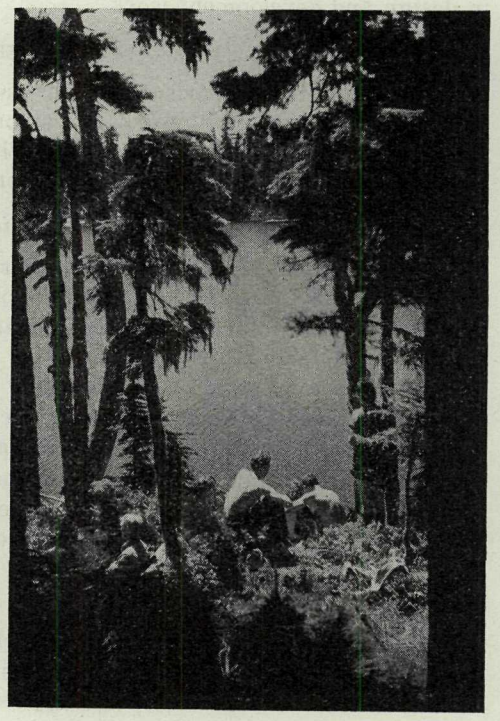
Peace Arch Park.

The much needed facilities of a kitchen-dining building and comfort-station were provided in 1949. Completion of these buildings has resulted in an appreciable increase in the number of park visitors. Approximately 13,000 signed the visitors' register during the period of May 23rd to October 31st, and more than a million persons passed through on the main highway. Landscaping was carried out to enhance the setting of



Fishing resorts benefit by æsthetic appeal.

Provincial parks and forests are rich in wild life.



Visitors enjoy the lakes and forests.

the new buildings and to create pleasant glades for outdoor picnicking. Almost 1 acre of ground has been turned into a conveniently located parking area. As in past years, the planting of some 13,000 annual flowers kept the park colourful during the summer months. Some planting material was provided for the Langford workshop and the Forest Ranger school at Green Timbers.

Manning Park.

During the summer of 1949 more improvements were undertaken than the total in all previous years. Even this amount of work will barely meet the basic requirements of the visiting public. Although all major buildings were constructed by contract, there were time-consuming phases in their erection that were undertaken by the Forest Service. These involved the clearing of land; excavation of basements, septic tanks, and sump holes; supply of building-gravel; back-filling and grading. Approximately 11 acres were cleared, and excavations were dug for three large buildings. Six hundred and twenty cubic yards of washed gravel were delivered to the various building-sites. Topsoil was hauled and rock walls constructed in the initial landscaping. The installation of a light and water service to the administration, service, and concession areas was completed.

Trail and road work undertaken totalled 5.1 miles. In connection with this, repairs were made to trails and one heavy-duty bridge was built on the Lightning Lakes jeep-road.

Mount Seymour Park.

In 1948 the first 3.88 miles of the Mount Seymour Highway were completed to the "Upper Parking-lot." In May, 1949, a contract was let for 2.42 miles to the "Water Hole," and this was further extended by 1.51 miles in August. This brought the entire road under contract, which, when completed, will give access to the park's "mountain-top" attractions. Provision for parking has been made by the location of parking areas both at key view points and near centres of main recreational activity. The administration and service area at the start of the highway was improved by the clearing of 1 acre for the service area and 0.26 acre at the administration building. A 3-inch wooden water-main, 2,500 feet long, now hooks up the administration building and service area to the city water system, although a booster pump had to be installed to step up the pressure. The main improvement to ski-ing facilities was in the clearing of 3½ acres in front of the proposed ski-lodge site. An 800-foot-long ski tow is planned for this area. Logs from the clearing were cut for fuel-wood and the slash carefully burned. Approximately twenty-five park-use permits were issued in the year, and about forty cabins were completed in the cabin area. Accommodation for the first-aid ski patrol was furnished through the erection of a Quonset hut near the ski camp. As in the past, spraying of creeks and lakes with DDT was attended to and further improvement noted in the control of biting insects.

Wells Gray Park.

This vast park dwarfs any efforts undertaken either to protect it or make it more convenient to visit. However, work along these lines has proceeded during the past few years and now a new phase appears imminent in the providing of administration facilities and accommodation for visitors. The main project was the replacing of a bridge across the Murtle River. A crew of men was secured locally and construction commenced in July. About 600 man-days were expended on the project.

Langford Workshop.

A drying-shed, measuring 20 by 54 feet, was added to the workshop, and workshop personnel completed the finishing of the workshop proper and installed necessary wood-

working machinery. During the summer two large entrance signs were designed and built for MacMillan Park. Other signs were planned for Manning Park. Five picnic tables were placed in Little Qualicum Falls Park, and a number of others are under construction. Two additions to the workshop staff will enable construction of an increased number of tables and signs, as well as unique carvings for fireplace plaques, signs, and furniture.

Maintenance.

The five heavily used parks on Vancouver Island were staffed by park attendants supervised by a parks officer. The attendants were kept busy on day-to-day maintenance, which causes work on large projects to be deferred. In order to deal with these, a small mobile crew is being employed during the winter months. Maintenance work on the many miles of trail in Wells Gray Park was supervised by the Park Ranger. In Tweedsmuir Park, a small trail crew spent several months in repairing the trail from near Stuie Lodge to Tanya Lakes, a distance of approximately 50 miles. This is the first maintenance work done on this trail since it was built over ten years ago. The emphasis in Manning Park was on new trail construction rather than the repairing of old trails. In Mount Seymour Park the main trail required a major share of time to keep a route open to the upper park area. That section of the park road already constructed is being maintained and kept open for both summer and winter traffic. Another item requiring annual attention is the provision of fuel-wood for various buildings. In all, over 60 cords of wood were cut during the summer. The intensive maintenance programme required at Peace Arch Park was alleviated by the purchase of a Gravely garden-type tractor with a 72-inch-wide grass-cutting unit and a 72-inch-wide gang-disk spiker.

RECONNAISSANCE AND INVENTORY.

General.

This work has continued unabated throughout the year, but there is a tremendous amount of work still required before the objective of a well-balanced Provincial park system is achieved. Due to the increased number of areas being proposed for recreational purposes, much time has been spent appraising and classifying them. It is also becoming increasingly necessary to appraise the recreational values in relation to other resources and land uses in order to reduce future conflicts of interest as much as possible. These two factors—number of areas to be studied and the degree of appraisal—are at present taking the greatest amount of this Section's time. Because much of the appraisal depends on local and regional factors, a definite attempt is being made to visit and understand the recreational potential and requirements of each district. Contacts with Forest Service district officers, Rangers, and Land Inspectors are gradually tending toward a uniform appreciation of our park standards and requirements. Thus, much of the preliminary appraisal is being done by men in the field best acquainted with local and regional conditions.

Reconnaissance.

During the year some seventy-five reserves or proposed reserves were examined and classified. The greatest number of these were areas readily accessible from major highways. They were given priority because of the increasing need for some type of picnic, camp-site, and lookout points along or near our main highways. Among the more important projects were the following:—

(1) The study of effects of logging along the road to Loon Lake, near Clinton.
(2) A check on the winter-sport potential of Silver Star Park.
(3) A study of the effects of flooding, by the United States Libby Dam project, on the recreational values in the Lower Kootenay River.

(4) A reconnaissance of a potential winter-sport and summer-use area on Mount Brenton, located on Southern Vancouver Island.
(5) An appraisal of the park potential of Hudson Bay Mountain near Smithers.
(6) Completion of the survey of Strathcona Park and the Forbidden Plateau with a view to revising the boundaries to obtain a better recreational unit and reduce conflict, especially with timber utilization.

INVENTORY.

Except for a general inventory of resources necessary for the appraisal of proposed parks or reserves, no complete inventory of our parks has been made to date. A start has been made in Strathcona and Manning Parks in connection with boundary revisions. In both these areas Forest Survey inventories have not been completed as yet but are gradually being compiled.

The over-all park inventory stands as follows:—

General Summary of Parks (as of December 31st, 1949).

Class of Park.	Number.	Acreage.
A	22	290,863.68
B	5	7,054,846.00
C	29	4,004.445
Special	3	1,656,455.00
Totals	59	9,006,209.125

New Parks.

Parks formed during the year 1949 are as follows:—

Name.	Created.	Acres.	Class.	Vicinity.	Forest District.
Beaver Point	6/5/49	35.00	"C"	Saltspring Island	Vancouver
Ivy Green	7/4/49	49.73	"A"	Ladysmith	Vancouver

Decreases in Acreage.

Cancelled: Liard River Special Park of 1,802,240 acres.

Increases in Acreage.

Wells Gray Park, Class "B," increased by 160 acres to 1,164,960 acres.

PLANNING.

GENERAL.

The lack of trained personnel greatly limited the amount of planning that should be done to pave the way for engineering and development programmes. For this reason, attention could only be given to the more pressing problems.

Two survey crews were engaged in planning work during the summer. One, composed of three university students and a cook, worked in Wells Gray Park, while the other, made up of three forest engineering graduates, examined the Sayward Provincial Forest and recreational problems in both the Kamloops and Nelson Forest Districts. Further to this, a report on cost estimates for æsthetic improvements to the John Hart Dam and townsite development was prepared at the request of the British Columbia Power Commission.

Wells Gray Park.

With the help of the Park Ranger, an investigation was made in the Hemp Creek area to determine park boundaries on the ground and to recommend the most suitable location for a park entrance and Ranger station.

Considerable time was spent in the key areas near Dawson and Helmcken Falls. At both falls a large-scale topographic map was made to guide parking, picnic, and camp-ground planning. Particular attention was given to locating and designing protective measures for view points facing these outstanding attractions.

A preliminary road location-line was surveyed to Helmcken Falls and showed that only 2.7 miles of road would be required to make these spectacular falls accessible to motor traffic.

In an attempt to find a suitable route between Dawson Falls and Murtle Lake, a difficult reconnaissance was made along the north bank of the Murtle River. This revealed that a portion of the route was feasible but that the remaining portion would be extremely costly to construct. Because the value of this trail depends so much on its possible correlation to a fire-protection plan, no definite recommendations have been made until all aspects are investigated.

The trail between Dawson Falls and Clearwater Lake was examined for possible relocations, but no major changes were recommended.

In the important Clearwater Lake region, where a great deal of park use will be concentrated, a detailed topographic map was compiled, with suggestions for the location of a lodge, landing-floats, camp-ground, and pasture. Further to this, two areas were mapped on the west side of Clearwater Lake in a region favoured by aeroplane visitors and also used as a hunting and fishing camp-site.

A general reconnaissance of Murtle, Azure, and Mahood Lakes was facilitated by the co-operation of the Kamloops District office in moving the survey party by aeroplane.

Sayward Forest.

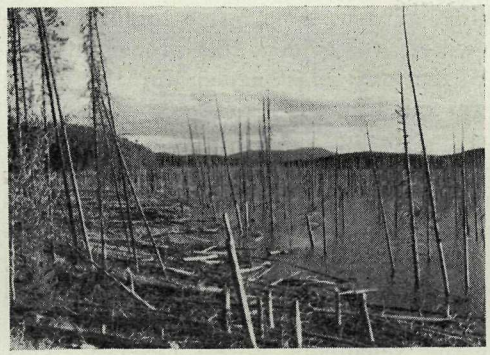
The recreational survey, so obviously required, was carried out in May and June. This survey has attempted to correlate recreational activities with other important land values and plan accordingly for developments most urgently needed. Such integration of land use is especially important in the Sayward Forest, where a multiplicity of purposes occur. Logging, reforestation, management licences, forest protection, hydro-electric power development, wild-life management, and trapping—together with existing tourist businesses and permit holdings—all call for consideration in recreational planning.

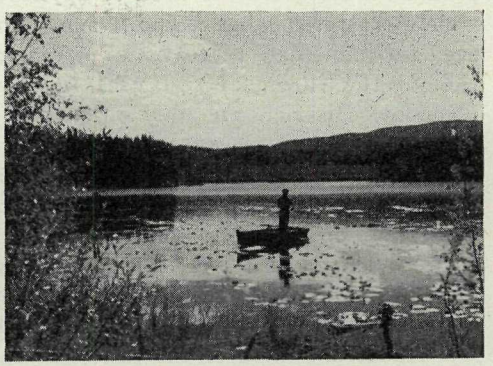
In the course of the work, at least thirty lakes were examined and information recorded dealing with the diverse physical features and cover types. Suitable campgrounds, picnic areas, summer-home sites, and centres for commercial establishments were tentatively selected. Possibilities for view points and features of æsthetic and educational value were considered. The existing road system and the necessary sign system, both directional and educational, were studied. Wild life, weather, and general botanical observations were carried on in the course of the survey. Enough detailed surveying has been completed to allow a mobile crew to begin improvement work.

On a further project, the party spent a week at Elk Falls Park, where recommendations were made for suitable landscaping to cover the many scars incurred in constructing the John Hart hydro-electric development. This report also included cost estimates for proposed improvements reported on in 1948.

Kamloops Recreational Survey.

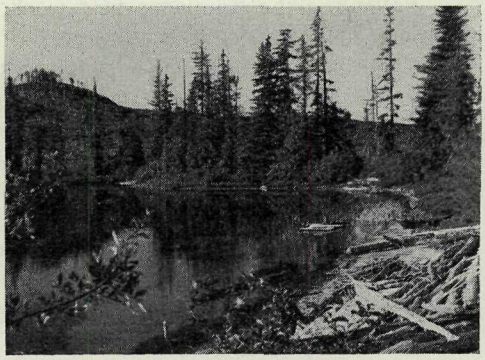
The crew made its headquarters at Kamloops for six weeks while investigating some of the recreational problems of the forest reserves in the district. The main





WATER-STORAGE SHOULD NOT ELIMINATE RECREATION.

Neighbouring lakes in the Kamloops Forest District.

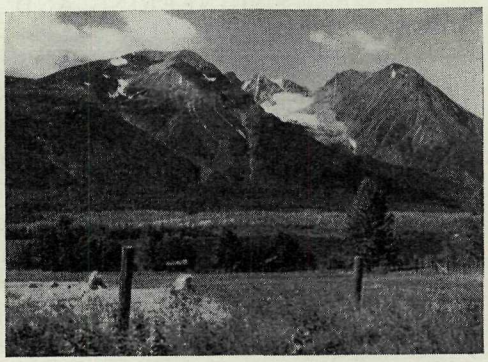


VALUABLE RECREATIONAL AREAS BECAUSE OF AN URGENT NEED AND ADAPTABLE CONDITIONS.

Potential ski-grounds—Mount Brenton, near Duncan.

Potential beach and swimming place—Morton Lake, Sayward Forest.

Defacing of scenic highways is unnecessary.



Investigation may lead to a new park. Hudson Bay Mountain, near Smithers.

problem arose from the flood of applications for fishing camps and summer homes on widely scattered lakes. The urgency for fishing-camp accommodation highlights the need for immediate recreational planning. However, it is evident that proper integration of the various forest uses required a recreational master plan for the entire Kamloops District. A start on such a plan was made in the course of high-priority investigations.

More than forty lakes were examined in connection with applications for special-use permits in various forest reserves. Reports on the lakes were as comprehensive as possible in order to provide information for future, more-detailed planning. The main factors noted were physical and ecological descriptions of lake and surroundings, present public and private use, recreational potentiality, fish and game conditions, and the possible development and status of land in the vicinity.

About one-third of the time was spent in the Nehalliston Forest Reserve. This forest was recently made more accessible by the completion of a road from Little Fort, on the North Thompson River, to Bridge Lake, in the Cariboo.

Nelson Recreational Survey.

Following the Kamloops field work, four weeks were spent in the Nelson District on the reconnaissance and surveying of public reserves and special-use permit areas.

Examinations were as thorough as possible, with a view toward accumulating data for present and future recreational planning. Eighteen separate areas were visited in the course of this work.

A general reconnaissance was made of the Kettle River valleys to study their present and potential recreation values. Suitable areas for public picnic and camp grounds were examined and recorded. The Champion Lakes Reserve was studied to determine its potentialities as a multi-use park. This group of three lakes and the surrounding land were examined in detail, and sufficient information acquired on topography, cover, and present use to prepare a preliminary development plan. A similar study was made of Jewel Lake, near Greenwood.

Cultus Lake.

The more important areas of this popular holiday centre are being surveyed during the 1949–50 winter season. The resulting maps will provide the base on which the location and details of required facilities may be plotted.

ENGINEERING AND ARCHITECTURAL DESIGN.

GENERAL.

The problems posed by highway and bridge location and construction, together with the great amount of surveying and design required in providing services to, and supervising construction of, numbers of buildings has led to the establishment of an engineering section.

With park buildings in urgent need at Mount Seymour and Manning Parks, the preparation of building plans has been an important item in the speed with which contracts can be let. During the year, plans were prepared for the following buildings in Manning Park: Concession building, administration building, crew-house, five-car garage, and power-house. Buildings designed for Mount Seymour Park comprise an administration building and a five-car garage. Plans for the completion of the present Forest Service buildings and alterations to the ski camp were also drawn. In addition, numerous drawings were required for additions and alterations to the above buildings. Building plans for a picnic-shelter and comfort-station in Little Qualicum Falls Park were completed.

Mount Seymour Park.

A survey crew of one resident engineer, a civil engineering graduate, several university students, and a cook were located at the lower-camp buildings during the summer. The work is itemized under the two headings "Surveys" and "Supervision of Contracts."

Surveys—

(1) Preliminary and final location for Mount Seymour Highway, 1.51 miles.
(2) Residency survey work, 2.42 miles.
(3) Reconstruction of Indian River Drive from 16-foot-wide road to 24-foot-wide road, 0.37 miles.
(4) Location of access road for service and administration areas.
(5) Investigation of water system for Mount Seymour Park.
(6) Foundation investigation for proposed lodge.
(7) Parking-lot surveys.

Supervision of Contracts—

(1) Contract for highway-construction, 3.93 miles. Completed to Station 330+00. Remainder 75 per cent. completed.
(2) Construction of parking areas with accommodation for 400 cars. Work completed.
(3) Indian River Drive reconstruction. Work completed.
(4) Clearing of service and administration areas with access road. Work completed.
(5) Contract for construction of five-car garage and administration building. Work completed.
(6) Reconstruction of certain sections of road completed in 1948.
(7) Construction of a ¾-mile length of 2,300-volt power-line. Project completed.

Supervision was given a project to install 2,500 feet of 3-inch wood pipe and a booster pumping-station to supply water to the administration and service areas.

Little Qualicum Falls Park.

In keeping with the present policy of planning development to enable optimum use of Provincial parks, a water system was designed for Little Qualicum Falls Park to meet an estimated eventual need of 3,000 gallons per day.

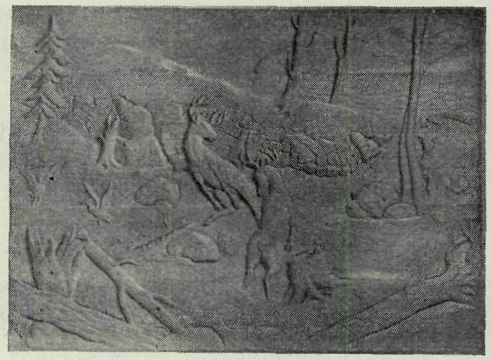
This project entailed the design of permanent casings for two springs, a covered reinforced-concrete catch-basin, a concrete storage-reservoir of 9,000-gallon capacity, together with a distribution system 5,000 feet in length.

Varied picnic facilities were planned adjacent to the new parking area in an effort to protect the scenic background of the falls by removing the heavy use for picnicking and parking from that vicinity. A group of twelve six-place tables, two fireplaces, and a faucet-equipped fountain were designed. Three smaller picnic-sites were laid out. Each unit has a fireplace, convenient water-supply, and a group of from two to four tables. A 24- by 40-foot stone-and-timber picnic-shelter was designed. A toilet building to accommodate men's and women's rooms was designed for location adjacent to the picnic and parking areas.

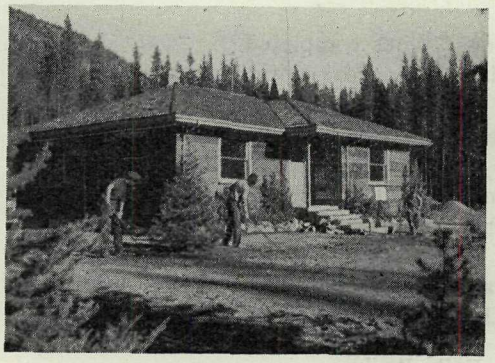
Wells Gray Park.

The replacement of the pack-horse bridge over the Murtle River necessitated the design of a crossing which would be safe during high-water periods and also meet the requirements of vehicular traffic should the need arise.

The bridge, designed for a 15-ton load, has a vertical clearance of 13 feet and a width of 12 feet. The total length is approximately 200 feet, including the approaches. The south approach bridges a rough, rocky portion of river-bed frequently flooded

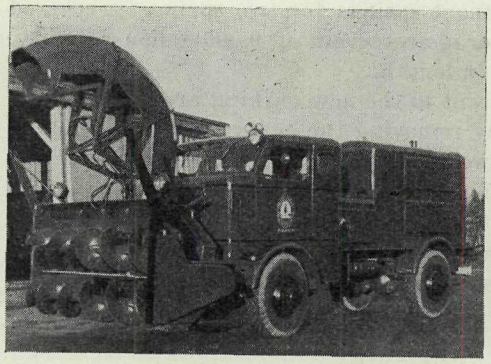


Carved plaques for fireplaces—concession building, Manning Park.



Administration building, Manning Park.

New Murtle River Bridge, Wells Gray Park.



Rotary snowplough for Mount Seymour Highway.

Difficult highway-construction, Mount Seymour Park.

during high water. Here, six spans, each 20 feet in length, were required. The main span over the river was bridged by a Howe truss, 62 feet 6 inches long, and a connection made to the north bank by an approach 16 feet long.

In all, eleven bents were framed but, as two of these were placed adjacent to other bents, only nine concrete footings were required. Twenty-five cubic yards of concrete were poured to form these footings, which were anchored by bolts to the bedrock.

All timbers, with the exception of decking and railings, were treated with a wood preservative. Butt joints were tarred, and bearing surfaces protected from rot by a layer of tar-paper.

Manning Park.

Engineering duties were particularly heavy in this park due to the large number of projects. These, in turn, were necessitated by the urgent need for administration and catering facilities occasioned by the opening of the Hope–Princeton Highway.

The engineering projects covered three main phases, namely, surveying, designing, and supervision of contracts.

Surveys—

(1) Location of dam-site and setting location-line and grade for 3,600 feet of main water-line for station and concession area supply.

(2) Setting location-line for 1,870 feet of primary and 500 feet of secondary power-transmission line.

(3) Staking all buildings, service areas, camp roads, and driveways.

(4) Location of 10 per cent. maximum grade of 3⅔-mile road from highway to first Lightning Lake.

(5) Preliminary line of 3,600 feet from Lightning Lake camp-site to Frosty Creek camp-site.

(6) Preliminary line of 2 miles, with maximum grade of 12 per cent., from Lightning Lakes camp-site along Skyline Trail.

(7) Preliminary line of 5½ miles, with maximum grade of 12½ per cent., from Ranger station to Blackwall Peak, on proposed jeep and riding trail to Three Brothers Mountain. Two thousand six hundred feet at the lower end of this line, plus a 420-foot-long branch, were given final location and grade as an access road for construction of the dam.

(8) Preliminary line of 4½ miles, with maximum grade of 12 per cent., for jeep and riding trail from Ranger station to Windy Joe Lookout.

(9) Preliminary line of 2⅔ miles, with maximum grade of 12 per cent., from Station 64 on Windy Joe Trail along ridge toward Mount Frosty.

(10) Preliminary line of 1¼ miles for riding trail to connect Windy Joe Trail (Station 17) to Lightning Lakes Road (Cambie Bridge).

Design.—A concrete dam and spillway of gravity section was designed to form a reservoir of 43,500-gallon capacity in Station Creek and to provide an intake for the station and concession area water-supply. The water-supply system was also designed. This consisted of 3,630 feet of 5-inch main with valves, house-service branches, and fire-hydrants. This system can be extended as the development of the area progresses.

Supervision of Contracts.—One contract, covering the erection of the park administration building, power-house, five-car garage, and a café and dining-room building, was supervised at all stages and was completed by the end of the year.

A second contract, to build a Forest Service personnel building with accommodation for twenty-six men, has been supervised to its present stage and is expected to be finished by mid-February, 1950.

FOREST MANAGEMENT.

The total estimated value of production for the year 1949 amounted to $331,590,000. This is approximately $30,000,000 less than the total for the previous year, which may be accounted for by curtailment of log output due to climatic conditions and the uncertain markets. The total cut for the Province was roughly 4,050,000,000 board-feet, log scale, being a reduction of some 244,000,000 feet from the previous year. The reduction was general throughout the entire Province, with the curtailment being somewhat greater in the Coast region.

The statistical tables in the Appendix show the details of management activity, and the following comments are offered with respect to the various data submitted.

Paper production exceeded 1948 totals, and home manufacture showed a more favourable balance. Prices remained fairly constant, with the exception of sulphate-pulp products.

Water-borne lumber shipments increased over the previous year, with the United States and the Atlantic Coast materially increasing the volume of lumber received. At the same time, curtailment in the United Kingdom market held the grand total somewhat below the 1948 volume.

Of the total production, which includes all products, Douglas fir again is the leading species, being double the volume of hemlock and overtopping cedar by a greater percentage. Spruce and balsam are next in importance, with the spruce output being about double that of balsam. Larch accounts for 92,000,000 feet, while lodgepole pine increased to 65,000,000 feet. White pine and yellow pine each accounts for about 40,000,000 feet. The balance is made up of deciduous species, including cottonwood.

Considering the origin of the forest production, timber sales account for 1,385,000,000 feet out of the 4,000,000,000, while old Crown grants still hold a production figure of about 1,000,000,000 feet. Timber licences are in third place, but show a reduction from the previous year. Volume production in cubic feet topped 1948 figures and indicates the factor of closer utilization from logged-over lands through salvage operations.

Total number of logging inspection reports was maintained on the same level as the previous year, with timber sales again leading in the type of logging activity. As previously mentioned, the intensity of supervision over this type of logging falls short of ideal, due largely to greatly increased activity and limited staff available to cope with it.

The number of timber trespasses showed a sharp advance and again emphasizes the necessity for more adequate field inspection.

Pre-emption inspections showed a material increase over the previous year due to accelerated co-operation through the assistance of Land Inspectors.

Areas examined for miscellaneous purposes under the "Land Act" were but slightly lower than in 1948 and reflect the continued desire for land use with increasing population. Here again, assistance secured through the Lands Branch Inspectors materially facilitated the work.

Total existing timber sales have dropped from the previous 6,500 to 6,200, but the total number of sales awarded during the year, including cash sales, was on the same level as the previous year. The total area under sale contract is now over 1,500,000 acres, with guarantee deposits in excess of $2,250,000.

A wide range in stumpage prices bid still prevailed owing to the highly competitive nature of many of the chances. The weighted average price bid on all species shows a reduction of about 30 cents from the previous year, the figure for 1949 being $4.05 per thousand, inclusive of royalty.

The number of operating sawmills throughout the Province remains identical with 1948, but a larger number of shut-downs both in sawmills and shingle-mills is indicated, due to restricted marketing conditions prevailing during the last half of the year.

Total log exports show a drop from 1948, the total being 146,000,000 feet as compared with 164,000,000 feet the previous year. As indicated by the record of exports, the demand for lumber products was fully maintained, assisted by the application of export quotas under the Federal Timber Control authority. At the same time, 30,000,000 feet out of the 146,000,000 feet originated on Crown grants with the export privilege, which is about 20 per cent. of the total.

Minor products marketed outside of the Province were valued at $5,500,000, being about $500,000 in advance of the previous year. The United States market took the larger proportion of shipments made, and poles and piling account for 67 per cent. of the total value.

Timber marks and draughting-office work again demanded a high degree of concentration due to the logging activity which prevailed.

SUSTAINED-YIELD MANAGEMENT.

Provision was made in 1947 for the granting of forest management licences to enable practice of sustained-yield forestry by private industry. Two licences are now in effect, for one of which the contract was executed during the year. Both licences are on the Coast. Contracts for an Interior licence (in the Nelson Forest District) are ready for executing and, in addition, drafts of the applicant's working-plan are now at hand for two more licences, for which contracts should be executed shortly. In six other cases, where the application has been approved and a reserve established, working-plans are in various stages of preparation. In all cases a lengthy study of the individual areas is necessary both on the part of the applicants and the Forest Service, for which reason some of the earlier applications are just reaching or have yet to reach the contract stage.

Parallel with private sustained-yield management on an industrial scale is the development of farmer-forestry and of working-circles for public management. During the latter part of the year, technical officers were assigned to the Division to provide for such developments. One officer has been detailed to extension work, with particular emphasis for the time being on the farm wood-lots provided for in 1948 legislation. The other will undertake such field surveys as are needed to complete working-plans for public working-circles. Work has commenced during the year on the Sayward working-circle, a portion of the Sayward Provincial Forest to be managed on this basis, and will be extended to other Provincial forests.

FOREST-COVER MAPS.

In the course of the year, 1,253 maps were revised, as follows: Victoria, 325; district offices, 424; Rangers' offices, 504. Of the above total, 106 are new replacements. New replacements comprise 26 new forest-survey editions distributed to the three offices concerned and 28 present maps replaced for wear and tear.

Instruction in forest-cover mapping and the organization of maps and plans was given to 147 Forest Service personnel, at forty-three points throughout the Province, as follows: Ranger School, Green Timbers, 21; Vancouver Forest District, 16; Prince Rupert Forest District, 22; Fort George Forest District, 37; Kamloops Forest District, 20; and Nelson Forest District, 31.

A set of three key maps has been prepared for distribution to all district offices showing maps available and in the process of being made, as follows: (1) Departmental reference map series; (2) standard topographic maps; and (3) air-survey interim maps. These maps will be periodically returned for revision to Victoria.

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SILVICULTURAL FUND.

In 1946, legislation was inaugurated to provide funds from Crown timber sold east of the Cascade Mountains in order that measures could be undertaken to reduce hazards created by the removal of timber, or to ensure or promote the growth of a second crop, or to provide silvicultural treatment incident to removing the existing stand. The funds are derived from the total stumpage collected and are described as the Silvicultural Fund.

In 1948, after sufficient funds had become available, a commencement was made in the Kamloops and Nelson Forest Districts, with initial action being taken on slash hazards and sawmill waste from bush mills. The Kamloops District had one crew and the Nelson District three to carry out project work.

With more funds being available for personnel and equipment in 1949, the four districts—Prince Rupert, Fort George, Kamloops, and Nelson—launched projects which met with considerable success. All districts engaged one crew to carry out the work, except Nelson which had two. Since the inauguration of these crews, improved methods have developed in the use of equipment, training in personnel, and supervision to show improvement from an economical point of view. As many projects require consideration, a great amount of planning will be necessary in the future, when more experience is gained, equipment becomes available, and trained personnel are acquired.

FOREST ACCOUNTS.

Revenue collections, which have been increasing steadily since 1943, reached a record high of $8,181,860.97 during the calendar year 1949, while charges against logging operations rose to a record $8,655,568.74.

These increases were reflected in a corresponding increase in the volume of accounting and recording work handled by this Division. The number of accounts issued during the year was as follows: Scale and royalty, 37,502; stumpage, 5,373; miscellaneous, 1,242; general, 806; marking-hammers, 2,350; and grazing and hay, 1,576.

Receipts issued for collections received totalled 26,370, while 2,564 vouchers were drawn on Timber Sale Deposit and Suspense Accounts and 38,868 vouchers were issued in connection with Forest Service expenditures. Discharge cheques issued to fire-fighters totalled 7,267.

The mechanical tabulation of Vancouver District Scale and Royalty Accounts, which was commenced in August, 1948, by the Bureau of Economics and Statistics, Department of Trade and Industry, has now completed its first full year of operation and is proving of value in compiling accurate records.

FOREST PROTECTION.

WEATHER.

The 1949 fire season had all the indications of a serious and costly one, at least for the south half of the Province. The early spring was exceptionally dry, but rains decreased the hazard in time to prevent serious flash fires. Similarly, during the summer, the hazard build-up was relieved several times by rain. This was particularly fortunate, as precipitation during the fire season for most of the Province was almost 50 per cent. less than last year. This is reflected in the comparative Table No. 48 (*see* Appendix, showing 1,701 fires in 1949 *v.* 799 fires in 1948).

In the Vancouver Forest District an unusual pre-fire season situation existed as a result of a freak condition occurring early in the previous winter. Prior to the occurrence of snowfall in December, 1948, forest soils were sealed off by heavy frost, with the result that considerably less than average soil-moisture penetration occurred. This caused early evaporation of moisture content of the forest soils and left the stage set for an extremely bad build-up, but the rains and showers of the last half of May saved the situation. The months of June and July, up to July 16th, although not particularly hazardous, saw a gradual build-up in fire risk which was relieved somewhat in the period of July 17th–31st with higher humidities and light rainfall. The month of August was about average until the twenty-seventh, when a serious hazard build-up commenced, extending to September 13th. The situation was again relieved with rains and showers in the last half of September.

In the Prince Rupert Forest District the rainfall was slightly less than in other years but was spread over a greater number of days, thus accounting for a very favourable fire season in the Interior of that district as well as in the Coastal region.

In the Fort George District the weather was generally favourable from the forest-protection point of view and is reflected in the reduced acreage burned and reduced damage figures (*see* Appendix), although the total number of fires (158) was slightly higher than the ten-year average. West of the Rockies the season opened with low hazard due to cool and damp weather until May 9th. From then until May 16th increased temperatures and winds dried out the slash areas, and a flurry of fires in these open areas occurred which did not run in the green timber. The situation was relieved on May 16th by cool and showery weather which, together with the presence of luxuriant green growth, prevented any serious fires. The next hazard period started on July 8th and, although alleviated by showers on July 16th, it was bad while it lasted. The Northern Interior Lumbermen's Association co-operated in asking millmen to take extra care during this period. At this time, also, numerous lightning-strikes occurred, often in accessible areas. From July 16th on, cooler and slightly wetter conditions prevented serious outbreaks. By May 1st the hazard east of the Rockies, particularly in the Fort St. John area, was already high. The situation was eased considerably by scattered showers on May 16th, and after that date, due to lower humidities and rain, the Peace River District had no serious fire-trouble.

In the Kamloops Forest District the weather was unusual in several respects. The early spring was exceptionally dry, but rains decreased the hazard shortly after conditions were right for grass fires. In fact, the Cariboo and Chilcotin were wet all summer, and it was almost fall before the grass turned brown. The central portion of the Kamloops District was quite wet, with a few long dry spells in September. The Okanagan, on the other hand, had particularly dry weather all summer and fall.

In the Nelson Forest District the season was considerably drier than 1948, there being only about 40 per cent. the amount of rain during the fire season. On several occasions the hazard built up to a critical point but, just as the fire situation threatened to become serious, the weather broke and it was reduced by timely rains. The most

prolonged and intense fire-hazard period occurred in mid-April. Due to the reduced rainfall, there was a noticeable lowering in the water-table level, with many creeks, springs, and wells drying up that had not been dry for years. Moderate lightning activity was experienced as usual in the Nelson District, but favourable rains occurred each time and no particular difficulty was experienced in controlling the resulting fires.

FIRES.

Occurrences and Causes.

The 1,701 fires of 1949 were over twice the number of last year and slightly above the ten-year average (*see* Table No. 48 of the Appendix).

For comparison with Table No. 46, shown below is the total fire occurrence by forest districts:—

Forest District.	Fire Occurrence during Ten-year Period 1940–49.	Percentage of all B.C.
Vancouver	3,960	25.48
Prince Rupert	598	3.85
Fort George	1,401	9.01
Kamloops	4,715	30.34
Nelson	4,868	31.32
Totals	15,542	100.00

The actual fire occurrence by months during the 1949 season (*see* Table No. 46) varied in each forest district with the periodic hazard build-up. Fifty-two per cent. of the total fires occurred during July and August, which are the worst fire months of the average season.

The three major causes of fire occurrence were campers and smokers, 29.2 per cent.; lightning, 28.6 per cent.; and railways, 19.1 per cent. Camper and smoker fires were again held to the ten-year average, but it is apparent that there is still much room for improvement and education in this field. Due to rains accompanying most lightning-storms, this cause is below the ten-year average and, as was to be expected, the Nelson and Kamloops Districts accounted for the majority of lightning fires—namely, 77 per cent.

In the Vancouver District 35 per cent. of the fires were due to railway operations, mainly on the Pacific Great Eastern. It is hoped that the recent installation of some diesel equipment will materially benefit the situation next year.

Cost of Fire-fighting.

For details under this heading *see* Tables Nos. 41 and 54 of the Appendix. The latter table covers only wages, food, and transportation of fire crews and not the Forest Service protection overhead as detailed for the previous year in Table No. 40. It is gratifying to point out that this year a gain of 8 per cent. over the last ten-year average was experienced in the number of fires which were extinguished without hiring additional fire-fighting crews.

Comparing Tables Nos. 41 and 52, it will be noted that outside agencies in the Vancouver Forest District report having spent more money on direct fire-fighting than the Forest Service for the entire Province. Actually fifteen of these fires aggregated $74,750 in fire-fighting cost to industry plus an additional $11,000 to the Forest Service.

The three major causes of Forest Service fire-fighting costs are lightning, 46 per cent.; campers and smokers, 28 per cent.; and industrial operations, 17 per cent.

The total cost to the Forest Service of direct fire-fighting for 1949—namely, $94,600—is almost three times that of last year but 34 per cent. less than the average over the past ten years.

DAMAGE.

The total area burned over in 1949 is estimated at 145,549 acres, or less than one-half of the average for the past ten years. This factor and the other comparable factors shown in Table No. 53 are ample proof of the timely breaks in the weather to help combat the 1,701 fires after they started. Again, the Peace River section accounts for the major part of the area burned—namely, 121,900 acres—although the bulk of this was on grazing land.

The total estimated damage to forest-cover from all forest fires during the year was $32,500, or less than 10 per cent. of the ten-year average. The total damage to miscellaneous property—including felled and bucked timber, cold-decked piles, logging equipment, and sawmills—was $326,850. This is well above the ten-year average. From Table No. 52 it will be noted that over 70 per cent. of this damage is attributed to fires caused by industrial operations, and some very expensive lessons were painfully learned, such as the danger of having large stockpiles of cold-decked logs in the woods at the height of the fire season. Seventy-six per cent. of this damage occurred in the Vancouver Forest District and includes damage in such low-risk areas as Wells Pass, Loughborough and Bute Inlets on the Mainland coast, and Tahsis Arm on the west coast of Vancouver Island.

FIRE-CONTROL PLANNING AND RESEARCH.

Fire-occurrence maps and fire-analysis ledgers for all districts except Prince Rupert have been compiled and brought up to date to the end of the 1949 fire season. In addition, new fire-occurrence maps were set up to start the 1950 season in order to prevent overcrowding of the existing maps. A start has also been made to bring the Prince Rupert District as up to date in this work as are the other forest districts.

VISIBILITY MAPPING.

Two visibility-mapping crews were in the field again this year. As in the past, the personnel for these crews were recruited from forestry students at the University of British Columbia. The crews started their work on Vancouver Island, then proceeded to the Prince Rupert, Fort George, and, finally, the Kamloops Forest Districts to survey immediately necessary requirements in those districts. In all, sixty-four possible lookout-sites were examined in detail with visibility maps, and reports completed on each.

The information obtained by the crews was analysed and the results compiled in five separate reports which recommend the establishment of fourteen new primary and six secondary lookouts—three primaries for Vancouver Island, nine primaries and five secondaries for Kamloops, one primary and one secondary for Fort George, and one primary for Prince Rupert.

PANORAMIC LOOKOUT PHOTOGRAPHY.

Lookout photography was reinstituted this season, using a two-man crew. Because it had not been possible to carry on this phase of protection last year, more work had accumulated in the five districts than could be done by one crew in the time available. The advantage of this was that the crew could adopt a flexible plan of operations. When clouds obscured visibility in one district, they were able, on radio advice, to move quickly to another district to take advantage of clear weather there. In all, fourteen lookout points were completed.

Primary lookouts photographed for the first time were located in the districts as follows: Vancouver, 1; Fort George, 2; Prince Rupert, 1; Kamloops, 1; Nelson, 4. In addition, three primary lookout points in the Vancouver District and two in the Nelson District were rephotographed. This latter work becomes necessary when the

forest-cover of the area seen from the lookout changes due to fire, logging, and growth, or where improvements, such as tower-building or clearing, have been made since the last set of photographs were taken.

The loose-leaf holders for the photographs, sent into the field in 1948, have been found to be preferable to the old folding binder type and have, therefore, been adopted as standard. With the multiple sets required for field use, eighty-one sets for this year's work have been completed. The number of lookouts photographed since the beginning of the work in 1936 is 112, of which 16 have been retakes.

Trail and Road Traverses.

As an aid to better fire-control planning, four crews were fielded this year in the Interior forest districts doing nothing but traverse work. These three-man crews were recruited from third-year forestry students at the University of British Columbia, and one was assigned to each district for three and one-half months of traverse work. Their purpose was not only traversing of roads and trails, using chain and staff compass, but also to make notes on the reconditioning work necessary and, particularly, to establish ¼-mile post markers along the trails and roads both on the ground and on the appropriate cover maps. In the Fort George District accuracy was ensured by plotting these traverses first on the available air photographs and thence transferring to the final maps. In all, some 364 miles of existing roads and trails were so traversed.

Weather-recording.

The fire-weather recording system as described in the 1946 Annual Report was continued in the Vancouver Forest District. In all, sixteen stations radioed reports of moisture and precipitation twice daily to both the Vancouver and Victoria offices. Similarly, in the Nelson Forest District, fifteen stations reported to the Nelson office. The subsequent charts prepared were of considerable assistance in giving a graphic representation of the hazard prevailing and in particular of the hazard build-up.

However, it has long been realized that combining this information with the detailed weather forecasts as supplied by the Dominion Public Weather Office, although of much assistance, still leaves a great deal to be desired when it comes to breaking down the general hazard picture to particular localities. With this in view, an experienced meteorologist has been engaged to undertake the study of fire danger, with particular reference to meteorological aspects.

Fire-weather Investigations.

The first step of the forest meteorologist's work was an intensive study of past investigations available for review both on the North American Continent and elsewhere in the world. It is obvious from this study that much remains to be accomplished in this field.

Our studies will be aimed at a clearer understanding of the factors which control fire-danger, such as relative humidity, fuel-moisture, and wind-speed. In addition, studies will be directed toward utilizing, if possible, existing Forest Service and private weather-station data to adapt the available weather forecasts to comparatively smaller areas. At this time it would appear that, because of the profound local influences exerted by topography, all meteorological qualities concerned in rating fire-danger and forecasting local weather conditions will have to be measured on the location for which the rating is required.

It is obvious from the slow progress which has been made over the past several years that we cannot anticipate a rapid solution of the complex problems involved.

Miscellaneous Projects.

Three hundred and twenty-six sets of fuel-moisture indicator-sticks were made up, seasoned, and finally checked by this Division. These were distributed among the Forest Service stations and to those operators in industry who requested them. We are pleased to report a gradual increase in use by industry of these fire-risk indicator-sticks. This year the total was 140 sets among operators in the Vancouver Forest District.

FIRE-SUPPRESSION CREWS.

Fire-suppression crews were again placed in the Vancouver, Kamloops, and Nelson Forest Districts and were again stationed in localities where fires were likely to occur within quick striking distance from existing roads. Three ten-man crews and ten twelve-man crews were fielded for a maximum of 100 days in mid-fire season. Actual locations of the crews were as follows: In the Vancouver District at Langford, Nanaimo, Parksville, and Campbellton; in the Kamloops District at Vernon, Kelowna, Penticton, Princeton, and Kamloops; and in the Nelson District at Elko, Lumberton, Erie, and Kettle Valley. Actual organization of these crews has been previously described in other Annual Reports (*see* page 42 of the 1948 Annual Report). In all, 162 fires were fought, and it will be noted from the table below that 86 were stopped at less than one-quarter acre in size. In the Penticton Ranger District, where the fire-hazard was particularly bad this year, one crew, working in relays, handled 43 fires and certainly proved how valuable a trained force of twelve men was to a hard-pressed Ranger staff.

In view of the fact that the fire-occurrence in 1949 was more than double that of last year, the value of maintaining these thirteen quick-acting fire-fighting crews was emphasized. Actually, they fought 67 more fires this year than the average for the past five years and contributed in no small degree to the low forest-cover damage.

In addition, these crews averaged more than 50 per cent. of their working-time on project work, such as trails and roads, and the results of that work are included in the tabulation on page 66.

RECORD OF SUPPRESSION-CREW ACTION, 1949.

Size of Fire when attacked.	Number of Fires.	Subsequent Spread (by Number of Fires).				
		¼ Acre or less.	Over ¼ Acre to 1 Acre.	Over 1 Acre to 5 Acres.	Over 5 Acres to 50 Acres.	Over 50 Acres.
Spot (up to ¼ acre)	99	86	10	3	....	....
Over ¼ acre and up to 1 acre	23	....	18	3	....	2
Over 1 acre and up to 5 acres	25	....	....	20	5	....
Over 5 acres and up to 50 acres	12	....	....	....	7	5
Over 50 acres	3	....	....	....	....	3
Totals	162	86	28	26	12	10

AIRCRAFT.

With the expiration of the one-year contract of 1948, tenders were called early this year for a two-year contract embracing a further one-year renewal clause. This contract was awarded to Central B.C. Airways, Limited, and included three floatplanes, each capable of carrying a pay-load of 1,000 pounds or better. For the contract season the aeroplanes were stationed at Prince George, Kamloops, and Nelson. All aircraft, while based at these specific points, were available, on call, in any forest district east of the Cascade and Coast Mountains.

All aircraft were fitted with air-to-ground radios and equipped with two crystals of Forest Service frequencies. These radios proved satisfactory throughout the season and were of great value in quick reporting of the fires spotted.

In all, a total of 940 hours were flown under the contract. In addition to fire patrol and spotting fires, these aeroplanes were used for the transport of men and supplies both to fires and some survey parties in distant locations. Dropping supplies by parachute proved successful where there was no convenient body of water large enough to afford a landing. In this connection, the value of aeroplanes with larger carrying capacities was demonstrated and, in the Nelson Forest District, a system of dropping loose lumber was evolved.

To supplement the contract flying, local aircraft were chartered to a limited degree. The outstanding cases in this category were the patrol flying out of Terrace, covering the management licence in the Kitsumgallum area, and fire-reconnaissance flying in the Peace River area.

MECHANICAL EQUIPMENT.

The improvement in supply of mechanical equipment mentioned in last year's Report has continued and, for the first time since cessation of hostilities, all equipment ordered last spring, together with back-ordered items, has been delivered.

AUTOMOTIVE.

It is expected that all future orders for motor-vehicles of standard type will be filled immediately from stock or within a matter of weeks from receipt of order.

Purchase of new equipment during 1949 was as follows:—

Sedans	8
Coupes	9
Coaches	1
Jeeps	2
Station wagons (four-wheel drive)	1
½-ton light deliveries (two-wheel drive)	16
1-ton light deliveries (two-wheel drive)	13
1-ton light deliveries (four-wheel drive)	17
Dodge power-wagons	2
Heavy-duty 5-ton trucks and trailers	4
Snowplough	1
Total	74

The 74 vehicles include 5 back-orders which had not been delivered at the end of 1948. Of the total number, 31 were replacement units and the balance were additional vehicles. A Sicard rotary snowplough was also acquired for use at Mount Seymour Park. The Forest Service fleet now totals 442 vehicles.

TANKERS.

It was decided to try out high-pressure fog-type fire-fighting equipment this year on an experimental basis and, for this purpose, three Bean F.M.C. Model 201F units were obtained. These consist of a light air-cooled gasoline-engine driving a two-cylinder reciprocating water-pump coupled to a live reel containing 400 feet of 7/16-inch high-pressure hose. This assembly is mounted on the top of a 100-gallon (U.S.) water-tank, the whole unit being designed to fit into the box of any popular make of ½-ton pick-up.

Unfortunately, the delay in obtaining an import permit, coupled with slow delivery, made it impossible to give the units a try-out this year. They are now on hand, however, and will be set up at the commencement of our next fire season.

The " drop-on " unit mentioned in last year's Report has proved quite satisfactory, although it was not used to any great extent due to a favourable fire season in the locality where operated.

Trailers, Tractors, and Maintainers.

Four heavy machinery-trailers were constructed during the year to be used primarily for hauling 45- and 60-horsepower crawler tractors, owned by the Forest Service. There are times, however, when haulage of rented tractors for fire-fighting is desired, and the trailers have, therefore, been built to accommodate larger tractors if necessary. The trailers are pulled by 5-ton Model ACR-623 G.M.C. trucks.

Delivery was taken of two 45-horsepower units for the Nelson Forest District, one 45-horsepower unit for the Kamloops District, one 60-horsepower unit for the Fort George District, and one 60-horsepower unit for the Parks Division.

Three Huber maintainers, complete with front-end loader, bulldozer blade, and grading blade, were purchased for the Nelson and Kamloops Forest Districts and the Parks Division.

Outboard Motors, Pumps, and Chain-saws.

Although delivery of outboards was still somewhat limited, it was possible to obtain complete requirements during the year. Some of the units were damaged by a fire which occurred at the Forest Service Marine Station and had to be rebuilt before being put into service. A total of nine were acquired—eight 22-horsepower and one 5-horsepower.

During the year fifty Bennett-MacDonald fire-pumps were manufactured, but assembly was badly disrupted by the fire, resulting in complete loss of these units. The loss was fully covered by insurance. In addition to these units, thirty-nine commercially manufactured medium-weight fire-pumps were obtained and supplied to the field.

During the year eleven chain-saws were purchased for various Forest Service activities, most of these being the one-man type used by our silviculture crews. The modern, small one-man chain-saws have proved to be a very versatile tool, and much of the trouble encountered in the operation of early models seems to have been eliminated by improved design.

Miscellaneous Equipment.

Three gasoline-driven and five automatic electric water systems were purchased and installed in various parts of the Province. Four electric-light plants, exclusive of marine installations, were purchased and installed at outlying Forest Service headquarters. These were two 40-kilowatt diesel plants for Parks Division, a 5-kilowatt diesel plant for Aleza Lake, and a 3-kilowatt gasoline plant for Blue River. In addition, two portable generating sets of 1,500 watts were obtained for the Public Relations Division's motion-picture projectors.

One gasoline-powered cement-mixer was obtained for use by the various park-improvement crews and one for the Fort George District. A Warsop gasoline-powered rock-drill was acquired, to be used for trail-construction in inaccessible locations and assigned to the Vancouver District.

One rather unusual activity completed by the mechanical staff was the design of two mobile cook-cars—one self-propelled and the other a trailer type—which were constructed under our supervision during the year. The cook-cars will be assigned to the ten-man silviculture crews for the present. It is expected that two additional trailer-type units will be completed next year for the Fort George and Prince Rupert Forest Districts.

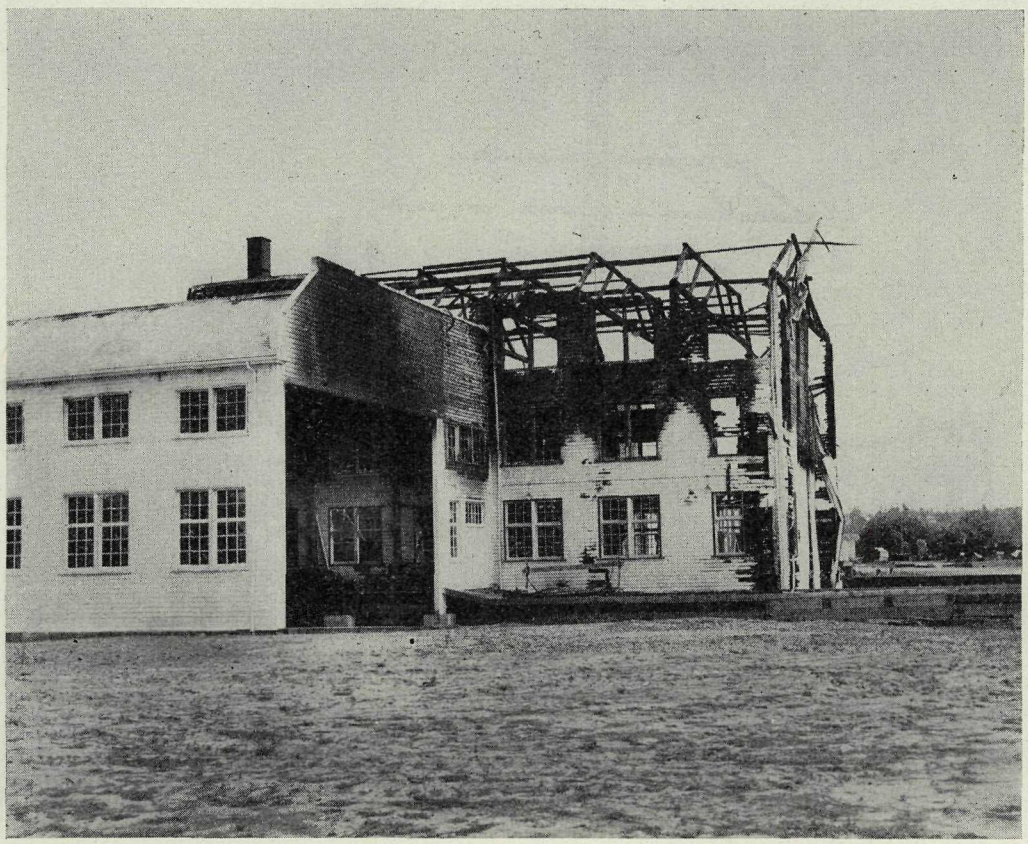
Mechanical Inspection.

The Mechanical Inspectors required to complete organization were obtained, and staff now comprises a Mechanical Superintendent, Assistant Mechanical Superintendent, and five Mechanical Inspectors. Some time was required for special training at the Marine Station, following which the Inspectors were assigned to field-inspection

duties and have operated continuously in the field since June. As a result, in addition to a very thorough inspection of all mechanical equipment, it has been possible for the Mechanical Inspectors to supervise the overhaul of all automotive and heavy-duty equipment in the field.

Arrangements have been made to assign District Inspectors to Nelson, Kamloops, and Vancouver Districts. One Inspector will be assigned to Fort George and Prince Rupert Districts, and one is to be attached to Victoria headquarters for parks, reforestation, economics, and other general utilization.

Following a request by the Department of Finance, the Forest Service Inspectors will check Department of Finance vehicles while on their rounds, and a similar arrangement has also been made with the Lands Branch. The Forest Service's mechanical section will, therefore, be servicing over 600 vehicles during 1950.



Marine Station following fire, May, 1949.

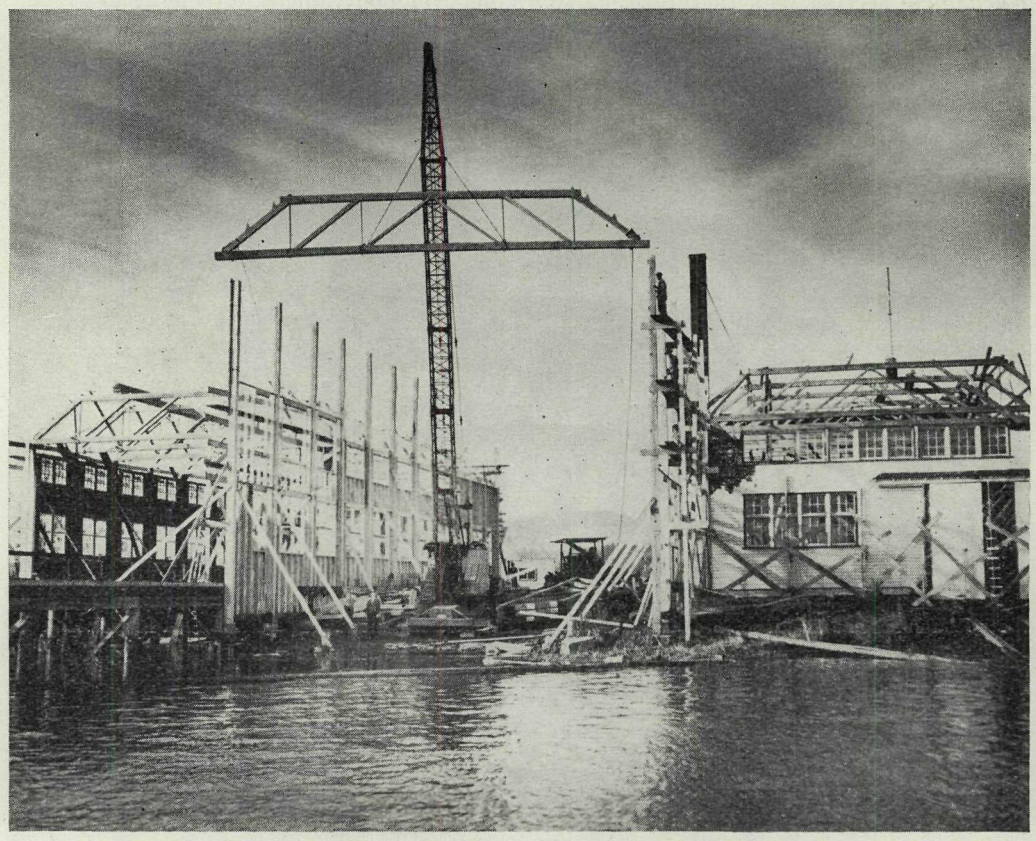
FOREST SERVICE MARINE STATION.

The year proved a disastrous one as far as the Forest Service Marine Station was concerned. A fire of unknown origin on May 15th partially destroyed the main building and ways and seriously damaged the new west wing which was practically completed. This loss greatly handicapped the normal activities of the station. Fortunately, the loss was almost fully covered by insurance and, owing to the prompt action of the staff and the Vancouver Fire Department, none of the Vancouver District launches which were at the station for overhaul suffered any damage. The fire was stopped before gutting the east wing of the plant, which contained two practically completed 34-foot Assistant Ranger launches.

The clearing-away of the debris was started immediately, and tenders for rebuilding the plant were opened on August 30th. Subsequent progress is illustrated in the photographs herewith. It is anticipated that, with the completion of installation of electrical and heating equipment in February, the plant will again be in full production.

In spite of the handicaps resulting from fire damage, a creditable total of completed work was turned out during the year, as detailed below.

In the marine-repair section, forty-one launch overhauls were carried out and, although the lack of the main marine ways was a serious detriment, the boats were serviced by using the small ways and pulling the boats up by tractor and also by making use of the west ways as soon as the electrical winch was overhauled and



Rebuilding Marine Station.

furnished with temporary power. The two new Assistant Ranger launches were completed and put in service for the fire season. These launches are now equipped with auxiliary charging units, which proved necessary because of the heavy battery-drain due to the more powerful radio transmitters which are now being installed. These auxiliary units proved so successful that it is proposed to similarly equip all launches of this type. Three such units have been completed and three more are now being fabricated. Five new boats were purchased, ranging in size from 16 feet to 42 feet, and these were overhauled and put in commission. One uncompleted hull which had been purchased in 1948 was completed and also put in service. In addition, four marine engines, ranging in size from 100 horse-power to 150 horse-power were shipped to the plant from various parts of the Province, and these were completely overhauled and rebuilt.

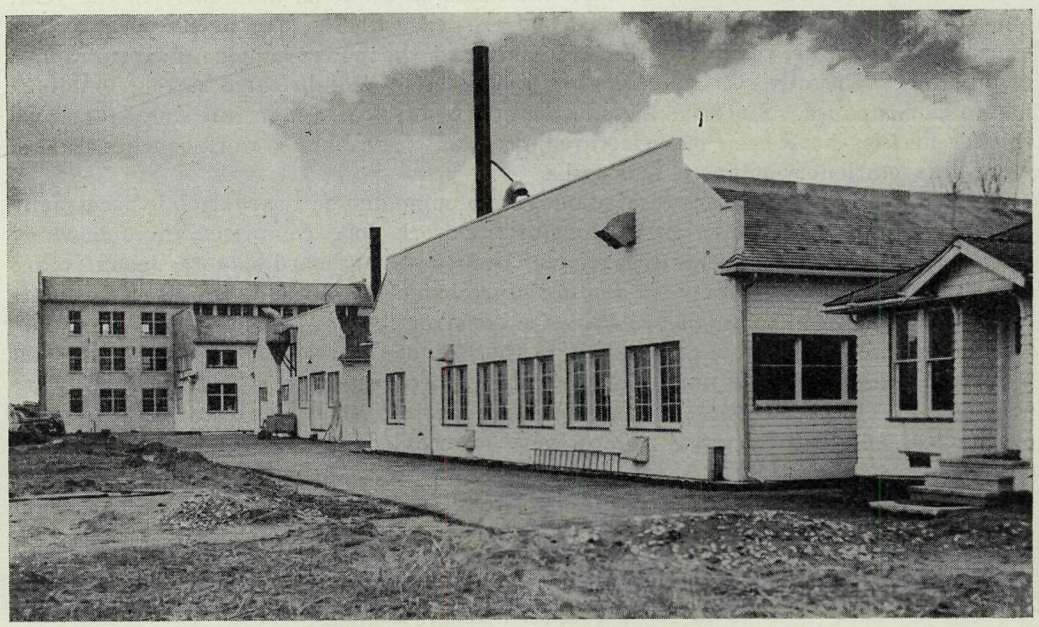
In the prefabricating-shop a start was made on sectional huts early in the year, and one model building was completed and erected, which served as temporary office quarters during the year. As the fire disrupted the power-supply, the programme of building twenty-five sectional huts and a number of prefabricated lookout buildings had to be postponed. Since the installation of temporary power in this shop, numerous smaller articles have been manufactured, such as tool-cabinets, work-benches, tables, stock-bins, stationery-cabinets, and desks.

A description of the work carried out in the pump and outboard shop is necessarily divided into two parts. Prior to the fire the work done comprised the following: Overhaul of fifty-two fire-fighting pumps, twenty-six outboard motors, manufacture of fifty circle scales and forty-six fuel-moisture balances. In addition, forty Bennett-MacDonald pumps were in various stages of construction and ten completed when they were all destroyed by fire. Subsequent to the fire, one Bennett-MacDonald pump and a specially built portable pump for irrigation purposes for the Elko Nursery were completed. Thirty-two more fire-pumps and thirteen more outboard motors were overhauled, and two Seagrave pumps were overhauled and rebuilt for the Ranger School.

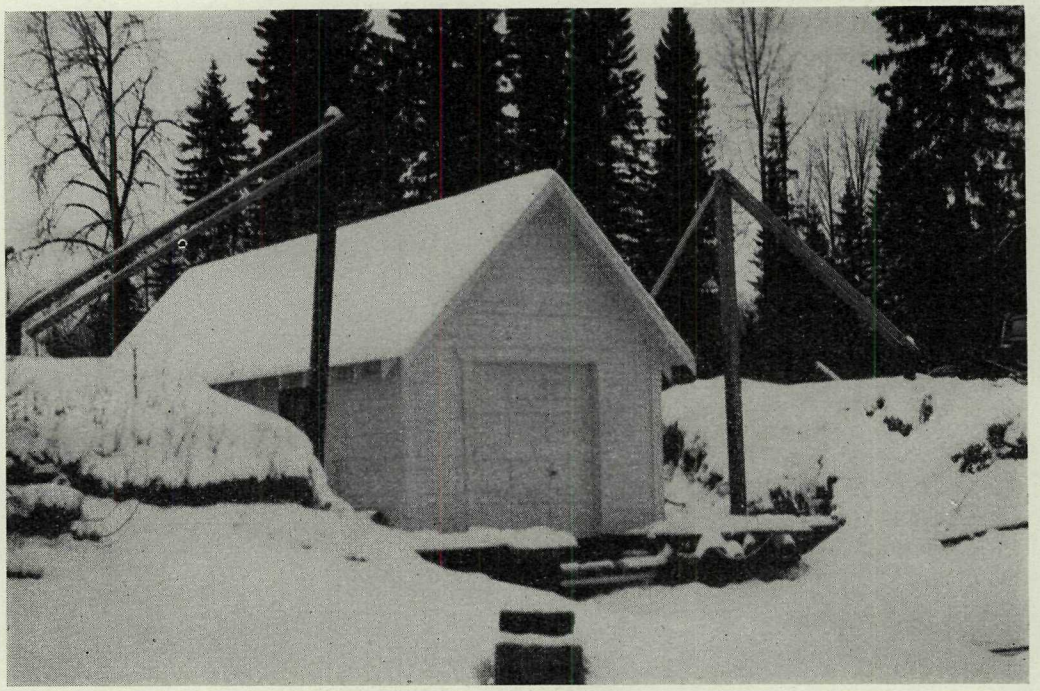
BUILDING AND CONSTRUCTION.

The construction programme for the adequate housing of staff and equipment, which commenced in 1947, was continued in 1949 and was the largest in the history of the Forest Service. Forty-five major building projects were on the agenda before the work of rebuilding the Forest Service Marine Station was necessitated. A fourth structural draughtsman was added to the staff to help with the overload of work entailed in preparation of site plans, building plans and specifications, contracts, and supervision of construction.

It was fortunate that this augmented programme of building was coincident with increased production of building materials and more stabilized prices for same. It was also found that more contractors were interested in doing this class of work than in past years. Because of these facts, a much larger proportion of our building programme for the year was carried forward to completion than in previous years.



Forest Service Marine Station, Vancouver.

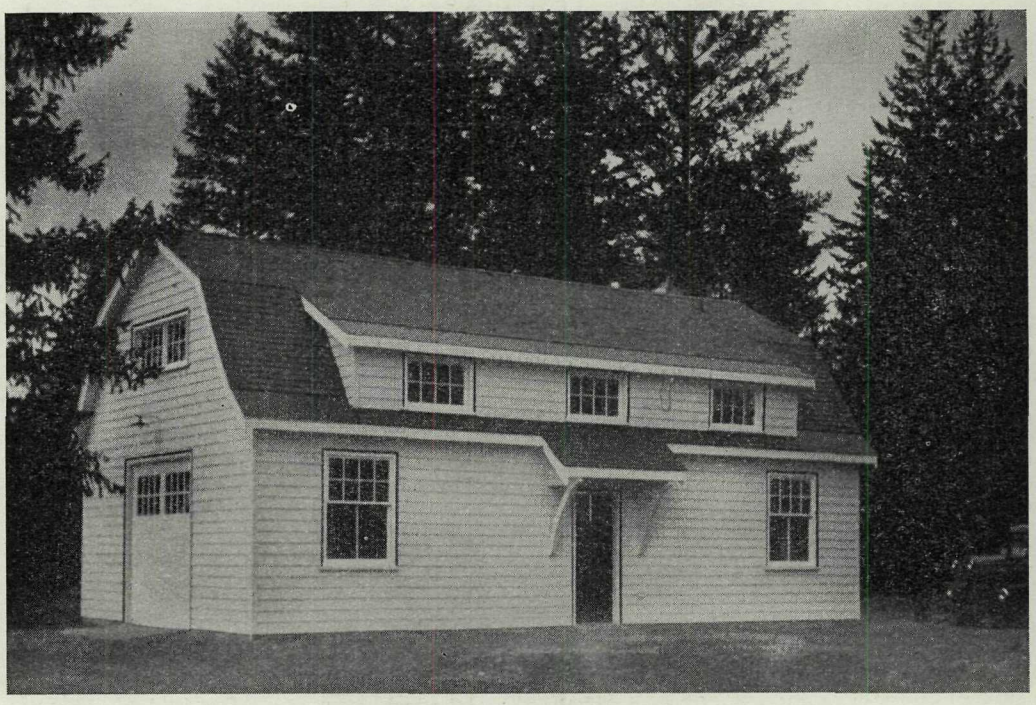


Floating boat-house on North Thompson at Blue River.

MAJOR NEW BUILDING PROJECTS FOR FOREST-PROTECTION AND ADMINISTRATION PURPOSES, 1949.

Location.	Type of Building.	Construction Agency.	Progress to Date.
Adams Lake	Boat-shelters	Forest Service project	Completed.
Alberni	Warehouse	Contract	Work proceeding.
Alberni	Alterations to office		Plans in preparation.
Alexis Creek*	Addition to Ranger office (residence)	Forest Service project	Completed.
Aleza Lake	Ranger office and stores building, four-car garage	Contract	Completed.
Aleza Lake	Residence for Research Forester	Contract	Completed.
Babine Lake	Boat-house, Pendleton Bay	Day-labour	Completed.
Barriere*	Ranger office and stores building	Contract	Completed.
Blue River	Office and stores building	Contract	Completed.
Blue River	Boat-house, Dalin Creek	Forest Service project	Completed.
Birch Island	Residence	Contract	Completed.
Canal Flats*	Ranger office and stores building, four-car garage	Contract	Completed.
Columbia X	Assistant Ranger headquarters	Day-labour	Work proceeding.
Columbia River	Boat-house	Day-labour	Work proceeding.
Creston	Warehouse	Contract	Work proceeding.
Elko*	Office and stores building, four-car garage	Contract	Completed.
Elko	Residence		Plans in preparation.
Edgewood*	Ranger office and stores building, four-car garage	Contract	Completed.
Grand Forks	Four-car garage	Contract	Work proceeding.
Houston	Office and stores building, four-car garage	Contract	Completed.
Kettle Valley	Office and stores building, four-car garage	Contract	Work proceeding.
Kelowna*	Alterations to Ranger office and stores building	Contract	Completed.
Kelowna	Four-car garage	Contract	Completed.
Langford	Warehouse		Plans in preparation.
Langford	Alterations to office		Plans in preparation.
Mission City	Ranger office and stores building, four-car garage	Contract	Completed.
Cowichan Lake	Residence for foreman	Contract	Completed.
McBride	Ranger office and stores building, four-car garage	Contract	Completed.
New Denver	Warehouse and four-car garage	Contract	Completed.
Nakusp	Boat-house	Forest Service project	Completed.
Prince Rupert	One-car garage	Forest Service project	Completed.
Revelstoke	Four-car garage	Contract	Completed.
Sicamous*	Ranger office and stores building	Contract	Completed.
Sechelt*	Ranger office and stores building, four-car garage	Contract	Completed.
Smithers*	Four-car garage	Contract	Completed.
Terrace	Office and stores building	Contract	Completed.
Terrace*	Four-car garage	Forest Service project	Completed.
Trout Lake	Boat-house	Forest Service project	Completed.
Vanderhoof	Four-car garage	Forest Service project	Completed.
Vernon	Warehouse	Contract	Completed.
Vancouver	Machine-shop building, Forest Service Marine Station	Forest Service project	Completed.
Vancouver*	New prefabricating building, Forest Service Marine Station	Forest Service project	Completed.
Vancouver*	Office, Forest Service Marine Station	Contract	Completed.
Westbank*	Assistant Ranger headquarters	Contract	Completed.
Williams Lake	Warehouse	Contract	Completed.

* Denotes project started last year (*see* page 49 of 1948 Annual Report).



Standard Forest Service warehouse, Vernon.

ROADS AND TRAILS.

With the gradual acquisition, during the past few years, of road- and trail-building machinery and with increased funds available to hire improvement crews, it has been possible to make a serious start on keeping up the necessary road and trail network so essential for adequate forest protection. In this programme more attention will be paid to the maintenance of existing roads and trails, some of which have not been cleared out for years, than to the construction of new roads and trails. For comparative purposes, below is listed the work accomplished throughout the Province, classified, by the degree of difficulty encountered, into light, medium, and heavy work.

	Light.	Medium.	Heavy.	Total.
	Miles.	Miles.	Miles.	Miles.
New road-construction	20	27	33	80
Road-maintenance	175	162	31	378
Total new road construction and maintenance	195	189	64	458
New trail-construction	59	26	14	99
Trail-maintenance	465	318	175	958
Total new trail construction and maintenance	524	344	189	1,057

RADIO COMMUNICATION.

During the year, while expansion in the number of stations continued, advances were the result of plans formulated during the preceding two years. Since the war the main efforts have been to get enough equipment, and only during the current year has it been possible to give full attention to improving reliability of message-handling.

New equipment consisted of thirty-seven SPF portable units, eight new-type 100-watt launch transmitters, seven new-type 25-watt transmitter-receivers for Assis-

tant Ranger launches, and five PAC units. In the Forest Service radio laboratory at Victoria, construction was completed on ten remote-control single-channel receivers (both a.c. and d.c.), two 450-megacycle experimental units, and a 150-watt transmitter of eight channels to replace the obsolete three-channel unit at Victoria. In all, fifty-one transmitter-receivers, nine transmitters, and ten remote receivers were purchased or built.

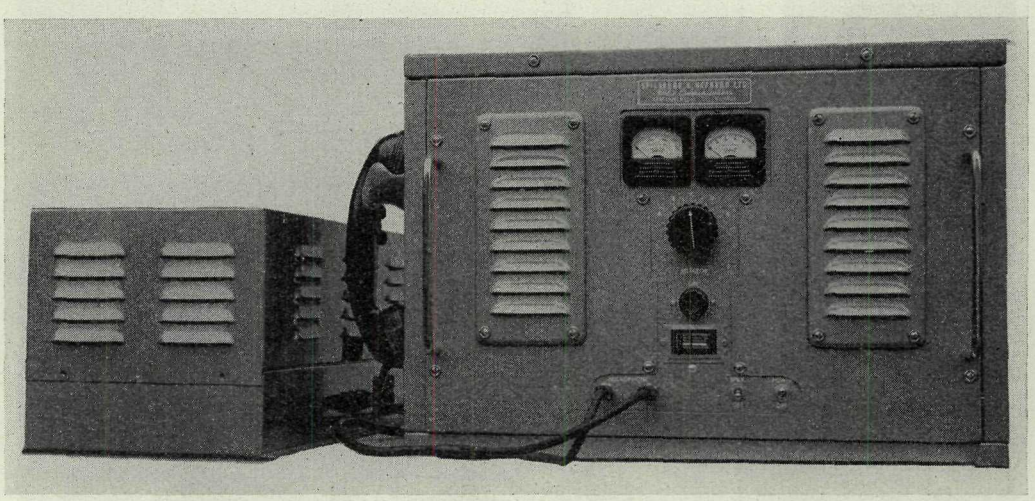
In past years, due to low power and insufficient frequencies, the only direct communication on an everyday basis between Victoria and the districts has been through the relaying facilities of Kamloops. With the establishment of 150-watt 8-channel transmitters at Kamloops and Prince George, and smaller units on higher

Type MRT transmitter with type RM receiver.

frequencies doing temporary duty at Nelson and Prince Rupert, Victoria can now communicate directly with all districts. Traffic is delivered to its destination within a matter of minutes instead of hours or even days, allowing, of course, for limitations imposed on delivery by local district schedules.

In the Vancouver District the abandonment of 3,430 kilocycles as an interdistrict frequency gave Vancouver this channel exclusively, allowing district contacts to be made at any time of day without interference from Victoria.

Assistant Ranger launches working along the coast between Vancouver and Port Hardy have, in the past, given less than their optimum value due to their inability to communicate with their Rangers or with Ranger headquarters. This year three of these small ships were equipped with new-type transmitter-receiver units. Six months of actual use have proved that, in spite of the small aerials available on these ships, the Assistant Ranger, far from headquarters, is no longer isolated and impossible to recall when needed in a hurry. Although these small 25-watt units were not intended for any other purpose than to provide communication within a Ranger district, it has been found that they are frequently heard in Vancouver, giving the Assistant Ranger recourse to contact with Station VB9T and the Northwest Telephone Company, should the need arise.



Type MRT-100 transmitter with power-supply—a marine radiophone of 100 watts and 5 channels.

In 1948 replacement of obsolete Ranger-launch radio equipment was started by the purchase of nine of the new-type RM receivers. At the same time, specifications were drawn up for a new launch transmitter of twice the power of the original launch sets. This unit, the MRT100, was commercially manufactured for the Service this year, and three are in actual operation and proving extremely satisfactory.

In the Prince Rupert District installation of the 6-channel remote-controlled receiver on Mount Hays was completed in June, with an immediate improvement in reception in spite of trouble experienced with the 6 miles of telephone-line connecting the receiver with the Court-house. Most of this line-trouble has been eliminated by the substitution of underground cable for the overhead open wire. At the same time a new temporary transmitter of 75 watts was built in Victoria to supply improved communication until a type HQT-200-8 can be constructed.

With the closest Ranger district some 80 miles from Prince Rupert and each succeeding district being still farther away, the PAC and S-25 units are not sufficient to cover territory notoriously poor for radio reception. A survey of the situation made

this summer resulted in a complete change in plans which will give Prince Rupert an improved communication system, including remote-control receivers at Terrace, Smithers, and, possibly, Hazelton. The first of the Ranger station remote-control units has already been put into operation at Burns Lake.

In the Nelson District new remote-control units were installed at Fernie and Creston, but it has not been possible to date to supply Nelson headquarters with a multi-channel 150-watt transmitter and to bring the Nelson remote-control set up to standard. Unfortunately, it has been necessary to vacate our present headquarters remote-site and to move farther away. While this will involve additional expense, the results will undoubtedly be worth while on account of the improved noise level.

With the installation of the HQT-200-8 transmitters in the spring of 1949, the range and reliability of both Kamloops and Prince George headquarters stations have increased 100 per cent. Both districts have additional remote-control installations planned, but these are at the moment in abeyance.

With the question of frequencies always a major problem, the addition of three high frequencies in 1948 made a tremendous difference to efficiency where long-distance contacts are concerned.

It was originally intended to go into the field of FM gradually, extending the cost on conversion over a period of years and maintaining most of the present units to supplement the reduced ranges of VHF transmission. With the prospect of a reshuffle of intermediate frequencies in the near future, it became necessary to take action at once, and the coming year may see one complete FM network in operation. Considerable experimental work was done in 1949, preparing sites and determining signal-strengths to be expected between Victoria and Campbell River, using high-elevation relay points to carry the signal over intervening topography. The final network, if subsequent results are as satisfactory as anticipated, will link between Victoria and Vancouver. So far, attempts to establish this latter circuit have failed due to the low elevation of both stations, but it is probable the difficulty will be overcome before long.

Having observed other FM systems operating on 40 megacycles, with long-distance signals from the Eastern States and Canada constantly interfering, all experiments have been carried out on 150 megacycles with no interference whatever. This frequency, therefore, will probably become the standard channel for all Forest Service FM operation. At the same time, experiments have been made with some success with frequencies as high as 450 megacycles and, although the results on this channel leave a great deal to be desired, there is little doubt that it will be used for short-range point-to-point communication in addition to 150 megacycles FM.

In line with the policy of appointing operators to provide headquarters radio stations with continuous radio watch and to give technicians freedom of movement for maintenance purposes, two additions to radio personnel were made during 1949. These appointments were at Nelson and Prince Rupert.

At the close of 1949 the number of sets in use was as follows: Type SPF, 298; type PAC, 52; type S-25, 5; HQ transmitters (50 watts), 1; HQ transmitters (75 to 100 watts), 3; type HQT-200-8 transmitters (150 watts), 2; launch transmitter-receiver installations (25 to 50 or 100 watts), 22; HQ remote-control installations, 6; Ranger station single-channel remote-control receivers, 8. Total transmitting units (all types), 383; total special receiver installations, 14. Net total, 397.

Messages handled by all districts, up to December 15th, exclusive of weather data, numbered notes, and conversations, reached the following totals: Victoria, 5,555; Vancouver, 5,749; Nelson, 2,163; Kamloops, 1,950; Fort George, 2,024; Prince Rupert, 1,206. Net total, 18,647. This figure, compared with a net total of 15,413 for 1948, represents an increase of messages for the current year of 3,234.

SLASH-DISPOSAL AND SNAG-FALLING.

Although spring burning was disappointing, the over-all results of slash-disposal in 1949 were very satisfactory owing to the extended period of favourable weather in the fall.

Many operators who were convinced of the advantage of spring burning were foiled in carrying out their plans by the rapid development of early hazard conditions. In spite of this, a total of 1,530 acres of slash was disposed of by fifty operators prior to the commencement of the fire season. Most of these operations were on the lower levels and, as is usually the case with spring burning, the damage was light.

The absence of industrial disputes in the logging industry permitted continuous operation through the summer, with the exception of a partial Forest Service closure of four days. However, a number of voluntary closures were put into effect by private companies during more hazardous periods and, in some cases, accidental fires caused prolonged shut-downs. In a certain number of cases these interfered with fall-burning plans, and an effort is being made where this occurred to remedy the situation by burning this coming spring.

The excellent fall weather for slash-disposal continued from September 12th until October 4th in most areas and was ideal for broadcast burning. On the southern tip of Vancouver Island these conditions prevailed even longer. During that period there appear to have been only two days—namely, September 27th and 28th—when the burning risk became dangerous, and a very small number of fires escaped temporarily during this period. The only areas affected by this were the east coast of Vancouver Island from Duncan south and the Gulf Islands. Of a total of 459 recorded slash burns, only 24 show damage, most of which is of a minor nature. Favourable spot-burning weather continued throughout October, and excellent results were obtained. The very heavy rains in November terminated any possibility of further burning in 1949, except on the southern tip of Vancouver Island where spot-burning continued well into November.

In recapitulation, a total of 70,414 acres was logged during 1949 in the Vancouver Forest District. This is a decrease of approximately 10 per cent. from 1948. Of this acreage, 48,966 acres were examined and reported on. The balance of 21,448 acres was logged subsequent to September 1st and, therefore, slash-disposal requirements will be dealt with in 1950, except for 4,730 acres included in this figure covering areas not considered necessary to deal with under section 113.

Compensation for failure to comply with the provisions of section 113 was levied during the current calendar year as follows:—

	Number.	Acreage.
Failure to dispose of slash as instructed	91	6,745
Failure to fall snags	39	1,196

As shown above, snags are being felled concurrently and, to date, results are satisfactory. At least 98 per cent. of assessments are for failure to clean up the few scattered snags that were missed.

Detailed statistics on all slash-disposal for the year 1949 appear in tabulated form in Table Nos. 42 to 45 of this Report.

FIRE-LAW ENFORCEMENT.

As will be noted from Table No. 55 of the Appendix, information was laid in thirty-one cases during the year, which is one more than the last ten-year average. In all but two cases convictions were obtained; thirteen for burning without a permit; nine for refusing to fight fire, and eight for failure to maintain proper fire-protection equipment in accordance with the regulations.

FOREST CLOSURES.

No general closure proved necessary in the Vancouver Forest District in 1949. Several times during the season the hazard build-up was such that many operators voluntarily went on early-morning shift or completely shut down their operations for short periods. By mid-July, with a two weeks' build-up of hazard conditions plus a forecast of continued dry weather, a restricted closure was instituted under section 120 of the "Forest Act," prohibiting industrial operations in the woods from 1 p.m. to sundown in that portion of the Vancouver District south of Bute Inlet. Fortunately, a change in weather allowed the lifting of this closure by July 18th. The postponement of the opening of hunting season from September 10th to September 17th precluded the necessity of a further forest closure at that time.

By mid-July, conditions were such in the Fort George District, vicinity of Quesnel, that, at the request of the Northern Interior Lumbermen's Association, operators were advised through press and radio releases to go on early-morning shift.

In the south part of the Province, regional closures were again invoked where warranted by existing forest values. These are listed in the table below. In some cases the closure gates were manned by Forest Service patrolmen. In other watershed areas less frequented by the public, warnings of the closures through press, radio, and poster advertising sufficed.

FOREST CLOSURES, 1949.

Area.	District.	Effective Date.	Date suspended.
Sayward Forest	Vancouver	June 28	Aug. 26
Silverhope Creek-Skagit River	Vancouver	July 13	Sept. 16
Vancouver Forest District (partial closure of sawmilling and industrial operations)	Vancouver	July 15	July 18
Bear Creek	Kamloops	July 13	Sept. 21
Granby River	Nelson	Aug. 6	Sept. 19
Lamb Creek	Nelson	Aug. 9	Sept. 19
Upper St. Mary River	Nelson	Aug. 9	Sept. 19
Cambridge, Tiger, Gorge, and Casino Creeks	Nelson	Aug. 18	Sept. 19
Topping, Hanna, McNally, Murphy, Sullivan, Poupoure, and Blueberry Creeks	Nelson	Aug. 18	Sept. 19
Pend d'Oreille River South	Nelson	Aug. 18	Sept. 19
Marsh, Hudu, Beavervale, and Kelly Creeks, and Champion Lakes areas	Nelson	Aug. 18	Sept. 19
Anderson-Five Mile area	Nelson	Sept. 8	Sept. 19

CO-OPERATION—OTHER AGENCIES.

Again, the usual excellent co-operation from honorary fire wardens must be acknowledged with thanks and appreciation. In 1949 the honorary fire warden organization numbered 818 throughout the Province. These public-spirited citizens voluntarily undertake fire-fighting duties in their local communities year after year, thus augmenting the Forest Service staff and performing a most valuable function in the forest-fire-suppression organization.

In addition, there were 684 fire-prevention officers appointed under authority of section 123 of the "Forest Act." These men are appointed at the request of their employers in forest industry and have the same authority as a forest officer on the particular operation with which they are concerned.

Acknowledgment must again be made for the excellent co-operation received from the Royal Canadian Air Force and from commercial air lines and private pilots in detecting and reporting fires.

FOREST-INSECT INVESTIGATIONS.*

Although the forest-insect problems in British Columbia remained numerous and varied throughout the year 1949, no major, devastating outbreak was reported for the year.

FOREST-INSECT SURVEY.

One of the more important developments of the year was the erection of the survey insectary on the Provincial Forest Service property at Langford. This has permitted the handling of Coastal survey material at Victoria, rather than at Vernon, as was the past procedure. The work has been further facilitated through an increase in the insect Ranger staff which now numbers twenty—eleven in the Interior and nine on the Coast. Considerable transportation by aircraft to otherwise inaccessible areas was provided to these men by the Forest Service.

* This section of the Report has been prepared by the Forest Insect Investigations, Science Service, Dominion Department of Agriculture, Victoria and Vernon Laboratories.

Insectary at Langford, V.I.

Collections for the year were as follows:—

Source.	Forest Districts.					Total.
	Vancouver.	Prince Rupert.	Fort George.	Kamloops.	Nelson.	
Forest Service personnel	376	94	193	146	139	948
Others	2,829	359	344	1,168	1,256	5,956
Totals	3,205	453	537	1,314	1,395	6,904

DETERIORATION OF HEMLOCK-LOOPER-KILLED TIMBER.

Studies on this problem, resulting from the 1946 outbreak of hemlock looper, were continued through the year. Although no looper activity has occurred over the past three years, marginal trees are still struggling for recovery. During the 1949 season the number of these marginal trees that died exceeded that of either of the two preceding years. This applies to all species, although Western hemlock was affected to the greatest extent. This increase in mortality has been due to the build-up in secondary insect populations over these intervening years. It appears evident that this secondary attack has now reached its peak, with the majority of marginal trees now being dead. Parasitism of secondary insects has increased greatly. A high of 95 per cent. parasitism was recorded in one hemlock undergoing attack by the important wood-borer *Tetropium velutinum*. Although most of the mortality occurred among trees that were from 95 to 100 per cent. defoliated, many trees that were defoliated as lightly as 50 per cent. were killed by secondary insect attack. This work will be continued through 1950.

OTHER STUDIES.

Ambrosia-beetles.—A new approach to the ambrosia-beetle problem was undertaken in 1949 when a sawmill study was conducted in co-operation with the British Columbia Forest Products, Ltd., and the Dominion Forest Products Laboratory. The study, one of a series of such mill investigations, was aimed at transposing ambrosia-beetle damage to sawlogs to actual dollar-loss by the mill operator.

Bark-beetles in the Interior of the Province appear to be on the increase. This is further substantiated by increasing prevalence of beetle outbreaks in the Western States.

The mountain-pine beetle, *Dendroctonus monticolæ* Hopk., has continued active on previously reported areas of white pine and lodgepole pine. An important new outbreak of this bark-beetle was reported this year in lodgepole pine on the White River drainage-basin in the East Kootenays. Over 1,000 acres are at present involved but, although the infestation is a menace to extensive stands of pine, the area is so inaccessible that the cost of direct control measures is considered prohibitive.

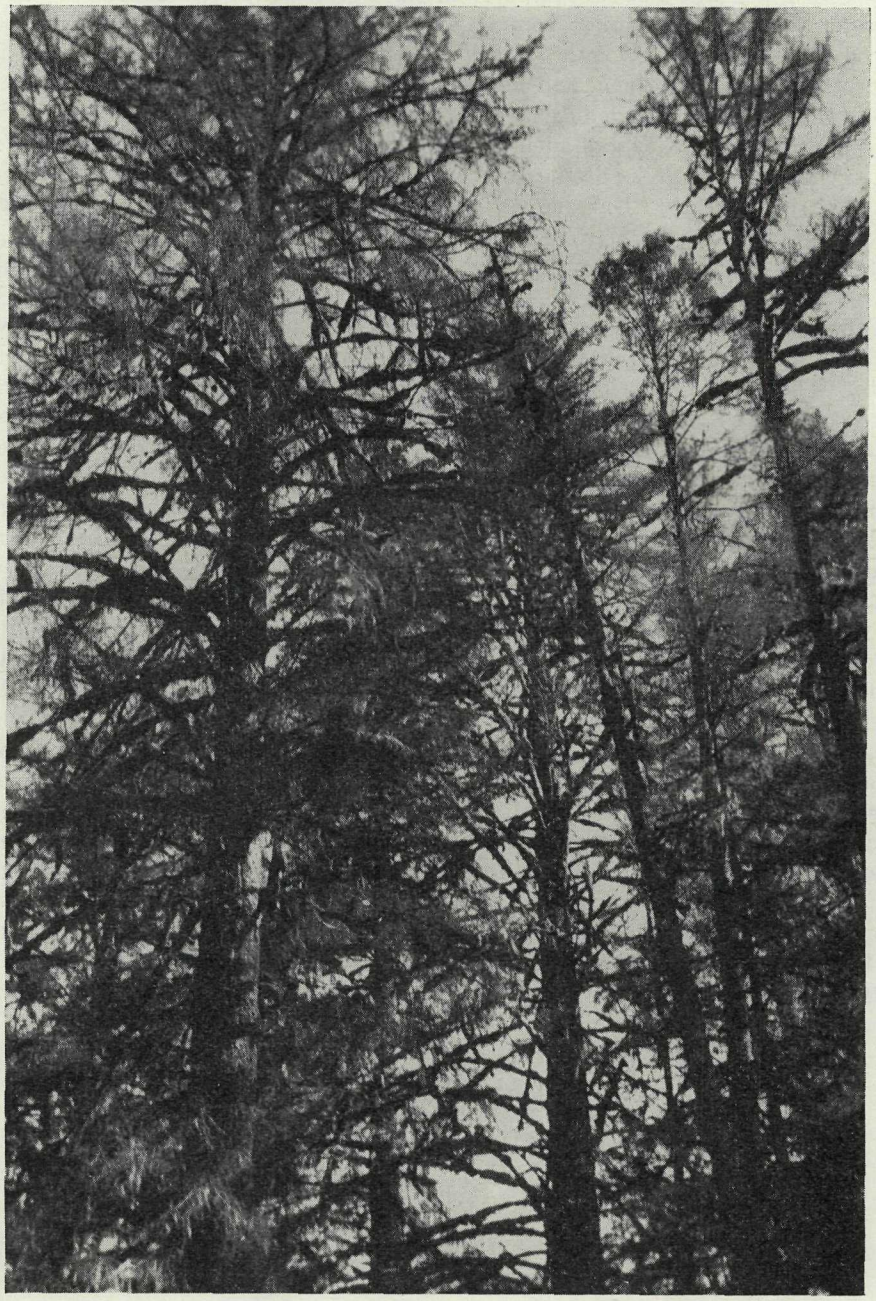
A sporadic outbreak of the Engelmann-spruce beetle, *Dendroctonus engelmanni* Hopk., is active on a timber sale at Bolean Lake in the Kamloops district. At present the infestation is confined mainly to an isolated uncut stand and to selectively logged areas immediately surrounding it. The early cutting of the infested timber has been recommended as a control measure and also as a salvage operation.

Bark-beetles at Palling, in the Burns Lake district, were active over an area of some 16 acres. Since a large stand of spruce was endangered, this small infestation was cut and burned, the first operation taking place in May and a second control in the fall. A total of 121 trees, 115 infested stumps and a pile of infested green slab wood, were burned in the course of the operation.

Spruce Budworm.—Due to improvement in the detection service, infestations of the spruce budworm, *Choristoneura fumiferana* (Clem.), were found to be much more extensive in spruce-alpine fir stands in the Southern Interior of the Province than previously recorded. This defoliator has continued active at Sock Lake, Johnson Lake, Bolean Lake, and east of Barkerville. Other infestations, which evidently have been active for several years, were located at Martin Creek and Bouleau Lake west of Okanagan Lake, on Silver Hills east of Lumby, at Mayson Lake in the North Thompson district, and apparently on Clearwater Creek, a tributary of the Peace River.

The infestations of the Douglas-fir tussock-moth, *Hemerocampa pseudotsugata* McD., recorded in 1948, subsided completely, but new defoliation occurred this year in sub-marginal stands south and east of Savona, on the east side of Deadman River, and in patches on the north side of Kamloops Lake, including a small area on Tranquille Creek.

Dead hemlock in 1949 following hemlock-looper outbreak in 1946.



Residual hemlock in 1949 following hemlock-looper outbreak in 1946.

The satin-moth, *Stilpnotis salicis* L., a species of European origin, was found to have extended its range in British Columbia eastward from Lytton to Savona and Cherry Creek. It was also recovered from the north end of Stump Lake. Lombardy poplars at Savona were almost completely defoliated in May. Although the attack appeared to be confined to exotic species of poplars, other hosts of this insect include native cottonwoods and aspen, and hence the spread of this pest constitutes a serious threat to the extensive stands of cottonwood and aspen in the Interior of the Province.

Feeding by the spruce gall-adelgid *Adelges cooleyi* (Gill.), on the foliage of Douglas fir in the semi-dry areas of the Interior continued to cause considerable loss to the Christmas-tree industry. Damage was severe in parts of the East Kootenay, including the areas sprayed with DDT in 1948 for the control of the false hemlock looper, but an investigation failed to show any increase of adelgid population on the sprayed area as compared to unsprayed stands.

Although the hemlock looper has been inactive throughout the Province over the past three years, one region was recorded during 1949 where a nucleus population persists. The area in question is located in the Prince Rupert District, westward from Hazelton to Scotia River in the vicinity of Kwinista. Heaviest population was recorded at Kitsumgallum Lake and in the vicinity of Salvus. Survey sampling in these areas averaged ten larvæ per beating. An autumn egg survey, however, failed to reveal any overwintering eggs, although a large number of the previous year's hatched eggs were found. Indications point to a diminished population in 1950, although this will require careful study.

Insect activity in nurseries and plantations during 1949 was not sufficient to occasion important losses. The most persistent problem remains that of white-grub larvæ attacking 1–0 stock in the Quinsam nursery. The larvæ have been shown to be present in all rotational areas during the past three seasons. Although relatively heavier losses occurred in 1949, they still remain less than 1 per cent. of production. A programme of experimental control was initiated during 1949, but effectiveness of the materials has yet to be determined. In the same nursery 2–0 stock suffered about 50 per cent. attack by the spruce gall-adelgid. A series of sprays was applied against this insect, and a safe and economical combination appears to be the use of nicotine sulphate and soap flakes. This was tested against more recent insecticides and made a very good showing.

A lead into the physiological effects of the spruce gall-aphid upon young stock has opened the way to a series of future investigations. The insect appears to have a definite relation to earlier hardening of stock.

FOREST-DISEASE INVESTIGATIONS.*

An intensive programme of forest-disease investigation was conducted in British Columbia during 1949. This programme was made possible, in part, through the valuable co-operation extended by the British Columbia Forest Service and the forest industry and, in part, by an increase in the technical staff assigned to forest pathology. Field personnel employed during 1949 totalled thirty, of which fourteen were permanent members of the Victoria organization and sixteen were student assistants or labourers. Seven additional employees were engaged in laboratory and administrative work in Victoria.

During the year, greater emphasis was afforded problems involving immature stands, and an expanded programme of investigation was undertaken in the case of the forest-disease problems occurring in the Interior of the Province.

Publications distributed during 1949 included the following:—

Bier, J. E.: Some common tree diseases of British Columbia. Canada, Dept. of Agr., Div. of Botany and Plant Pathology, Ottawa. 1949.

Foster, R. E., and Hurn, D. R.: A preliminary report on deterioration in the Western hemlock-Douglas fir type on lower Vancouver Island following attack by the Western hemlock looper. For. Chron. 25:202–204. 1949.

Thomas, G. P.: Interim report on decay losses sustained in mature and overmature northern black cottonwood in the Quesnel region, British Columbia. Dom. Lab. of For. Pathology, Victoria. Mimeographed. October, 1949.

Thomas, G. P.: Two new outbreaks of *Phomopsis lokoyæ* in British Columbia. Dom. Lab. of For. Pathology, Victoria. Mimeographed. November, 1949.

Waldie, R. A.: Decay losses in Western white spruce in the Upper Fraser Region. Dom. Lab. of For. Pathology, Victoria. Mimeographed. October, 1949.

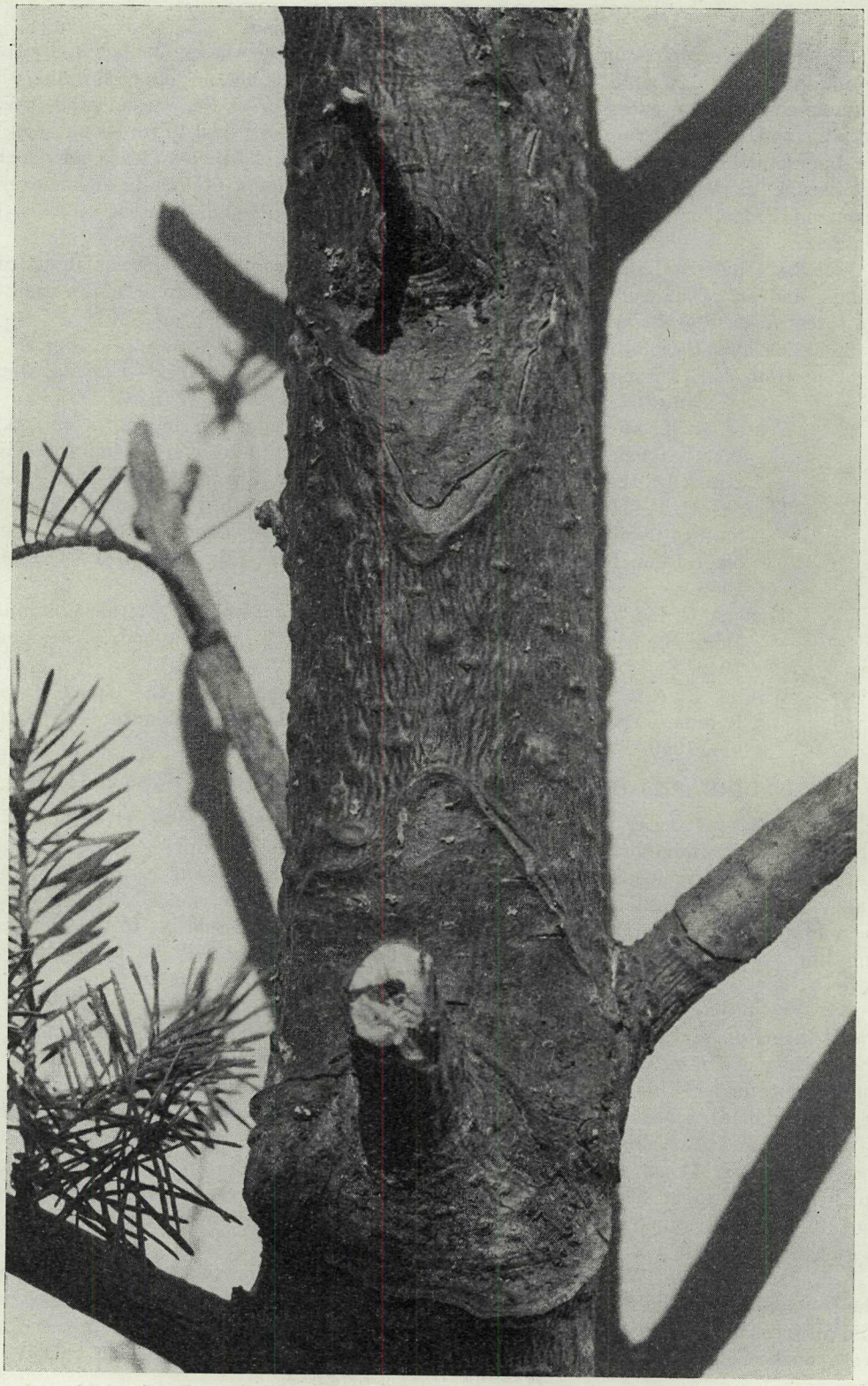
DISEASES OF MATURE AND OVERMATURE FORESTS.

1. Studies of decay in mature and overmature Douglas fir were conducted in several of the more important forest regions of British Columbia during 1949. Samples were obtained on Vancouver Island, in the vicinity of Parksville and in the Chemainus Valley, and in the Mainland coast area at Bella Coola. To date, some 1,550 trees have been analysed, and preliminary information has been obtained relative to the incidence and importance of decay in this species. Further sampling will be undertaken to permit the study of decay in fir over a full range of site and age classes.

2. Preliminary investigations into decay of Western hemlock and Amabilis fir in the Prince Rupert Forest District were initiated in 1949. The study was confined to the vicinity of Onion Lake, south of Lakelse Lake. On the basis of preliminary information obtained in this region, it appears that extensive cull losses may be realized in certain localities. On a total-stand basis, decay resulted in losses of 60 and 49 per cent. in hemlock and Amabilis fir respectively. On a residual-tree basis, decay resulted in losses of 51 and 44 per cent. in Western hemlock and Amabilis fir respectively. Ages for hemlock averaged 364 years and those for Amabilis fir averaged 303 years. Average site was determined to be 100. More extensive sampling is projected in the Lakelse region during 1950.

3. An analysis of Western hemlock in the Big Bend region was undertaken through the co-operation of the British Columbia Forest Service. Two areas were investigated, and all trees above 9 inches in diameter contained on an area of 3 acres were felled and were bucked into short lengths in order to obtain accurate information relative to

* This section of the Report has been prepared by the Laboratory of Forest Pathology, Science Service, Dominion Department of Agriculture, Victoria, B.C.



Stem and branch canker of Douglas fir caused by **Phomopsis Lokoyæ** (Hahn).

decay and related losses. Western hemlock was found to be very defective in both areas. On a total-stand basis, cull from decay exceeded 71 per cent. of the gross volume in a 265-year-old stand at Martha Creek and 66 per cent. in a 224-year-old stand at Wigwam. Most of the loss was attributed to the Indian-paint fungus (*Echinodontium tinctorium* Ell. and Ever.), although considerable variation in the incidence of this fungus and that of *Fomes Pini* (Thore) Lloyd was recorded. Present information indicates that an appreciation of external indications of decay would facilitate the determination of individual trees, and areas, free from extensive decay.

4. Studies of decay in Northern black cottonwood were conducted in the Upper Fraser region north of Quesnel. A field research centre was established at Quesnel, and technical personnel of the Ottawa and Victoria laboratories were employed in a detailed study of the fungi associated with decay in this species. A field crew augmented previous studies relative to the nature and extent of decay and other losses occurring in peeler and potential pulp volumes by obtaining an additional 4-acre sample. The sample, now complete for the Upper Fraser region, will permit the analysis of 300 trees.

5. Further studies were conducted relative to the deterioration of insect-killed Western hemlock and Douglas fir on Vancouver Island. Studies were confined, for the most part, to Douglas fir. It was found that the cumulative losses from decay were of relatively minor importance in this species to date. A further examination of the progress of deterioration in Western hemlock is projected for 1950.

DISEASES OF IMMATURE FORESTS.

1. An extensive survey of the disease of native and introduced plantation stock was undertaken in the vicinity of Elk Falls, Campbell River, and Echo Lake. In addition, preliminary studies were conducted on the Lower Mainland. It is intended that this survey provide a basis for an intensive programme concerned with diseases of immature forests.

2. Specific investigations were undertaken concerning *Poria weirii* root-rot of Douglas fir. The progress of the disease was recorded at a number of points in the Coastal area, and records were maintained for a number of permanent sample plots.

3. An outbreak of the Douglas-fir canker, caused by *Phomopsis lokoyæ* Hahn, was recorded in the vicinity of Haney in the Lower Fraser Valley and in the vicinity of Soda Creek, south of Quesnel. This outbreak, in two widely separated areas, was attributed to the unusual climatic conditions prevailing during the previous season. No permanent damage of a serious nature was noted.

4. An intensive survey was continued in the Coastal and Interior regions in an effort to isolate individual white-pine trees that are resistant to the blister-rust disease. Initial steps were taken toward the establishment of an experimental disease area on Vancouver Island. Permanent plots in the Interior region were re-examined, and the progress of the disease was recorded under natural conditions of development.

5. A disease of unknown cause and origin, pole-blight of Western white pine, was reported in the Arrow Lakes district. An extensive survey confirmed its presence throughout most of the commercial range of this species in the Interior. Certain of the areas examined revealed over 30 per cent. of the pine as affected. Reports from Idaho and adjacent States indicate that there is no recovery from this disease, and that the death of affected trees may be anticipated within a very few years. An experimental area in the vicinity of New Denver has been placed in reserve to provide the facilities for intensive studies pertaining to the nature, cause, and control of the disease.

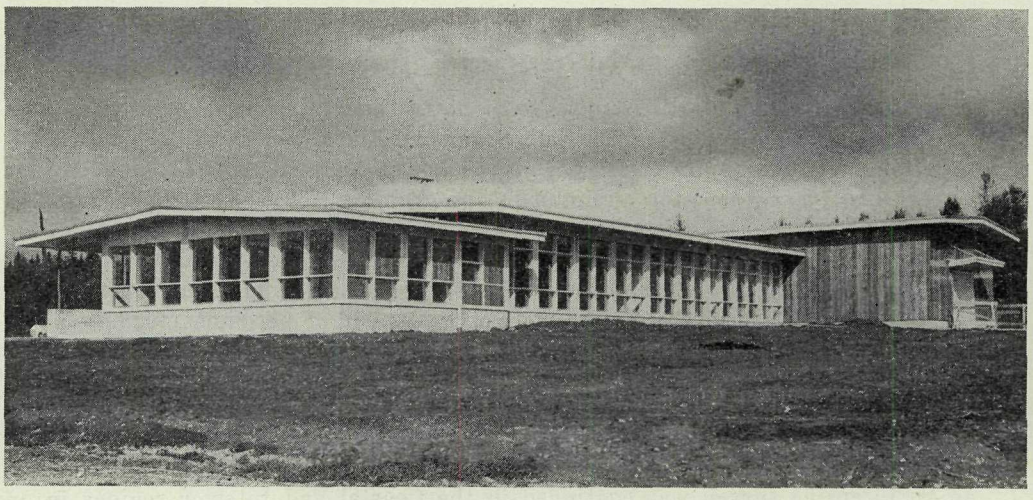
DISEASES OF NURSERY STOCK.

No extensive mortality was observed in the three forest nurseries on the Coast of British Columbia during 1949. Records were maintained relative to normal disease mortality which may be anticipated in Douglas-fir nursery stock. In addition, a detailed control programme was carried out at the Duncan nursery.

FOREST RANGER SCHOOL.

The Ranger School opened to its fourth class on January 6th, 1949. Previous classes had been given training in two three-month terms. Commencing with the fourth class, the course has been extended to three three-month terms. No additional subjects have been added, but more time is devoted to the practical aspects of Ranger work in both forest protection and management. The subjects taught and time allotted are listed later in this Report.

Twenty-one students are attending the present class, twenty representing—as in previous years—all forest districts, with one man from the Parks and Recreation Division (*see* Appendix, Table No. 57). Five are either Rangers or Acting Rangers, and the others are Assistant Rangers who were recommended for Ranger training by their District Foresters. The present class will not graduate until April, 1950, at which time it is expected that a number of Ranger positions will be filled from their ranks, the remainder forming a reserve body of trained Assistant Rangers. In this connection it is of interest to note that the three previous classes included thirty-five men in the Assistant Ranger category who were tested and trained with a view to using them as replacements for retiring Rangers or for newly created Ranger districts. Most of these men have now been appointed to the Ranger staff.



Ranger School, Green Timbers Forestry Station.

It is noticeable, and is to be expected, that this year's and, probably, ensuing classes will have a greater number of younger and less-experienced men than was the case with the first three classes. More time is necessary for instruction in the fundamentals of all subjects than would be the case with Assistant Rangers of longer service or greater woods experience. The extra term now allotted is, therefore, proving necessary.

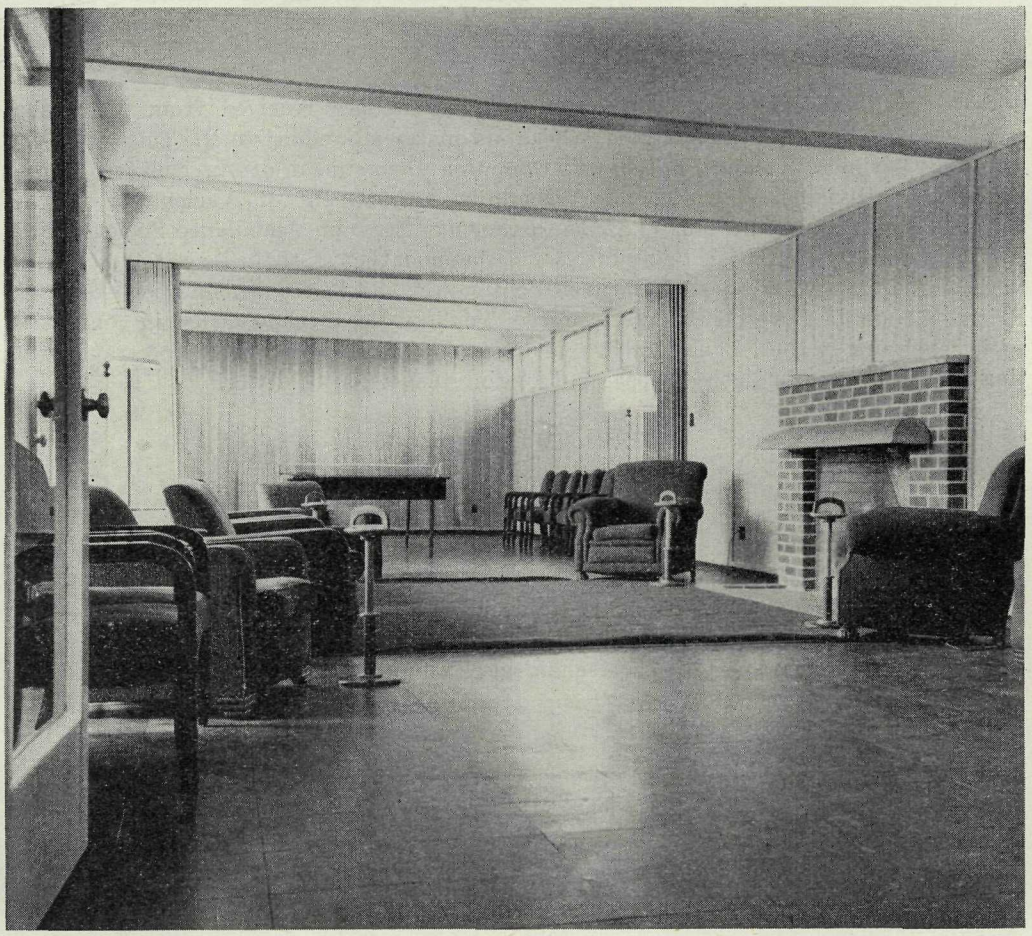
EXTRA COURSES.

Following the spring term, a one-week special course was given to lookout-men appointed to the Vancouver Forest District. Over and above the quick detection and accurate reporting of forest fires, the importance of the lookout-man is increasing due to his added duties in connection with weather records. The course, therefore, emphasized training in the use and maintenance of detection and weather instruments plus the keeping of proper records. Reports received again indicate that the time and expense involved were well repaid by the added efficiency of the lookout-man.

SCHOOL BUILDINGS AND GROUNDS.

The new school buildings were completed during the early summer of 1949, and the class was able to make full use of them from the commencement of the fall term.

During the summer months a considerable amount of work was accomplished by the staff in preparing the buildings for use. A number of small improvements were made to the classrooms, the workshop was fitted and equipped for practical instruction in the mechanical courses, and the tool-cache was fitted with shelves and racks and fully equipped with fire-fighting tools for a 350-man unit. Other improvements were made to the kitchen, dining-room, and living-quarters.



Lounge in new Ranger School dormitory.

An underground sprinkler system for the lawns was installed, and a fire-protection system included and tied in to two outside hydrants. This was designed for additional fire protection for the buildings. A cement reservoir with a capacity of 16,000 gallons was built to connect both systems, sprinkler and protection, as may be required.

The roads fronting the building and the driveways leading to each set of buildings were paved, with exception of the driveway to the garage.

Advantage was taken of the open fall to seed down the extensive laws and open area behind the school. In addition, considerable progress was made in landscaping the grounds, many ornamental trees and shrubs being planted. Work on this project was halted by winter weather.

The new school buildings were officially opened on September 16th, 1949, by the Deputy Minister of Forests, Dr. C. D. Orchard, followed by an address by the Minister of Lands and Forests, Hon. E. T. Kenney. A large gathering was present, including representatives of the forest industries, the University, and local Governmental and municipal officials. Following Mr. Kenney's address, the buildings were inspected by the guests and refreshments served in the lounge and dining-room.

The Forest Ranger School has now been brought to a standard that should compare favourably with any similar institution. The buildings are fully modern and well equipped for their purpose. When landscaping of grounds is completed, the school will be a credit to this Service from both the æsthetic and practical view-points.

ACKNOWLEDGMENTS.

We wish to acknowledge with thanks the assistance received from the undermentioned persons or organizations, whose aid materially added to the efficacy of the courses: Division of Plant Pathology, Dominion Department of Agriculture, Forest Pathology; Division of Entomology, Dominion Department of Agriculture, Forest Entomology; Provincial Police, Law Enforcement; St. John Ambulance Society, First Aid; University of British Columbia, for accommodation at their Loon Lake camp in the Haney Forest where the school carried out survey and forest-mensuration exercises; British Columbia Forest Products, Limited, Youbou, for transportation in connection with field work in the Nitinat Valley; and Victoria Lumber Company, for transportation and assistance in slash-disposal and logging-inspection field work.

CURRICULUM, 1949–50.

Spring Term, 1949.

Operation.	Number of Hours.
1. Fire Law and Operation Procedure	60
2. Preliminary Fire Organization	45
3. Construction and Maintenance of Improvements	55
4. Operation and Care of Mechanical Equipment	60
5. Office Methods	20
	240

General Courses.	
1. Mathematics	30
2. Surveying	50
3. Forest Entomology	25
4. Botany	35
5. Public Speaking	30
6. Forest Mensuration	50
	220

Totals for Spring Term.	
Operation	240
General	220
Miscellaneous and tests	50
	510

FALL TERM, 1949.

Operation.

6. Fire Prevention	30
7. Fire Suppression	110
	140

General Courses.

2. Surveying (continued)	100
4. Botany (continued)	40
6. Forest Mensuration (continued)	100
7. Stumpage Appraisals	100
	340

Totals for Fall Term, Tests included.

Operation	140
General and Tests	350
	490

SPRING TERM, 1950.

The third term will consist of log scaling, forest management procedure, grazing management, silviculture, forest pathology, forest inventory mapping, and a general review of all operation subjects previously taken.

PUBLIC RELATIONS AND EDUCATION.

The work of the Division increased during the year to a point where further expansion and diversification is almost impossible with the present staff. Additional shelf-space for the library, storage shelves for publications, and greater space for photographs, films, and motion-picture work is urgently required if the Division work is to be carried on in an orderly and efficient manner.

PRESS AND RADIO.

The customary annual series of forest-protection advertisements, six in number, was carried in ten daily, seventy-one weekly, and fifteen other publications. Layout and copy were produced by the Division; the art work was done by the Government Printing Bureau; and mechanical work and insertion schedules handled by an agency. In addition, special copy was prepared for eighteen advertisements in that number of publications of various categories.

During this year the Service initiated a pre-fire-season advertising campaign, placing three special advertisements in all daily and weekly newspapers. These advertisements contained no art work; copy was written in the Division; and insertion instructions were issued direct to the publications.

For the first time the Service instituted a regular programme of radio announcements, 15-second flashes to the number of twenty-six being broadcast over every station in the Province.

Both the press and the radio services contributed generously to the advancement of our educational programme, and the thanks of the Division are extended for this invaluable co-operation.

MOTION PICTURES AND PHOTOGRAPHY.

Motion Pictures.

The stock of the motion-picture library was reduced from seventy-seven to seventy-five subjects. Three obsolete films were removed from circulation and one new sound-and-colour film was added late in the year.

A considerable number of forestry films produced by outside agencies were previewed by members of the staff with a view to purchase. However, none of these were considered sufficiently applicable to conditions existing in British Columbia to warrant their inclusion in the library.

There is now evident a strong trend on the part of the borrowing public away from silent films. This aversion to silent subjects has become apparent this year by the reduction in individual film-loans to 8 per cent. below the 1948 total. It is felt that the individual loan figure is the best basis for gauging the public's interest in the library, as the numbers in the audiences are actually the responsibility of the borrower and not a result of the interest created by the film subjects themselves.

Although the number of loans was down from 436 in 1948 to 397 this year, the number of showings was up to a new high of 1,505. The total audience for the year amounted to 126,105 persons—a significant increase of 41,087 over the preceding year. This brings the cumulative total audience for the years 1945 to 1949, inclusive, up to 319,225 persons, with an average audience size of 105.

Members of the Service continued to make good use of the film library. A total of 160 showings was given by headquarters and district personnel to an audience of 12,765. The Fort George District registered the largest total audiences, with 4,167 persons attending its showings, while Kamloops District maintained its excellent record by giving 36 individual showings.

Late in the year, projection units, complete with portable generators for use in areas without electric power, were allotted on permanent loan to the Nelson, Kamloops, and Prince Rupert-Fort George Districts by this Division. It is expected that this will enable the districts to greatly increase their use of the film library and make it possible for the Service to reach a still larger audience in the future.

A block of seven National Film Board subjects was given a circulation outlet through the library. These films were used primarily to complement our educational subjects in order to produce balanced programmes of the widest possible interest.

The most widely shown forestry films were "Mount Robson Park" (shown eighty-four times to 6,924 persons), "Garibaldi Park" (seventy-three times to 6,573 persons), and "Tweedsmuir Park" (sixty-nine times to 6,156 persons).

The most distant point at which our films were shown was the Department of Forestry, Swiss Institute of Technology, Zurich, Switzerland, where a block of four subjects was shown six times to a total audience of 765 students and foresters. Certain American universities continued to show interest in our films, as well as the University of British Columbia, to whom a greater number of loans were made than ever before.

A tabular statement on the stock and circulation of the film library appears on page 140 of this Report.

PHOTOGRAPHY.

In 1949 the Division darkroom processed and supplied the following material:—

Enlargements—

8 by 10—284: To newspapers, magazines, and other publications.

8 by 10—363: To divisions of the Forest Service, the general public, and Government publications.

5 by 7— 90: To divisions of the Forest Service.

5 by 7—189: To publishers and for educational purposes.

Contact Prints—

136: Various requests and for files.

The Division photographer took 246 black-and-white photographs and 180 colour transparencies for the Division files. Also, many copy photographs were made from old prints, and fading negatives in the old files were intensified.

Special photography was done for all divisions of the Service, such as copying charts, illustrating radio hook-ups, photographing increment-borer cores to give contrast to the growth-rings and enlarge them for more accurate measurement. This latter gave record prints before the cores had a chance to shrink.

Production of the following motion pictures in colour has been completed to the initial editing stage, and they are ready for sound-tracking: "Reforestation," 1,000 feet; "Coast Logging," 1,000 feet; and "Forest Protection," 800 feet. Work was done toward completion of the Christmas-tree industry film and the film on helicopter spraying of hemlock loopers.

The Division photographer hand-coloured thirty-three 11-by-14 photographs for the Forest Service Ranger School.

A new file system and library of 35-millimetre colour slides has been started and plans completed for sets of indexed slides, suitable for lectures, education, and public entertainment.

PUBLICATIONS.

The Annual Report of the Service for the calendar year 1948 was edited and distributed. Assistance was rendered to other divisions of the Service on various editorial and printing projects, including one popular bulletin, two technical bulletins, three research notes, and three forest-protection bulletins. The Division designed the 1950 Service calendar, produced six personnel news-letters, and arranged for the

reprinting of three other publications of various types. Forty thousand copies of a children's booklet, "How the Fir Forest Was Saved," by H. W. Weatherby, were printed, and distribution of the major portion of the edition effected by direct mail or through the district offices and Ranger staff.

In the case of all publications enumerated, staff of the Division was responsible for arranging printing by the Government Printing Bureau. Numerous minor printing jobs were also supervised by members of the staff.

EXHIBITS.

The two portable displays dealing with forest protection and reforestation respectively were again circulated at various fairs and exhibitions held throughout the Province during the late summer and early fall of the year. Designed as an educational media, a supply of the leaflet "Forest Fire-Reforestation" accompanied the displays for distribution to the public attending these events.

The protection exhibit was first shown early in September at the Prince George Fall Fair and was then shipped to Rossland, Nelson, and Creston for entry in their respective fairs. A member of this Division was in attendance at Rossland and also at Nelson, where a special broadcast was arranged over radio station CKLN covering the display and featuring radio contact between the exhibit and the Service's patrol aircraft which circled the fair grounds during the broadcast and aroused interest and favourable comment.

The reforestation display, with a member of this Division in attendance, was shown at the Invermere Fall Fair and later shipped to Elko and Creston where the local Rangers and their staffs attended.

In addition to these portable displays, a number of floats and exhibits were constructed by members of the field staff throughout the Province for participation in local parades. When called upon, this Division assisted in this phase of public-relations work with the loan of banners and signs for decorating these floats.

Plans have been developed for the construction of a portable exhibit accenting the desirability of proper range management. The circulation of this exhibit will be primarily through the fall fairs and stock shows in the grazing areas of the Province. Preliminary work has also been done on the compiling of a suitable leaflet for distribution with the display.

PROTECTION AND DIRECTIONAL SIGNS.

PROTECTION.

During the early part of the year, twenty forest-protection highway signs of Scotchlite reflecting fabric were constructed by members of the Division. These signs measured 7 by 4 feet, using 1- by 3-inch finished lumber for the frames and a single sheet of high-grade masonite for the sign-boards. Three different colours of Scotchlite fabric were employed in making up the message and design. Four of these signs were allotted to each of the forest districts for erecting at various points throughout their areas for purposes of testing their durability and effectiveness under summer and fall weather conditions. As a result of these tests, it was found that the signs were effective both in the daylight and at night, but that certain minor improvements would be advisable in their construction. These improvements will be incorporated in signs scheduled for future construction.

Sufficient material has been assembled for the completion of twenty-five more similar signs, but improved working facilities are essential if this phase of our work is to be carried out in a satisfactory manner.

DIRECTIONAL.

Continued study was given to the subject of standardized directional signs, and all districts were requested to submit their opinions on four basic designs drawn up by this Division. By the end of the year a standard design had been decided upon for Ranger stations.

ARTICLES, PAPERS, AND ADDRESSES.

A number of special articles were prepared for newspapers and other publications. Papers, addresses, and radio scripts were also produced and delivered for a variety of audiences. This phase of the Division's work was curtailed this year to some degree due to the volume and urgency of other activities.

CO-OPERATION.

A total of 818 honorary fire wardens were appointed by the district offices. To all appointees was dispatched a letter of appreciation over the signature of the Minister of the Department. Each appointee received a year's subscription to the conservation magazine "Forest and Outdoors."

Material, suggestions, and assistance in editing manuscripts were rendered to a number of individuals preparing material on forestry or the forest industries for publication.

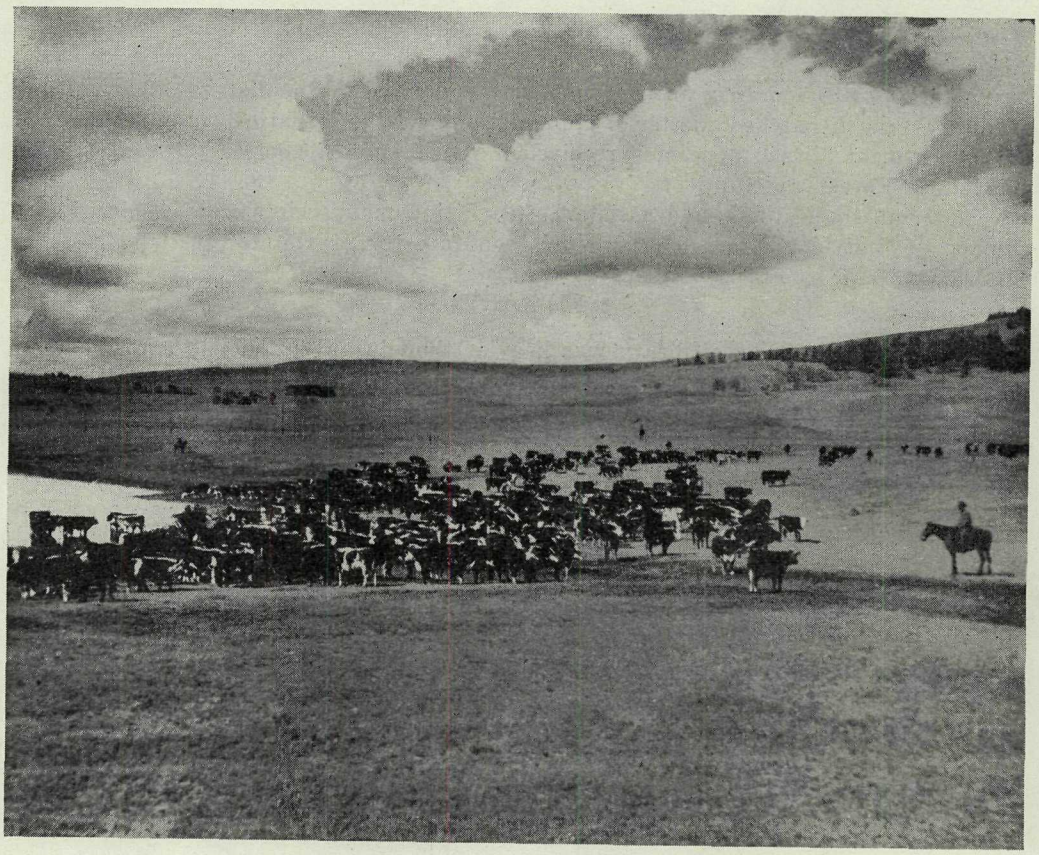
LIBRARY.

Work of the reference library was heavier than in any previous year and, from time to time, it became necessary to supplement the efforts of the librarian with assistance from other staff members.

GRAZING.

INTRODUCTION.

The range-livestock industry plays a very important part in the agricultural economy of British Columbia. Many factors enter into the production of range live stock, but the most important basic element is the availability of high-quality forage. Fortunately, range is a renewable resource which, under careful management, can continue to produce maximum yields indefinitely. On the other hand, overstocking and mismanagement result in range deterioration and progressively lower forage yields. It is, therefore, important to the live-stock producer that the range be so managed as



Typical herd of commercial beef cattle, Nicola district.

to remain at the highest level of productivity year after year. Further, grass and other forage plants are important in water and soil conservation and must be maintained in a healthy condition to avoid flood and erosion. Game and other wild life can only thrive under good range conditions. Recreational values may also be lowered where range depletion occurs. Heavy trampling and browsing, as a result of a shortage of forage, may retard timber reproduction and growth.

It is, therefore, in the interests of the public as a whole that the management of our range lands be so planned and directed as to obtain maximum live-stock production consistent with the conservation of the range resource and to meet the requirements of other forms of land use. The Forest Service endeavours to reach these objectives in the administration of the Crown range lands, and it may be said that 1949 saw continued progress in this direction.

GENERAL CONDITIONS.

Weather has an important bearing on the live-stock business. Not only the range forage itself but also hay production, stock handling, and stock condition are affected.

The winter of 1948–49 was long and cold, necessitating constant heavy feeding. Forage-growth was retarded in the Kamloops and Cariboo Districts by cold, dry weather in March and April, but in the south-easterly portion of the Province growth commenced at about the normal date. Some supplementary feeding of concentrates was necessary to pull the stock through, particularly in those areas where the 1948 hay-crop was poor. Calf-crops were poor in some sections, possibly due to the hard winter and unfavourable spring conditions.

Below-normal rainfall during the spring and early summer reduced forage-growth on the open grasslands, particularly on depleted ranges covered by annual grasses and weeds. Ranges in good condition and carrying a high percentage of desirable perennial grasses were much less seriously affected.

Heavy rains in June and July in the Kamloops Forest District resulted in an excellent growth of forage on the summer ranges. Some recovery took place on the open grasslands, and fall ranging conditions were generally good. A very mild fall made it possible to graze the Crown ranges, where feed was available, until early in December.

In the south-easterly portion of the Province, July and August were extremely dry, with the result that the drier, more open, and heavily used areas in the East Kootenays were cleaned off rather severely, necessitating the removal of stock to the hay meadows early in September. The timbered ranges in this locality were in generally good condition, and it is unfortunate that a greater use of this type of range has not been developed by the stockmen.

Grazing conditions were not entirely favourable on the alpine ranges, used largely by sheep. Turn-out was delayed because of the late spring, and the season further shortened by early frosts at the high elevations. Lambs made out fairly well, however.

Hay-crops were above average in some areas, while in others they were normal or below. The extremely wet weather in the Cariboo and Chilcotin persisted until after August 15th, and a considerable amount of hay cut during this period was spoiled. Later, good weather allowed haying to continue until after the end of September. A large quantity of only fair-quality natural-meadow hay was put up.

Damage by grasshoppers was again negligible, and no active control measures were undertaken in the grasshopper-control areas.

Ranch labour continues to be a problem. More men are available, but there is a growing demand for the amenities of the town, and there is an abnormally large turnover. It is extremely difficult for the rancher to properly manage his stock on the range with inexperienced help. Most materials and equipment are now in good supply, good-quality barbed wire—a useful tool in range management—being one of the important exceptions.

RANGE MANAGEMENT PLANS.

Each range should have a complete management plan, based on careful reconnaissance, and this should be revised where periodic inspections indicate the necessity. After discussion with the stockmen concerned, these plans are included as conditions in the grazing permits. This work is going on constantly throughout the range areas as more information becomes available. In 1949 our efforts were concentrated particularly on ranges in the Grand Forks, Creston, East Kootenay, Riske Creek, Nicola, and Kamloops areas. On the whole, stockmen co-operated well, and it is to be hoped that a programme of rational range management will enjoy universal support as the benefits are demonstrated by practice.

The chief problems receiving attention are too early turn-out, poor distribution, and overstocking. The first can only be effectively overcome by the rancher providing more and better-quality winter feed and thus being in a position to feed his stock until the range grasses have a good start. This situation is slowly improving, as a result of continuous checking by the grazing and Ranger staff and co-operation by the ranchers, without the necessity of seriously reducing live-stock numbers.

There is always a tendency to allow stock to remain on the open grassland and other areas suitable for spring and fall use for the whole season, even though considerable areas of unused, timbered, summer range are often available. Wherever necessary and practical, fuller use of the timbered range is being insisted upon, thus reducing the pressure on the overgrazed areas. Progress toward remedying this situation was made in 1949. The East Kootenay requires particular attention.

Fortunately, it has been possible to reduce overstocking in most cases by making adjustments between range units and opening up areas of unused range. However, in a few instances, it is now becoming evident that a reduction in permitted stock is necessary. This is done only as a last resort and then over a period of several years.

CO-OPERATION.

Co-operation by and with local live-stock associations is an important part of range administration. Range-users, through these incorporated and recognized bodies, are able to give a balanced opinion on range management that is highly valuable to administrative officers. Further, associations provide the machinery by which co-operative range management plans may be carried out.

There are now forty-two active live-stock associations in the Province. These reported ninety-six meetings, of which eighty-four were attended by forest officers. Two new associations were recognized during the year and a third has become incorporated, and its application for recognition is expected early in 1950.

Close co-operation with the Game Department continued throughout the year, in considering game-livestock relationships on the range and the problem of predatory animals. Similarly, close contact was maintained with the Live Stock Branch of the Department of Agriculture in connection with its programme of establishing bull-control and disease-free areas in the range country.

RANGE IMPROVEMENT.

Most ranges cannot be utilized fully without some form of improvement and development. The Range Improvement Fund, the standing of which is reported on page 129, is available for such purposes. The "Grazing Act Amendment Act, 1949," increased the contribution to this fund from one-third to one-half of grazing fees collected each year.

During the year the following projects were completed: Stock-bridges, 2; cattle-guards, 2; drift-fences, 8; experimental plots, 2; holding-grounds (repaired), 7; mud-holes, 6; stock-trails, 15; water-developments, 3; weed-control measures, 1.

Some of the ranges are still encumbered with wild and useless horses. During 1949 action was taken in critical areas in co-operation with the live-stock associations. Horses rounded up and shipped out for slaughter numbered 364, and 217 were shot.

Stockmen have continuously advocated burning as means of improving forage. This is a highly complex and controversial matter as numerous factors are involved. In order to obtain more scientific data, a series of experimental burns is being carried out by the Dominion Range Experiment Station and this Service in co-operation with several other agencies. The effect of fire on various types and under different conditions is being studied. Also, in conjunction with this, a study of old existing burns is being made.

It is felt that, in most cases, depleted ranges in British Columbia may be most economically rehabilitated by conservative management practices. There are some areas, however, on which it is evident that reseeding will be necessary. Some trial seedings carried out late in 1948 were checked closely during 1949 to ascertain results. It is too early to arrive at definite conclusions, but there is some evidence that it will be necessary to drill the seed to achieve satisfactory results on the dry grasslands.

Comparison of overgrazed range in poor condition and area artificially seeded to crested wheat-grass, Quilchena.

The encroachment of goatweed on to the Interior range lands is a matter of considerable concern. This aggressive and poisonous weed is difficult to control and is capable of replacing the valuable forage on most of our lower range lands. Various control measures were tested during the year and the fullest possible information obtained regarding control measures used elsewhere. Every effort will be made to control this weed before it gains a foothold in the range areas.

RANGE RECONNAISSANCE.

Our programme of range reconnaissance was continued in 1949, a total of 691,912 acres being covered. The following areas were mapped:—

	Acres.
Tunkwa Stock Range	155,513
Swakum Mountain	41,781
Rose Lake-150-Mile	318,308
Watching Creek	710
Waldo Stock Range	134,000
Creston Flats	41,600

Extensive examinations were carried out in several areas, including the Coutlee Plateau and Maka Creek units of the Nicola Stock Range and the White Lake Stock Range. In addition, 145 man-days were spent gathering grazing data required in connection with the proposed dam projects on the Kootenay River.

GRAZING, HAY, AND SPECIAL-USE PERMITS.

The grazing of stock at large on Crown range is controlled through the issuance of permits under authority of the "Grazing Act." Although the number of stock was down somewhat, as a result of heavy sales in 1948, a record number of permits was issued in 1949. This is due largely to the necessity of issuing spring and fall permits separate from summer permits where intensified management plans are in effect. The

Good-quality Herefords in shipping-corral, Nicola.

tabulation on page 141 shows the volume of business for 1949 and the past ten years. Fees billed and collected were at approximately the same level as in 1948, and are shown in the tabulation on page 141.

During the year 213 hay-cutting permits were issued, authorizing the cutting of 2,400 tons of hay and 253 tons of rushes on Crown lands.

Under special conditions, fenced pastures may be allowed within Provincial forests. These are normally pastures used in conjunction with commercial lodges or special pastures required by stockmen in handling their stock on the forests. Such use is secured through special-use permit issued under authority of the Forest Reserve Regulations. Former Dominion grazing leases, lying within Provincial forests in the

Railway Belt, are being replaced by grazing special-use permits upon expiry. Special-use permits (grazing) to the number of twenty-four were issued in 1949.

MISCELLANEOUS.

Live-stock Losses.

Losses of stock were about normal in 1949. Poison-weeds accounted for some stock, but losses in mud-holes were light owing to high water-levels. An increasing number of cattle are being reported killed on highways running through range areas. Losses of stock through gunshot wounds and predators were also reported.

Predatory Animals.

Many reports have been received in recent years to the effect that predatory animals, particularly wolves, are taking a heavy toll of range live stock and, in 1948, the British Columbia beef-cattle growers requested that temporary summer employees of the Forest Service be kept on during the winter to help combat this menace. As an experiment, two men were employed a total of nine man-months during the winter of 1948–49 to hunt in the range areas of the Cariboo and Chilcotin. From the standpoint of bag obtained—twenty-six coyotes and one wolf—the trial was not an outstanding success. However, it was evident that the weather and distribution of game were such that wolves were not forced to approach the more settled areas and prey on domestic live stock during that period. Numerous reported kills were investigated but, in many cases, there was no evidence that the stock had been killed by predators.

Markets and Prices.

Excellent prices were received by British Columbia livestock-producers throughout the year, maintaining the industry in a healthy economic condition. Shipments of cattle were down somewhat from 1948, but sheep and lambs were about the same. There were six major range-livestock sales in 1949.

Stock-counts.

As a check on the number of stock on the Crown range and under authority of the Grazing Regulations, several counts were carried out early in 1950.

Prosecutions.

During the year it was necessary to institute one civil suit to recover arrears of grazing fees, and full collection was made. Two charges of grazing in trespass were laid and, on the hearing, the accused was found guilty and fined $25 on both counts.

PERSONNEL DIRECTORY, 1950.

VICTORIA OFFICE.

C. D. Orchard	Deputy Minister and Chief Forester	Victoria.
R. C. St. Clair	Assistant Chief Forester.	
C. Cooper	Forest Counsel.	
R. G. McKee	Forester i/c Operation Division	Victoria.
P. Young	Assistant Forester.	
D. W. Perrie	Meteorologist.	
W. C. Spouse	Mechanical Superintendent.	
A. B. Crowe	Assistant Mechanical Superintendent.	
J. H. Taylor	Marine and Structural.	
G. A. Playfair	Radio Superintendent.	
H. E. Ferguson	Assistant Radio Superintendent.	
R. L. Fielder	Technical Forest Assistant (Fire Research).	
L. Lucas	Technical Forest Assistant (Fire Research).	
A. Stringer	Chief Clerk.	
E. B. Prowd	Forester i/c Management Division	Victoria.
S. E. Marling	Forester.	
G. M. Abernethy	Assistant Forester.	
R. C. Telford	Assistant Forester (Management Licences).	
J. S. Stokes	Assistant Forester.	
A. E. Collins	Assistant Forester (Forest-cover Maps).	
W. G. Hughes	Assistant Forester (Farm Wood-lot Licences).	
D. M. Carey	Assistant Forester (Public Working-circles).	
F. F. Slaney	Engineer.	
A. L. Parlow	Forester-in-training.	
N. V. Mason	Forester-in-training.	
R. G. Gilchrist	Chief Draughtsman.	
E. H. Henshall	Chief Clerk.	
A. G. Mumford	Chief Clerk (Timber-sale Administration).	
S. F. Bankes	Senior Clerk (Timber-sale Contracts).	
F. S. McKinnon	Forester i/c Economics Division	Victoria.
J. L. Alexander	Forester (Mensuration).	
R. H. Spilsbury	Forester (Soils).	
H. M. Pogue	Assistant Forester (Surveys).	
E. H. Garman	Assistant Forester (Silviculture).	
G. Silburn	Assistant Forester (Surveys).	
H. N. Cliff	Assistant Forester (Surveys).	
A. R. Fraser	Assistant Forester (Mensuration).	
A. L. Orr-Ewing	Assistant Forester (Silviculture).	
G. C. Warrack	Assistant Forester (Silviculture).	
L. A. de Grace	Assistant Forester (Aleza Lake Experimental Station).	
H. C. Joergensen	Assistant Forester.	
R. M. Malcolm	Assistant Forester.	
J. M. Finnis	Forester-in-training.	
R. L. Schmidt	Forester-in-training.	
W. Young	Forester-in-training.	
C. J. Calder	Forester-in-training.	
W. Mulholland	Forester-in-training.	
D. Glew	Forester-in-training.	
B. Ford	Forester-in-training.	
H. E. Lyons	Forester-in-training.	
M. B. Clark	Forester-in-training.	
J. Frey	Forester-in-training.	
J. P. Decie	Forester-in-training.	
D. Macdougall	Technical Forest Assistant.	
A. N. Clarke	Technical Forest Assistant.	
J. H. Warwick	Technical Forest Assistant.	
G. W. Allison	Technical Forest Assistant.	
D. R. Selkirk	Technical Forest Assistant.	
W. Bailey	Technical Forest Assistant.	
C. J. T. Rhodes	Supervising Draughtsman.	

VICTORIA OFFICE—*Continued.*

H. G. McWilliams	Forester i/c Reforestation Division	Victoria.
A. H. Bamford	Assistant Forester.	
E. G. Whiting	Assistant Forester.	
T. Wells	Nursery Superintendent, New Westminster.	
J. R. Long	Nursery Superintendent, Duncan.	
W. Turner	Nursery Superintendent, Campbell River.	
N. G. Wharf	Clerk.	
E. G. Oldham	Forester i/c Parks and Recreation Division	Victoria.
C. P. Lyons	Assistant Forester.	
D. M. Trew	Assistant Forester.	
L. Brooks	Forester-in-training.	
R. H. Ahrens	Forester-in-training.	
A. W. Weston	Forester-in-training.	
R. Lowrey	Forester-in-training.	
D. L. Macmurchie	Technical Forest Assistant.	
N. M. F. Pope	Technical Forest Assistant.	
F. R. Rainbow	Technical Forest Assistant.	
E. A. McGowan	Engineer-in-training.	
C. J. Velay	Engineer-in-training.	
R. G. Knight	Engineer-in-training.	
J. M. M. Bailey	Engineer-in-training.	
R. Stewart	Architectural Draughtsman.	
A. Wade	Draughtsman.	
S. E. Park	Clerk.	
E. Charlton	Accountant.	
E. Druce	Forester i/c Public Relations and Education Division	Victoria.
D. R. Monk	Public Relations Officer (Administration).	
P. W. H. G. Johnson	Public Relations Officer (Photography).	
Miss I. Chisholm	Forest Service Library.	
W. C. Pendray	Forest Agrologist i/c Grazing Division	Victoria.
W. V. Hicks	Inspector, Forest Accounts	Victoria.
D. I. MacLeod	Assistant Inspector.	
W. C. Higgins	Chief Accountant.	
A. E. Rhodes	Assistant Accountant.	
J. R. L. Conn	Clerk, Expenditures.	
E. Clough	Overrun Investigator.	
R. D. Greggor	Forester i/c Ranger School	New Westminster.
J. A. Pedley	Assistant Forester.	
G. L. Levy	Clerk.	
J. G. MacDonald	Superintendent, Forest Service Marine Station	Vancouver.

DISTRICTS.

Vancouver.

E. W. Bassett	District Forester	Vancouver.
D. B. Taylor	Assistant District Forester.	
D. H. Ross	Assistant Forester (Operation).	
J. A. K. Reid	Assistant Forester (Management).	
C. F. Holmes	Assistant Forester (Slash-disposal Officer).	
C. E. Bennett	Assistant Forester.	
W. E. L. Young	Assistant Forester.	
G. R. Johnston	Forester-in-training.	
J. McNeill	Fire Inspector.	
C. S. Frampton	Supervisor.	
R. H. Morrison	Supervisor.	
P. R. Neil	Technical Forest Assistant.	
G. A. MacKenzie	Technical Forest Assistant.	
C. L. Armstrong	Supervisor of Scalers.	
A. C. Heard	Assistant Supervisor of Scalers.	

DISTRICTS—*Continued.*

VANCOUVER—*Continued.*

H. A. D. Munn	Assistant Supervisor of Scalers.
J. A. Fetherstonhaugh	Inspector of Licensed Scalers.
J. H. Templeman	Inspector of Licensed Scalers.
F. O'Grady	Export Inspector.
H. H. Hill	Mechanical Inspector.
E. P. Fox	Chief Clerk.
G. H. Birkenhead	Supervising Draughtsman.
S. W. Croteau	Radio Technician.

R.D. No.			
1.	J. A. Mahood	Ranger	Chilliwack.
2.	J. H. Robinson	Ranger	Mission.
3.	G. G. Armytage	Ranger	North Vancouver.
4.	S. C. Frost	Ranger	Squamish.
5.	L. C. Chamberlin	Ranger	Sechelt.
6.	D. H. Owen	Ranger	Pender Harbour.
7.	W. Black	Ranger	Powell River.
7.	W. P. Rawlins	Ranger	Powell River.
8.	R. W. Aylett	Ranger	Lund.
9.	A. F. W. Ginnever	Ranger	Thurston Bay.
10.	K. A. McKenzie	Ranger	Thurston Bay.
11.	A. C. C. Langstroth	Ranger	Alert Bay.
12.	R. W. Jones	Ranger	Port Hardy.
13.	C. D. S. Haddon	Ranger	Campbell River.
14.	S. Silke	Ranger	Courtenay.
15.	W. E. Jansen	Ranger	Nanaimo.
16.	P. Sweatman	Ranger	Duncan.
17.	J. P. Greenhouse	Ranger	Langford.
18.	F. Tannock	Ranger	Alberni.
19.	J. F. Solloway	Ranger	Zeballos.
20.	H. Barker	Ranger	Cowichan Lake.
21.	R. Little	Ranger	Harrison Lake.
22.	R. J. Glassford	Ranger	Parksville.
23.	M. H. Mudge	Ranger	Alert Bay.
	H. Stevenson	Ranger	Vancouver.

PRINCE RUPERT.

M. W. GORMELY	DISTRICT FORESTER	PRINCE RUPERT.
M. O. Kullander	Assistant District Forester.	
J. P. MacDonald	Assistant Forester (Operation).	
L. B. Boulton	Assistant Forester (Management).	
R. W. Corregan	Forester-in-training.	
C. V. Smith	Chief Clerk.	
I. Martin	Senior Draughtsman.	
F. Goertzen	Radio Technician.	
J. B. Scott	Inspector of Licensed Scalers.	

R.D. No.			
1.	S. T. Strimbold	Ranger	Burns Lake.
1.	R. L. Brooks	Ranger	Burns Lake.
2.	L. G. Taft	Ranger	Hazelton.
2.	R. G. Benson	Ranger	Hazelton.
3.	S. G. Cooper	Ranger	Terrace.
3.	W. H. Campbell	Acting Ranger	Terrace.
4/7.	J. A. Willan	Ranger	Prince Rupert.
5/6.	H. B. Hammer	Ranger	Queen Charlotte City.
8.	A. A. Antilla	Ranger	Ocean Falls.
9.	W. A. Antilla	Ranger	Southbank.
10.	C. L. Gibson	Ranger	Smithers.
11.	D. R. Smith	Ranger	Houston.
11.	J. Mould	Ranger	Topley.

DISTRICTS—*Continued.*

FORT GEORGE.

L. F. SWANNELL	DISTRICT FORESTER	PRINCE GEORGE.
A. H. Dixon	Assistant District Forester.	
E. W. Robinson	Assistant Forester (Management).	
W. G. Henning	Assistant Forester (Operation).	
F. H. Nelson	Supervisor.	
A. H. McCabe	Inspector of Licensed Scalers.	
F. Hollinger	Mechanical Inspector.	
R. B. Carter	Chief Clerk.	
R. C. Simpson	Radio Technician.	

R.D. No.			
1.	J. S. Macalister	Ranger	McBride.
2.	G. G. Jones	Ranger	Penny.
3.	A. F. Specht	Ranger	Prince George (S.).
4.	C. L. French	Ranger	Prince George (N.).
5.	A. V. O'Meara	Ranger	Vanderhoof.
6.	L. A. Willington	Ranger	Quesnel.
7.	H. T. Barbour	Ranger	Pouce Coupe.
8.	W. V. McCabe	Ranger	Aleza Lake.
9.	N. Threatful	Ranger	Vanderhoof.
10.	R. B. Angly	Ranger	Fort St. John.
11.	R. I. Patterson	Ranger	Fort Fraser.
12.	W. N. Campbell	Ranger	Fort McLeod.
	G. E. Meents	Ranger	Prince George.

KAMLOOPS.

A. E. PARLOW	DISTRICT FORESTER	KAMLOOPS.
W. C. Phillips	Assistant District Forester.	
J. R. Johnston	Assistant Forester (Operation).	
W. W. Stevens	Assistant Forester (Management).	
C. D. Grove-White	Assistant Forester (Silviculture).	
A. R. Waldie	Assistant Forester.	
T. R. Broadland	Recreational Officer.	
H. K. DeBeck	Assistant Forest Agrologist.	
M. T. Wallace	Assistant Forest Agrologist.	
A. Paulsen	Assistant Forest Agrologist.	
A. J. Kirk	Fire Inspector.	
E. A. Charlesworth	Inspector of Licensed Scalers.	
C. Williams	Inspector of Licensed Scalers.	
J. R. Smythe	Mechanical Inspector.	
W. P. Cowan	Technical Forest Assistant.	
C. R. Downing	Technical Forest Assistant.	
C. H. Huffman	Technical Forest Assistant.	
E. A. Bowers	Radio Technician.	
C. R. Lee	Supervising Draughtsman.	
H. J. Parker	Chief Clerk.	

R.D. No.			
1.	M. A. Johnson	Ranger	Vernon.
2.	H. W. Campbell	Ranger	Birch Island.
3.	D. P. Fraser	Ranger	Barriere.
4.	H. A. Ferguson	Ranger	Kamloops.
5.	H. G. Mayson	Ranger	Chase.
6.	J. Boydell	Ranger	Salmon Arm.
7.	J. A. Sim	Ranger	Sicamous.
8.	E. L. Scott	Ranger	Revelstoke.
9.	J. W. Hayhurst	Ranger	Vernon.
10.	C. Perrin	Ranger	Penticton.
11.	J. H. Dearing	Ranger	Princeton.
12.	C. E. Robertson	Ranger	Clinton.
13.	H. S. Noakes	Ranger	Williams Lake.
14.	T. L. Gibbs	Ranger	Alexis Creek.
15.	R. B. W. Eden	Ranger	Kelowna.

DISTRICTS—*Continued.*

KAMLOOPS—*Continued.*

R.D. No.			
16.	L. E. Cook	Ranger	Wells Gray Park.
17.	R. C. Hewlett	Ranger	Merritt.
18.	C. M. Yingling	Ranger	Blue River.
19.	H. C. Hewlett	Ranger	Enderby.
20.	R. H. Boyd	Ranger	Manning Park.
21.	O. Paquette	Ranger	100-Mile House.

NELSON.

H. B. FORSE	DISTRICT FORESTER	NELSON.
I. T. Cameron	Assistant District Forester.	
L. S. Hope	Forester (Silviculture).	
G. W. Minns	Assistant Forester (Management).	
J. E. Milroy	Assistant Forest Agrologist.	
R. G. Gill	Technical Forest Assistant.	
J. H. A. Applewhaite	Technical Forest Assistant.	
G. T. Robinson	Inspector of Licensed Scalers.	
J. H. Holmberg	Fire Inspector.	
I. B. Johnson	Fire Inspector.	
R. O. Christie	Fire Inspector.	
R. H. Baker	Mechanical Inspector.	
L. A. Chase	Supervisor.	
S. S. Simpson	Chief Clerk.	
J. C. I. Rogers	Supervising Draughtsman.	
L. S. Ott	Radio Technician.	

R.D. No.			
1.	J. L. Johnson	Ranger	Invermere.
2.	R. A. Damstrom	Ranger	Fernie.
3.	H. J. Coles	Ranger	Golden.
4.	F. R. Hill	Ranger	Cranbrook.
4.	J. B. Gierl	Ranger	Cranbrook.
5.	A. I. Ross	Ranger	Creston.
6.	J. L. Humphrey	Ranger	Kaslo.
7.	R. E. Robinson	Ranger	Lardeau.
8.	L. M. Quance	Ranger	Nelson.
9.	C. R. Tippie	Ranger	New Denver.
10.	H. L. Couling	Ranger	Nakusp.
11.	J. F. Killough	Ranger	Rossland.
12.	E. W. Reid	Ranger	Grand Forks.
13.	L. E. Stilwell	Ranger	Kettle Valley.
13.	J. E. Connolly	Ranger	Kettle Valley.
14.	C. J. McGuire	Ranger	Canal Flats.
15.	H. R. Wood	Ranger	Arrowhead.
16.	W. D. Haggart	Ranger	Edgewood.
17.	F. G. Hesketh	Ranger	Elko.
	G. C. Palenthorpe	Ranger (Spare)	Nelson.

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(1)

DISTRIBUTION OF PERSONNEL, 1949.

Personnel.	Forest District.						
	Vancouver.	Prince Rupert.	Fort George.	Kamloops.	Nelson.	Victoria.	Total.
Continuously employed.							
Chief Forester, Assistant Chief Forester, and Division Foresters	....	....	....	....	....	9	9
District Foresters and Assistant District Foresters	2	2	2	2	2	....	10
Foresters and Assistant Foresters	5	3	2	3	3	27	43
Agrologists and Assistants	....	....	....	4	2	1	7
Foresters-in-training	1	1	1	1	1	22	27
Supervisors of Rangers and Fire Inspectors	2	....	1	1	3	....	7
Rangers	26	11	11	22	18	1	89
Supervisor of Scalers and Assistants	5	1	1	2	2	....	11
Scalers, Official	72	....	....	....	....	....	72
Scalers, Licensed	....	....	....	1	....	....	1
Inspectors, Royalty and Export	3	....	....	....	....	2	5
Mechanical—Radio and Engineering Supervisors	2	1	1	1	2	12	19
Technical Forest and Public Relations Assistants	1	....	....	3	1	16	21
Nursery, Reforestation, Parks, and Research Assistants	....	....	....	....	....	47	47
Nursery Superintendents	....	....	....	....	....	3	3
Draughtsmen	4	2	1	3	3	23	36
Clerks, Stenographers, and Messengers	56	14	13	16	16	89	204
Superintendent and Foremen, Forest Service Marine Station	....	....	....	....	....	4	4
Mechanics, Carpenters, and Technicians	....	....	....	....	1	20	21
Launch Crewmen	12	3	....	....	....	1	16
Assistant and Acting Rangers	22	8	15	21	24	....	90
Dispatchers	14	....	1	7	6	....	28
Cruisers and Compass-men	3	....	....	4	....	....	7
Truck and Tractor Operators	3	....	....	....	....	7	10
Foremen	....	....	1	....	....	9	10
Miscellaneous	....	....	....	1	1	16	18
Total, continuous personnel	233	46	50	92	85	309	815
Seasonally employed.							
Assistant and Acting Rangers	13	7	10	14	19	....	63
Patrol-men	14	6	9	16	12	....	57
Lookout-men	20	11	14	21	33	....	99
Dispatchers and Radio Operators	6	7	4	9	13	....	39
Fire-suppression Crewmen	42	....	....	56	44	....	142
Reforestation—Snag-fallers, Planters, etc.	8	....	....	....	....	453*	461
Cruisers and Compass-men	....	1	1	....	2	39	43
Truck and Tractor Operators	....	2	4	5	7	8	26
Student Assistants	4	4	2	4	7	23	44
Silvicultural Crewmen	....	8	4	7	16	....	35
Foremen	6	4	....	7	6	8	31
Miscellaneous	....	4	4	13	....	56	77
Total, seasonal personnel	113	54	52	152	159	587	1,117
Total, all personnel	346	100	102	244	244	896	1,932

* Peak employment.

(2)

SUMMARY OF PLANTING DURING THE YEARS 1940–49.

Year.	Experimental.		Forest Service on Crown Land.		Private Companies.		Community Forests.		Private Planting and Farm Wood-lots.		Total.	
	Trees in Thousands.	Acres.	Trees in Thousands.	Acres.	Trees in Thousands.	Acres.	Trees in Thousands.	Acres.	Trees in Thousands.	Acres.	Trees in Thousands.	Acres
1949	15.3	15.0	7,418.5	8,125.0	855.5	1,010.0	5.0	.....	23.2	15.0	8,317.5	9,165.0
1948	3.4	4.0	9,123.3	10,560.0	1,402.0	2,140.0	5.0	5.0	18.4	20.0	10,552.1	12,729.0
1947	.....	.....	3,466.5	4,380.0	473.5	490.0	.....	.....	34.0	20.0	3,974.0	4,890.0
1946	.....	.....	3,670.2	6,000.0	3,854.2	4,700.0	.....	.....	6.7	7.0	7,531.1	10,707.0
1945	.....	.....	160.0	180.0	1,035.0	1,215.0	.....	.....	8.4	10.0	1,203.4	1,405.0
1944	68.0	70.0	7,108.2	9,175.0	600.0	914.0	102.0	132.0	11.4	11.0	7,889.6	10,302.0
1943	22.4	25.0	8,535.0	10,804.0	556.9	510.0	70.5	70.0	12.4	12.0	9,197.2	11,421.0
1942	5.3	5.0	6,673.8	7,908.0	.....	.....	2.5	3.0	12.5	12.0	6,694.1	7,928.0
1941	7.3	7.0	8,267.7	10,188.0	460.0	550.0	15.0	15.0	2.2	2.0	8,752.2	10,762.0
1940	6.1	6.0	1,156.7	1,293.0	118.0	135.0	67.0	55.0	8.1	8.0	1,355.9	1,497.0
Previously planted	600.9	504.7	1,183.6	1,657.0	208.2	252.3	42.0	42.0	20.8	20.0	2,055.5	2,476.0
Totals to date	728.7	636.7	56,763.5	70,270.0	9,563.3	11,916.3	309.0	322.0	158.1	137.0	67,522.6	83,282.0

(3) ESTIMATED VALUE OF PRODUCTION, INCLUDING LOADING AND FREIGHT WITHIN THE PROVINCE.

Product.	1940.	1941.	1942.	1943.	1944.	1945.	1946.	1947.	1948.	1949.	Ten-year Average, 1940–49.
Lumber	$55,514,000	$64,596,000	$67,150,000	$66,520,000	$81,495,000	$78,244,000	$87,013,502	$155,761,222	$219,289,000	$206,228,610	$108,181,133
Pulp and paper	22,971,000	27,723,000	27,457,000	25,597,000	30,391,000	33,782,000	41,800,555	57,145,678	73,989,000	68,482,241	40,933,847
Shingles	9,620,000	11,550,000	12,822,000	8,332,000	10,006,000	10,544,000	12,946,506	23,625,946	25,094,000	16,881,240	14,142,170
Boxes	4,779,000	4,707,000	5,397,000	4,697,000	7,218,000	7,855,000	8,288,491	10,430,608	6,129,000	3,424,268	6,292,537
Doors	740,000	*	*	*	*	*	*	*	*	*	*
Plywood	.....	.....	.....	.....	6,100,000	6,000,000	9,120,000	20,830,000	22,430,000	21,500,000	14,330,000†
Piles, poles, and mine-props	1,759,000	1,723,000	2,576,000	2,387,000	2,088,000	2,986,000	5,125,762	5,225,000	4,158,000	4,470,379	3,249,814
Cordwood, fence-posts, and lagging	1,399,000	1,522,000	2,165,000	4,485,000	3,303,000	2,621,000	2,647,488	2,200,000	1,671,000	2,058,200	2,407,169
Ties, railway	258,000	204,000	221,000	268,000	484,000	507,000	478,519	580,000	671,000	467,127	413,865
Additional value contributed by the wood-using industry	1,600,000	2,000,000	2,500,000	2,800,000	1,600,000	1,500,000	1,700,000	1,600,000	1,800,000	2,000,000	1,910,000
Laths and other miscellaneous products	1,400,000	1,500,000	1,500,000	1,400,000	1,500,000	1,500,000	1,400,000	1,200,000	1,598,000	1,454,000	1,445,200
Logs exported	2,684,000	4,212,000	2,618,000	1,555,000	2,065,000	1,766,000	2,349,280	3,313,672	6,435,000	4,029,069	3,102,702
Pulp-wood exported	8,000	7,000	2,000	16,000	35,000	25,000	6,787	32,610	29,000	139,200	30,060
Christmas trees	72,000	176,000	162,000	227,000	236,000	271,000	402,056	293,652	470,000	445,965	275,567
Cascara bark	.....	.....	150,000	150,000	90,000	54,000	192,421	50,000	23,000	9,250	89,835‡
Totals	$102,804,000	$119,920,000	$124,720,000	$118,434,000	$146,611,000	$147,655,000	$173,471,370	$282,288,388	$363,786,000	$331,589,549	.....

* Included in wood-using industry value. † Average for six-year period only. ‡ Average for eight-year period only.

(4) PAPER PRODUCTION (IN TONS).

Product.	1940.	1941.	1942.	1943.	1944.	1945.	1946.	1947.	1948.	1949.	Ten-year Average.
Newsprint	262,144	275,788	252,559	211,696	236,696	253,671	259,921	338,239	327,764	378,355	279,694
Other papers	68,428	75,453	74,915	63,026	74,038	80,691	82,833	72,755	79,446	83,927	75,552

In addition to 433,175 tons of pulp manufactured into paper in the Province, 197,807 tons were shipped out of the Province during the year.

(5)

WATER-BORNE LUMBER TRADE (IN M B.M.).

Destination.	1940.	1941.	1942.	1943.	1944.	1945.	1946.	1947.	1948.	1949.	Ten-year Average, 1940–49.
Australia	72,797	49,614	13,819	45,452	55,332	68,600	67,269	71,313	54,376	83,523	58,210
New Zealand	2,584	2,517	2,199	.....	3,150	5,637	5,892	15,362	6,768	10,702	5,481
South America	1,795	28,091	4,244	2,433	.....	.....	11,794	5,519	5,486	7,234	6,660
China	6,347	9,663	.....	.....	.....	229	58,632	48,426	34,390	4,318	16,201
Japan	835	.....	.....	.....	.....	.....	.....	.....	.....	.....	84
United Kingdom and Continent	971,594	479,861	466,902	653,847	618,517	595,473	418,960	744,804	470,445	345,812	576,621
South Africa	84,708	68,142	20,878	24,924	44,214	46,732	95,588	69,136	108,384	101,957	66,466
India and Straits Settlements	139	2,292	846	.....	50	51	161	8,783	2,497	12,261	2,708
United States and Atlantic Coast	70,726†	68,383†	6,368†	3,301†	†	9,587†	2,905	205	104,636	310,411	57,652
Philippine and Hawaiian Islands	.....	.....	.....	83	.....	.....	1,084	73	13,901	11,086	2,622
West Indies and Cuba	15,309	19,056	4,683	3,930	8,240	10,412	16,832	18,934	4,328	9,754	11,148
South Sea Islands	7,187	5,074	5,060	1,402	5,350	2,370	3,565	6,388	5,930	7,668	4,999
Mexico and Central America	5	2,975	229	.....	.....	4	5,812	7	435	4,619	1,409
Egypt, Palestine, and Arabia	17,326	88	146	237	1,278	1,241	19,185	28,451	10,291	11,744	8,999
*Belgium	.....	.....	.....	.....	.....	2,243	897	180	1,203	3,202	773
*Denmark	120	.....	.....	.....	.....	.....	420	.....	.....	51	59
*France	4,938	.....	.....	.....	.....	2,109	16,229	26,107	30	1,841	5,125
*Germany	.....	.....	.....	.....	.....	.....	.....	.....	.....	51	5
*Holland	.....	.....	.....	.....	.....	.....	17,387	52,813	7,883	1,945	8,002
*Italy	686	.....	.....	.....	581	313	.....	80	47	294	200
*Norway and Sweden	.....	.....	.....	.....	.....	.....	.....	.....	.....	258	26
Foreign, unclassified	821†	279†	29†	250†	2,086†	2,031†	2,603	12,597	10,568	6,939	3,820
Totals	1,257,917	736,035	525,403	735,859	738,798	747,032	745,215	1,109,178	841,598	935,670	837,270

* Previously included with United Kingdom.

† Includes a considerable volume with destination unknown due to cloaking of war shipments.

(6)

TOTAL AMOUNT OF TIMBER SCALED IN BRITISH COLUMBIA DURING THE YEARS 1948-49 (IN F.B.M.).

Forest District.	1948.	1949.	Gain.	Loss.	Net Gain.
Vancouver	3,091,275,786	2,962,078,034	.....	129,197,752	.....
Prince Rupert	175,108,525	174,799,387	.....	309,138	.....
Totals, Coast	3,266,384,311	3,136,877,421	.....	129,506,890	.....
Prince Rupert (I.)	100,372,636	98,910,325	.....	1,462,311	.....
Fort George	297,219,261	263,403,404	.....	33,815,857	.....
Kamloops	334,671,933	298,230,238	.....	36,441,695	.....
Nelson	294,816,878	252,260,939	.....	42,555,939	.....
Totals, Interior	1,027,080,708	912,804,906	.....	114,275,802	.....
Grand totals	4,293,465,019	4,049,682,327	.....	243,782,692	243,782,692

(7)

SPECIES CUT, ALL PRODUCTS (IN F.B.M.).

Forest District.	Fir.	Cedar.	Spruce.	Lodge-pole Pine.	Hemlock.	Balsam.	White Pine.	Yellow Pine.	Cypress.	Larch.	Hard-woods.	Cotton-wood.	Totals.
Vancouver	1,405,324,521	569,708,234	52,238,294	.....	723,864,536	170,554,759	22,316,822	338,556	5,171,617	.....	10,093,975	2,466,720	2,962,078,034
Prince Rupert	12,900,338	36,968,500	51,296,615	167,231	63,902,064	9,066,637	.....	.....	162,818	.....	33,687	301,497	174,799,387
Totals, Coast	1,418,224,859	606,676,734	103,534,909	167,231	787,766,600	179,621,396	22,316,822	338,556	5,334,435	.....	10,127,662	2,768,217	3,136,877,421
Prince Rupert (I.)	508,504	7,294,478	57,759,846	23,901,822	6,280,871	2,890,871	.....	.....	.....	.....	274,500	.....	98,910,325
Fort George	48,208,396	2,919,829	179,939,478	28,676,609	3,313	3,242,925	.....	.....	.....	.....	98,681	314,173	263,403,404
Kamloops	175,783,540	23,767,669	35,117,966	4,848,903	2,751,595	1,634,379	7,083,823	27,193,260	.....	19,094,847	391,047	563,209	298,230,238
Nelson	61,814,712	32,464,982	40,282,395	7,476,964	11,478,007	1,661,709	10,835,993	12,856,345	.....	72,811,419	63,639	514,774	252,260,939
Totals, Interior	286,315,152	66,446,958	313,099,685	64,904,298	20,513,219	9,429,884	17,919,816	40,049,605	.....	91,906,266	827,867	1,392,156	912,804,906
Grand totals	1,704,540,011	673,123,692	416,634,594	65,071,529	808,279,819	189,051,280	40,236,638	40,388,161	5,334,435	91,906,266	10,955,529	4,160,373	4,049,682,327

Material cut and scaled in Cubic Feet included above.

(Conversion factor: 1 cubic foot = 5.7 board-feet.)

Vancouver	104,378	1,590	206,118	.....	15,859,623	1,100,966	2,024	.....	.....	.....	.....	.....	17,274,699

(8)

TOTAL SCALE (IN F.B.M.) SEGREGATED, SHOWING LAND STATUS, ALL PRODUCTS, 1949.

	Forest District.						Totals.
	Vancouver.	Prince Rupert, Coast.	Prince Rupert, Interior.	Fort George.	Kamloops.	Nelson.	
Timber licences	635,601,206	15,056,460	.....	5,626,490	5,030,240	13,119,438	674,433,834
Timber berths	145,418,069	.....	.....	.....	10,514,471	2,622,177	158,554,717
Timber leases	190,137,566	.....	.....	.....	.....	41,000	190,178,566
Pulp leases	4,325,170	20,991,304	.....	.....	.....	.....	25,316,474
Pulp licences	26,295,561	59,156,537	.....	.....	.....	.....	85,452,098
Hand-loggers' licences	62,811	790,602	.....	.....	.....	.....	853,413
Dominion lands	23,180,366	328,836	2,415,173	.....	6,270,508	4,760,299	36,955,182
Timber sales	652,219,414	59,665,341	83,234,489	222,598,678	198,176,718	169,462,351	1,385,356,991
Pulp-timber sales	.....	8,372,798	.....	.....	.....	.....	8,372,798
No mark visible	106,421,609	.....	.....	.....	.....	.....	106,421,609
Miscellaneous	3,987,781	2,336,701	3,946,445	11,348,592	8,592,714	4,207,215	34,419,448
Crown grants—							
To 1887	968,187,649	.....	.....	74,638	22,486,243	2,662,676	993,411,206
1887 to 1906	121,875,405	782,486	211,454	52,198	6,668,005	31,261,946	160,851,494
1906 to 1914	26,825,264	6,309,666	4,683,839	3,395,182	18,093,101	10,468,079	69,775,131
1914 to date	57,540,163	1,008,656	4,418,925	20,307,626	22,398,238	13,655,758	119,329,366
Totals	2,962,078,034	174,799,387	98,910,325	263,403,404	298,230,238	252,260,939	4,049,682,327

Timber from lands in the former Dominion Government Railway Belt which has passed over to the jurisdiction of this Province is included under the various land-status headings shown above.

Only timber from Indian reserves and other lands still under the jurisdiction of the Dominion Government is shown under the heading "Dominion Lands."

Total Scale of Material in Cubic Feet included above segregated, showing Land Status, all Products.

(Conversion factor: 1 cubic foot=5.7 board-feet.)

Forest District.	Timber Licences.	Timber Leases.	Pulp Leases.	Dominion Lands.	Timber Sales.	No Mark visible.	Crown Grants.			Total.
							To 1887.	1887–1906.	1914 to Date.	
Vancouver	622,355	213,026	1,977,376	2,177	97,590	1,209,625	12,423,110	687,346	42,094	17,274,699

TIMBER SCALED IN BRITISH COLUMBIA IN 1949 (BY MONTHS AND DISTRICTS).

Month.	Vancouver.	Prince Rupert (Coast).	Prince Rupert (Interior).	Fort George.	Kamloops.	Nelson.	Total F.B.M.	Total Lineal Feet.	Total Cords.	Total Hewn Ties.	Total Cubic Feet.
January—											
F.B.M.	90,289,402	2,608,850	6,993,942	25,228,415	19,132,691	14,484,290	158,737,590	.....	.....	.....	.....
Lineal feet	346,450	.....	112,488	32,610	268,280	814,009	.....	1,573,837	.....	.....	.....
Cords	2,564	.....	250	867	1,686	1,987	.....	.....	7,354	.....	.....
Hewn ties	1,833	.....	.....	.....	1,840	10,111	.....	.....	.....	13,784	.....
Cubic feet	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
February—											
F.B.M.	75,878,245	801,984	7,240,609	39,123,905	19,723,135	11,697,568	154,465,446	.....	.....	.....	.....
Lineal feet	1,756,932	.....	113,435	59,400	1,423,550	532,770	.....	3,886,087	.....	.....	.....
Cords	2,547	.....	221	638	3,512	1,717	.....	.....	8,635	.....	.....
Hewn ties	3,077	.....	24,597	12,936	988	7,873	.....	.....	.....	49,471	.....
Cubic feet	19,500	.....	.....	.....	.....	.....	.....	.....	.....	.....	19,500
March—											
F.B.M.	154,876,401	2,595,141	10,195,277	35,894,158	14,631,837	13,596,342	231,789,156	.....	.....	.....	.....
Lineal feet	713,919	.....	53,053	24,090	436,632	186,399	.....	1,414,093	.....	.....	.....
Cords	3,478	.....	551	477	3,629	2,828	.....	.....	10,963	.....	.....
Hewn ties	.....	.....	12,866	24,802	818	6,701	.....	.....	.....	45,187	.....
Cubic feet	89,709	.....	.....	.....	.....	.....	.....	.....	.....	.....	89,709
April—											
F.B.M.	226,728,144	5,067,745	12,015,882	42,581,703	15,244,891	10,522,647	312,161,012	.....	.....	.....	.....
Lineal feet	698,478	1,336	39,660	79,105	121,400	133,467	.....	1,073,446	.....	.....	.....
Cords	3,620	.....	268	467	1,123	1,456	.....	.....	6,934	.....	.....
Hewn ties	4,489	.....	18,937	8,966	6,421	3,623	.....	.....	.....	42,436	.....
Cubic feet	23,146	.....	.....	.....	.....	.....	.....	.....	.....	.....	23,146
May—											
F.B.M.	290,106,272	13,338,749	5,977,011	9,422,594	10,851,561	10,282,421	339,978,608	.....	.....	.....	.....
Lineal feet	998,089	4,126	82,600	83,805	193,182	128,378	.....	1,490,180	.....	.....	.....
Cords	3,489	75	219	1,431	3,666	1,324	.....	.....	10,204	.....	.....
Hewn ties	1,253	.....	14,589	17,050	6,101	3,390	.....	.....	.....	42,383	.....
Cubic feet	329,816	.....	.....	.....	.....	.....	.....	.....	.....	.....	329,816
June—											
F.B.M.	334,077,981	18,114,491	4,797,686	7,303,934	24,939,218	15,621,260	404,854,570	.....	.....	.....	.....
Lineal feet	635,833	7,811	223,345	129,415	352,910	454,709	.....	1,804,023	.....	.....	.....
Cords	4,623	26	310	1,363	1,584	3,109	.....	.....	11,015	.....	.....
Hewn ties	.....	.....	15,843	23,988	5,327	8,054	.....	.....	.....	53,212	.....
Cubic feet	636,455	.....	.....	.....	.....	.....	.....	.....	.....	.....	636,455

July—											
F.B.M.	314,701,296	17,048,452	5,160,792	14,302,975	24,913,039	24,404,618	400,531,172	.....	.....	.....	.....
Lineal feet	2,677,969	513	243,850	130,377	388,396	300,063	.....	3,741,168	.....	.....	.....
Cords	1,833	70	287	902	1,115	1,871	.....	.....	6,078	.....	.....
Hewn ties	1,325	.....	368	12,415	9,468	3,684	.....	.....	.....	27,260	.....
Cubic feet	440,744	.....	.....	.....	.....	.....	.....	.....	.....	.....	440,744
August—											
F.B.M.	317,463,165	25,760,389	6,093,392	15,701,848	16,615,549	22,874,282	404,508,625	.....	.....	.....	.....
Lineal feet	1,166,376	10,177	185,805	42,615	1,044,688	953,678	.....	3,403,339	.....	.....	.....
Cords	3,984	153	257	430	1,907	4,456	.....	.....	11,187	.....	.....
Hewn ties	256	.....	46,717	8,477	1,583	7,442	.....	.....	.....	64,475	.....
Cubic feet	386,339	.....	.....	.....	.....	.....	.....	.....	.....	.....	386,339
September—											
F.B.M.	310,757,625	23,255,721	7,079,823	16,338,010	21,353,091	24,340,191	403,124,461	.....	.....	.....	.....
Lineal feet	1,285,400	7,995	354,410	182,259	1,191,372	1,043,043	.....	4,064,479	.....	.....	.....
Cords	3,567	.....	80	493	3,717	4,381	.....	.....	12,238	.....	.....
Hewn ties	.....	.....	17,630	17,413	4,453	5,503	.....	.....	.....	44,999	.....
Cubic feet	276,493	.....	.....	.....	.....	.....	.....	.....	.....	.....	276,493
October—											
F.B.M.	269,810,437	21,872,824	5,172,232	16,996,013	26,478,138	24,308,225	364,637,869	.....	.....	.....	.....
Lineal feet	1,038,681	9,760	366,640	25,260	1,147,044	702,822	.....	3,290,207	.....	.....	.....
Cords	3,886	.....	191	952	1,323	1,443	.....	.....	7,795	.....	.....
Hewn ties	.....	.....	10,443	10,026	1,896	996	.....	.....	.....	23,361	.....
Cubic feet	319,596	.....	.....	.....	.....	.....	.....	.....	.....	.....	319,596
November—											
F.B.M.	308,629,408	21,942,044	6,949,744	13,890,863	23,754,444	22,878,527	398,045,030	.....	.....	.....	.....
Lineal feet	798,011	19,705	370,175	63,849	1,340,423	1,206,373	.....	3,798,536	.....	.....	.....
Cords	3,260	101	118	577	1,639	3,844	.....	.....	9,539	.....	.....
Hewn ties	1,313	.....	11,423	15,814	4,065	3,007	.....	.....	.....	35,622	.....
Cubic feet	335,979	.....	.....	.....	.....	.....	.....	.....	.....	.....	335,979
December—											
F.B.M.	201,075,694	21,989,852	6,248,573	13,497,957	41,750,341	19,760,193	304,322,610	.....	.....	.....	.....
Lineal feet	359,595	.....	730	44,145	794,855	1,257,784	.....	2,457,109	.....	.....	.....
Cords	1,920	40	226	733	2,858	3,053	.....	.....	8,830	.....	.....
Hewn ties	3,152	.....	3,590	617	250	3,165	.....	.....	.....	10,774	.....
Cubic feet	172,872	.....	.....	.....	.....	.....	.....	.....	.....	.....	172,872
Totals—											
F.B.M.	2,894,394,070	174,396,242	83,924,963	250,282,375	259,387,935	214,770,564	3,877,156,149	.....	.....	.....	.....
Lineal feet	12,475,733	61,423	2,146,191	896,930	8,702,732	7,713,495	.....	31,996,504	.....	.....	.....
Cords	38,771	465	2,978	9,330	27,759	31,469	.....	.....	110,772	.....	.....
Hewn ties	16,698	.....	177,003	152,504	43,210	63,549	.....	.....	.....	452,964	.....
Cubic feet	3,030,649	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,030,649

Total scale in F.B.M., 4,049,682,327.

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LOGGING INSPECTION, 1949.

Forest District.	Type of Tenure operated.				No. of Inspections.
	Timber Sales.	Hand-loggers' Licences.	Leases, Licences, Crown Grants, and Pre-emptions.	Totals.	
Vancouver	2,209	1	1,660	3,870	5,841
Prince Rupert	1,155	6	445	1,606	2,580
Fort George	708	....	68	776	1,425
Kamloops	1,518	....	1,215	2,733	2,938
Nelson	815	....	1,052	1,867	2,699
Totals, 1949	6,405	7	4,440	10,852	15,483
Totals, 1948	4,847	5	3,982	8,834	15,432
Totals, 1947	4,428	5	3,190	7,623	13,876
Totals, 1946	3,627	6	3,021	6,654	12,974
Totals, 1945	3,492	9	2,852	6,353	11,901
Totals, 1944	3,373	4	2,540	5,917	11,648
Totals, 1943	3,259	11	2,519	5,789	12,110
Totals, 1942	3,086	18	2,569	5,673	13,753
Totals, 1941	3,207	18	2,833	6,058	11,438
Totals, 1940	2,864	12	2,272	5,148	10,968
Ten-year average, 1940–49	3,857	10	3,022	6,889	12,958

(11)

TRESPASSES, 1949.

Forest District.	No. of Cases.	Areas cut over (Acres).	Quantity cut.							No. of Resulting Seizures.	Amount charged.
			Feet B.M.	Lineal Feet.	Cords.	Ties.	Christmas Trees.	Cedar Shakes, Car-stakes.	Posts.		
Vancouver	101	519	6,802,643	6,741	139	.....	471	34,070	.....	8	$37,948.98
Prince Rupert	59	297	4,530,933	20,483	555	690	300	.....	.....	2	9,976.32
Fort George	53	445	2,056,766	1,200	122	1,076	.....	.....	1,650	4	6,435.65
Kamloops	115	1,779	5,774,476	63,623	313	1,348	4,375	.....	.....	5	20,303.85
Nelson	90	1,092	1,254,745	152,618	169	400	3,876	.....	7,135	9	7,258.47
Totals, 1949	418	4,132	20,419,563	244,655	1,298	3,514	9,022	34,070	8,785	28	$81,923.27
Totals, 1948	312	3,062	11,738,855	470,674	3,569	18,211	3,711	11,135	4,100	8	$59,654.37
Totals, 1947	316	5,132	17,234,601	659,621	5,599	5,235	15,416	439,554	17,506	15	$74,761.43
Totals, 1946	226	2,568	7,084,343	1,760,574	1,469	2,900	10,148	41,377	35,997	8	$27,530.63
Totals, 1945	267	3,313	24,322,556	516,960	1,910	9,902	2,438	.....	.....	10	$37,877.12
Totals, 1944	210	2,467	12,317,066	179,219	3,369	4,231	3,781	.....	.....	5	$29,193.16
Totals, 1943	167	3,058	9,744,957	129,409	6,873	552	7,923	.....	.....	7	$23,725.29
Totals, 1942	180	1,159	4,413,906	365,861	4,757	490	1,512	.....	.....	15	$14,391.61
Totals, 1941	236	1,788	7,627,990	526,391	2,887	1,365	4,150	.....	.....	17	$24,253.10
Totals, 1940	194	877	5,206,829	94,444	1,573	4,279	9,854	.....	.....	13	$14,088.24
Ten-year average, 1940–49	252	2,755	12,011,067	494,781	3,331	5,068	6,796	.....	.....	13	$38,739.82

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PRE-EMPTION INSPECTION, 1949.

Pre-emption Records examined by Districts.

Vancouver	34
Prince Rupert	3
Fort George	144
Kamloops	187
Nelson	39
Total	407

(13)

AREAS EXAMINED FOR MISCELLANEOUS PURPOSES OF THE "LAND ACT," 1949.

Forest District.	Applications for Hay and Grazing Leases.		Applications for Pre-emption Records.		Applications to Purchase.		Miscellaneous.		Totals.	
	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.
Vancouver	1	3	7	489	213	8,938	102	912	323	10,342
Prince Rupert	9	1,571	5	785	52	3,851	24	917	90	7,124
Fort George	19	2,621	37	5,244	171	16,447	23	2,051	250	26,363
Kamloops	58	34,449	41	6,449	194	15,300	32	2,685	325	58,883
Nelson	4	1,020	5	630	154	9,152	12	366	175	11,168
Totals	91	39,664	95	13,597	784	53,688	193	6,931	1,163	113,880

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CLASSIFICATION OF AREAS EXAMINED, 1949.

Forest District.	Total Area.	Agricultural Land.	Non-agricultural Land.	Merchantable Timber Land.	Estimated Timber on Merchantable Timber Land.
	Acres.	Acres.	Acres.	Acres.	M B.M.
Vancouver	10,342	2,166	8,176	954	18,729
Prince Rupert	7,124	1,876	5,248	10	150
Fort George	26,363	13,234	13,129	695	18,193
Kamloops	58,883	7,490	51,393	118	1,079
Nelson	11,168	1,986	9,182	.....	.....
Totals	113,880	26,752	87,128	1,777	38,151

(15)

AREAS CRUISED FOR TIMBER SALES, 1949.

Forest District.	Number cruised.	Acreage.	Saw-timber (M B.M.).	Pit-props, Poles, and Piles (Lin. Ft.).	Shingle-bolts and Cordwood (Cords).	Railway-ties (No.).	Car-stakes, Posts, Shakes, etc. (No.).
Vancouver	475	59,192	606,596	817,219	16,055	2,625	143,300
Prince Rupert	307	33,920	182,871	1,099,586	3,004	88,550	7,800
Fort George	317	47,047	204,819	375,322	2,820	73,910	95,050
Kamloops	367	77,142	185,257	4,734,079	21,982	4,990	.....
Nelson	172	52,275	175,799	2,572,970	13,141	400	492,360
Totals, 1949	1,638	269,576	1,355,342	9,599,176	57,002	170,475	738,510
Totals, 1948	1,851	346,648	1,817,737	7,603,641	44,726	180,602	1,947,010
Totals, 1947	1,960	361,834	1,481,715	23,015,436	50,346	299,501	1,064,125
Totals, 1946	2,059	362,587	1,230,716	40,760,769	90,078	216,892	2,718,706
Totals, 1945	1,488	261,150	948,673	48,743,325	95,774	301,276	1,802,468
Totals, 1944	1,476	334,729	1,205,308	8,166,829	137,737	483,363	1,345,439
Totals, 1943	1,771	590,953	907,768	10,720,729	259,741	454,767	816,544
Totals, 1942	1,469	305,222	794,676	8,562,739	100,232	381,106	743,500
Totals, 1941	1,611	321,220	689,595	15,794,246	126,463	199,174	263,480
Totals, 1940	1,620	300,480	572,562	11,309,288	72,157	314,644	512,042
Ten-year average, 1940–49	1,695	345,440	1,100,409	18,427,619	103,426	300,175	1,195,183

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TIMBER-SALE RECORD, 1949.

District.	Sales made.	Sales closed.	Total existing.	Total Area (Acres).	Acreage paying Forest Protection Tax.	Total 10-per-cent. Deposits.
Vancouver	559	680	1,573	359,311	250,522	$1,054,805.70
Prince Rupert	360	438	1,047	233,828	180,164	256,504.07
Fort George	356	319	849	194,995	133,623	272,649.74
Kamloops	448	492	1,692	435,836	390,723	380,825.26
Nelson	286	375	1,065	324,093	276,033	302,796.71
Totals	2,009	2,304	6,226	1,548,063	1,231,065	$2,267,581.48
Including cash sales	553	.....	.....	.....	.....	.....
Total sales	2,562	.....	.....	.....	.....	.....

TIMBER SALES AWARDED BY DISTRICTS, 1949.

Forest District.	No. of Sales.	Acreage.	Saw-timber (F.B.M.).	Poles and Piling (Lin. Ft.).	No. of Posts.	No. of Cords.	No. of Ties.	No. of Christmas Trees.	No. of Hop-poles.	No. of Car-stakes.	No. of Blasting-sticks.	No. of Fence-rails.	No. of Bean-poles.	No. of Cedar Shakes.	Estimated Revenue.
Vancouver	571	101,079	518,124,000	1,010,014	10,400	15,692	.....	.....	.....	.....	.....	.....	.....	542,000	$2,459,816.92
Prince Rupert	376	49,295	131,085,000	1,467,900	6,400	5,264	103,060	.....	.....	2,200	.....	.....	.....	.....	563,018.08
Nelson	346	79,672	155,320,000	3,409,455	1,091,710	7,524	5,755	.....	.....	.....	.....	.....	.....	.....	728,903.02
Fort George	583	50,161	225,720,000	491,370	147,582	7,144	67,250	.....	.....	.....	.....	.....	.....	.....	981,041.45
Kamloops	649	95,510	207,906,000	3,919,727	345,615	21,933	24,235	.....	.....	450	.....	.....	.....	.....	936,256.23
Totals, 1949	2,525	375,717	1,238,155,000	10,298,466	1,601,707	57,557	200,300	.....	.....	2,650	.....	.....	.....	542,000	$5,669,035.70
Totals, 1948	2,611	440,198	1,824,615,000	12,052,076	966,267	65,599	235,583	.....	.....	.....	117,000	.....	.....	1,247,800	$8,544,121.84
Totals, 1947	2,469	375,781	1,469,890,000	27,185,542	1,291,482	64,576	236,851	.....	3,000	1,800	.....	.....	.....	636,385	$7,097,435.12
Totals, 1946	**2,637**	**443,505**	**1,262,948,000**	**55,461,304**	**2,982,443**	**87,322**	**266,338**	.....	**600**	**5,350**	.....	.....	**1,000**	**2,072,726**	**$5,036,148.66**
Totals, 1945	**1,898**	**330,190**	**949,614,000**	**39,645,792**	**2,325,117**	**76,221**	**255,242**	.....	**2,500**	**2,450**	.....	.....	.....	.....	**$3,475,676.91**
Totals, 1944	1,893	345,132	855,187,000	6,866,301	1,665,783	93,058	381,571	.....	.....	620	60,000	.....	10,000	.....	$2,879,952.84
Totals, 1943*	2,016	394,981	888,580,000	10,875,063	943,827	214,317	336,251	.....	20,000	3,970	150,000	1,000	.....	.....	$3,064,953.20
Totals, 1942	**1,710**	**363,193**	**751,591,000**	**11,944,558**	**746,345**	**100,812**	**299,905**	.....	.....	**4,420**	.....	.....	.....	.....	**$2,339,521.06**
Totals, 1941	**1,853**	**362,997**	**623,121,000**	**14,763,144**	**639,015**	**103,422**	**198,549**	.....	**2,500**	**5,300**	.....	**100**	.....	.....	**$1,953,469.79**
Totals, 1940	**1,734**	**314,659**	**548,898,000**	**10,073,574**	**447,909**	**105,185**	**309,618**	**219,450**	**2,000**	**5,750**	.....	**940**	.....	.....	**$1,599,106.33**
Ten-year average, 1940–49	2,135	374,635	1,041,259,900	19,916,582	1,360,990	96,807	272,021	.....	.....	.....	.....	.....	.....	.....	$4,165,942.15

* Revised figures.

Average Stumpage Prices as bid per M B.F. Log-scale, by Species and Forest Districts, on Saw-timber cruised on Timber Sales, 1949.

Forest District.	Douglas Fir.			Cedar.			Spruce.			Hemlock.			Balsam.		
	M B.F.	Price per M.	Price Range per M.	M B.F.	Price per M.	Price Range per M.	M B.F.	Price per M.	Price Range per M.	M B.F.	Price per M.	Price Range per M.	M B.F.	Price per M.	Price Range per M.
Vancouver	214,955	$5.87	$2.75–13.10	99,373	$4.22	$2.00–8.60	7,019	$3.97	$2.25–10.40	138,475	$2.91	$1.50–8.20	45,101	$2.88	$1.50–6.25
Prince Rupert (Coast)	8,581	4.05	4.00– 5.00	9,466	2.95	2.25–5.15	8,645	3.77	2.50– 5.00	10,835	3.05	2.50–3.75	2,480	3.17	2.50–4.50
Prince Rupert (Interior)	95	3.10	3.00– 3.75	2,287	3.77	3.00–3.80	43,329	4.19	3.25– 8.65	20,703	3.95	2.50–5.50	3,492	3.68	2.75–5.50
Fort George	34,207	3.71	2.75– 5.10	.....	.....	.....	192,370	3.64	2.50– 6.45	.....	.....	.....	3,132	3.23	2.00–4.00
Kamloops	115,572	3.39	2.25– 6.20	2,143	3.08	2.25–5.00	36,468	3.91	2.25–23.00	3,214	2.30	1.75–3.50	2,039	2.98	2.25–4.00
Nelson	35,978	3.62	2.50– 9.00	6,298	3.22	2.50–4.75	25,512	5.06	3.00–14.00	6,678	3.07	2.40–3.75	2,988	3.85	2.40–6.85
Totals for Province	409,388	$4.75	.....	119,567	$4.04	.....	313,343	$3.87	.....	179,905	$3.04	.....	59,232	$3.01	.....

Forest District.	White Pine.			Western Yellow Pine.			Larch (Tamarack).			Other Species.			All Species.		
	M B.F.	Price per M.	Price Range per M.	M B.F.	Price per M.	Price Range per M.	M B.F.	Price per M.	Price Range per M.	M B.F.	Price per M.	Price Range per M.	M B.F.	Price per M.	Price Range per M.
Vancouver	2,364	$7.41	$3.60–11.70	.....	.....	.....	.....	.....	.....	2,761	$3.57	$2.25–8.00	510,048	$4.45	.....
Prince Rupert (Coast)	.....	.....	.....	.....	.....	.....	.....	.....	.....	110	3.29	3.00–4.50	40,117	3.40	.....
Prince Rupert (Interior)	.....	.....	.....	.....	.....	.....	.....	.....	.....	17,739	3.84	3.00–6.25	87,645	4.03	.....
Fort George	.....	.....	.....	.....	.....	.....	.....	.....	.....	15,228	3.53	2.00–5.10	244,937	3.63	.....
Kamloops	2,781	6.81	4.00– 9.00	28,475	$4.70	$2.75– 7.00	14,914	$3.38	$2.50–5.35	1,719	3.12	2.25–6.10	207,325	3.68	.....
Nelson	5,335	8.83	5.60–16.00	5,094	5.31	4.00–12.00	50,795	3.49	2.50–6.90	9,557	3.50	2.40–7.25	148,235	4.02	.....
Totals for Province	10,480	$7.99	.....	33,569	$4.84	.....	65,709	$3.46	.....	47,114	$3.63	.....	1,238,307	$4.05	.....

Note.—Stumpage inclusive of royalty.

(19)

Average Stumpage Prices received for M B.F. Log-scale, by Species and Forest Districts, on Saw-timber scaled from Timber Sales, 1949.

Forest District.	Douglas Fir.		Cedar.		Spruce.		Hemlock.		Balsam.		White Pine.		Western Yellow Pine.		Larch (Tamarack).		Other Species.		All Species.	
	M B.F.	Price per M.	M B.F.	Price per M.	M B.F.	Price per M.	M B.F.	Price per M.	M B.F.	Price per M.	M B.F.	Price per M.	M B.F.	Price per M.	M B.F.	Price per M.	M B.F.	Price per M.	M B.F.	Price per M.
Vancouver	285,975	$5.12	145,496	$4.48	12,392	$3.37	146,322	$2.72	43,754	$2.89	4,105	$6.37	313	$4.97	.....	.....	2,168	$2.69	640,526	$4.27
Prince Rupert (Coast)	2,954	3.94	16,145	3.43	19,845	3.29	20,904	2.71	6,320	2.91	.....	.....	.....	.....	.....	.....	3	2.46	66,171	3.14
Prince Rupert (Interior)	512	3.00	610	3.08	48,939	3.74	4,355	3.08	2,764	3.48	.....	.....	.....	.....	.....	.....	13,378	3.46	70,558	3.63
Fort George	30,236	3.82	20	2.98	133,830	4.27	.....	.....	1,923	3.17	.....	.....	.....	.....	.....	.....	12,642	3.73	178,651	4.14
Kamloops	109,063	3.13	2,155	2.77	29,931	3.93	946	2.26	1,575	2.83	4,296	7.29	14,040	4.40	11,469	$3.08	1,975	2.95	175,450	3.44
Nelson	38,431	3.64	5,676	3.24	22,671	4.90	9,109	2.91	854	3.38	4,843	7.71	7,347	5.31	59,432	3.75	1,670	3.13	150,033	4.02
Totals for Province	467,171	$4.46	170,102	$4.32	267,608	$4.07	181,636	$2.79	57,190	$2.93	13,244	$7.08	21,700	$4.71	70,901	$3.64	31,836	$3.47	1,281,389	$4.02

Note.—Vancouver District figures in this table do not include royalty in some cases. In all other districts, stumpage rates quoted include royalty.

TIMBER CUT FROM TIMBER SALES DURING 1949.

District.	Board-feet.	Lineal Feet.	Cords.	Ties.	Posts.	Christmas Trees.	Hop-poles.	Stakes and Sticks.	Car-stakes.	Stubs.	Blasting-sticks.	Anchor-blocks.	Shingle-shakes.	Shake Blanks.	Cubic Feet.
Vancouver	643,053,444	1,290,813	3,871.00	.....	9,054	.....	8,126	676,725	7,000	.....	.....	.....	2,061,390	470,162	17,121
Prince Rupert	130,037,790	1,936,175	143.00	148,046	16,000	.....	.....	.....	1,000	.....	.....	.....	.....	.....	.....
Fort George	211,626,984	753,795	7,317.00	119,937	118,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kamloops	175,450,972	4,965,323	15,832.00	22,252	297,900	.....	.....	.....	650	.....	77,000	.....	.....	.....	.....
Nelson	150,034,032	4,466,710	5,985.00	36,980	916,900	197,699	.....	80,000	.....	.....	.....	.....	.....	.....	.....
Totals, 1949	1,310,203,222	13,412,816	33,148.00	327,215	1,357,854	197,699	8,126	756,725	8,650	.....	77,000	.....	2,061,390	470,162	17,121
Totals, 1948	1,355,986,827	13,329,783	42,102.00	357,618	1,403,700	157,944	4,072	1,031,925	2,975	.....	.....	.....	4,585,000	286,750	.....
Totals, 1947	1,263,834,114	24,205,192	42,463.62	391,343	2,140,769	408,239	21,336	.....	3,252	.....	75	.....	.....	.....	.....
Totals, 1946	792,163,118	35,854,520	56,123.50	311,596	1,696,068	224,712	63,974	.....	15,218	.....	75,675	100	2,210,919	.....	.....
Totals, 1945	696,065,196	16,823,506	49,028.79	413,093	1,335,191	415,093	15,596	13,596	21,249	.....	.....	.....	5,763	.....	.....
Totals, 1944	643,497,149	8,354,765	79,080.74	435,862	1,356,253	368,410	39,124	363,880	1,989	373	.....	.....	6,000	.....	.....
Totals, 1943	526,361,074	8,881,017	80,313.62	288,140	594,164	341,277	250,342	.....	15,111	.....	36,125	.....	.....	.....	.....
Totals, 1942	499,861,024	9,169,501	43,891.18	189,953	461,231	322,153	96,335	.....	920	.....	.....	.....	.....	.....	.....
Totals, 1941	499,155,819	8,886,147	49,941.85	324,835	311,360	159,968	2,075	.....	2,850	.....	.....	1,900	.....	.....	.....
Totals, 1940	478,965,174	8,262,287	52,642.99	274,918	295,022	1,000	1,000	.....	1,794	410	12,000	.....	.....	.....	.....
Ten-year average, 1940–49	806,609,271	14,717,953	52,873.00	331,511	1,091,568	289,052	50,198	.....	7,401	.....	.....	.....	.....	.....	.....

(21)

SAW AND SHINGLE MILLS OF THE PROVINCE, 1949.

Forest District.	Operating.				Shut Down.			
	Sawmills.		Shingle-mills.		Sawmills.		Shingle-mills.	
	No.	Estimated Eight-hour Daily Capacity, M B.M.	No.	Estimated Eight-hour Daily Capacity, Shingles, M.	No.	Estimated Eight-hour Daily Capacity, M B.M.	No.	Estimated Eight-hour Daily Capacity, Shingles, M.
Vancouver	448	8,858	56	7,637	95	1,157	6	451
Prince Rupert	231	1,296	.....	.....	23	163	3	12
Fort George	384	3,396	.....	.....	57	385	.....	.....
Kamloops	355	2,674	2	30	82	305	3	.....
Nelson	253	2,858	3	41	57	363	5	50
Totals, 1949	1,671	19,082	61	7,708	314	2,373	17	513
Totals, 1948	1,671	18,570	68	8,464	179	840	11	360
Totals, 1947	1,634	17,546	73	8,609	143	754	6	100
Totals, 1946	1,228	15,256	59	8,656	115	741	8	165
Totals, 1945	931	13,590	51	7,054	137	808	7	150
Totals, 1944	807	14,974	51	6,695	110	702	16	581
Totals, 1943	614	13,623	54	7,411	120	646	19	829
Totals, 1942	551	13,197	70	8,874	149	1,206	11	135
Totals, 1941	557	13,820	76	8,835	129	1,083	5	63
Totals, 1940	542	12,691	77	8,585	141	1,432	18	307
Ten-year average, 1940–49	1,021	15,234	64	8,089	153	1,059	11	321

(22)

EXPORT OF LOGS (IN F.B.M.), 1949.

Species.	Grade No. 1.	Grade No. 2.	Grade No. 3.	Ungraded.	Totals.
Fir	140,471	3,790,410	16,501,252	.....	20,432,133
Cedar	5,227,067	8,546,338	11,281,947	.....	25,055,352
Spruce	.....	195,358	733,245	.....	928,603
Hemlock	1,016,727	8,764,758	74,774,818	.....	84,556,303
Balsam	.....	.....	.....	14,228,041	14,228,041
White pine	.....	8,309	96,904	.....	105,213
Cypress	7,963	73,974	159,767	.....	241,704
Hardwoods	.....	337	.....	.....	337
Cottonwood	.....	3,495	2,774	.....	6,269
Totals, 1949	6,392,228	21,382,979	103,550,707	14,228,041	145,553,955*
Totals, 1948	9,380,092	31,127,805	106,739,296	16,367,096	163,614,289
Totals, 1947	7,156,095	21,100,803	52,368,152	7,552,386	88,177,436
Totals, 1946	6,843,046	17,485,065	28,308,163	33,898,926	86,535,200
Totals, 1945	3,852,321	20,696,800	24,903,105	32,624,170	82,076,396
Totals, 1944	6,724,297	29,051,958	33,851,519	32,027,805	101,655,579
Totals, 1943	2,809,744	17,720,743	28,863,804	29,261,754	78,656,045
Totals, 1942	2,639,167	18,960,886	27,618,347	106,793,550	156,011,950
Totals, 1941	8,549,320	63,485,278	43,165,973	191,879,335	307,079,906
Totals, 1940	4,697,188	37,567,582	24,865,886	150,396,702	217,527,358
Ten-year average, 1940–49	5,904,350	27,857,991	47,423,494	61,502,977	142,688,812

* Of this total, 115,767,801 F.B.M. were exported from Crown grants carrying the export privilege; 29,786,154 F.B.M. were exported under permit from other areas.

(23)

SHIPMENTS OF POLES, PILING, MINE-PROPS, FENCE-POSTS, RAILWAY-TIES, ETC., 1949.

Forest District.	Quantity exported.	Approximate Value, F.O.B.	Where marketed.			
			United States.	Canada.	United Kingdom.	Other Countries.
Vancouver—						
Poles ... lin. ft.	4,001,927	$1,000,481.75	2,429,106	1,561,036	...	11,785
Piling ... lin. ft.	660,583	165,145.75	165,995	491,072	...	3,516
Fence-posts ... posts	91,434	22,858.50	1,220	90,214	...	...
Pulp-wood ... cords	14,190	205,755.00	14,190	...	...	...
Sticks and stakes ... lin. ft.	836,830	29,289.00	836,830	...	...	...
Shakes ... pieces	4,518,207	225,910.35	4,473,373	44,834	...	...
Christmas trees ... trees	82,984	16,596.80	82,984	...	...	...
Prince Rupert—						
Poles and piling ... lin. ft.	1,861,654	373,000.00	1,038,090	823,564	...	...
Posts ... cords	28	400.00	...	28	...	...
Hewn ties ... ties	162,221	154,000.00	...	162,221	...	...
Fort George—						
Poles ... lin. ft.	648,960	103,833.60	315,640	333,320	...	...
Hewn ties ... ties	128,973	126,884.82	...	128,973	...	...
Posts (fence) ... cords	1,808	18,085.00	...	1,808	...	...
Kamloops—						
Poles and piling ... lin. ft.	5,547,550	1,102,425.30	3,940,225	2,607,325	...	...
Hewn ties ... ties	82,076	98,028.92	...	82,076	...	...
Fence-posts ... cords	4,179	105,741.00	51	4,128	...	...
Mine-timbers ... lin. ft.	27,809	2,219.92	...	27,809	...	...
Stubs ... lin. ft.	3,710	371.00	...	3,710	...	...
Christmas trees ... trees	1,020,742	234,770.66	953,823	66,919	...	...
Nelson—						
Poles ... lin. ft.	4,560,893	912,159.00	2,998,290	1,562,603	...	...
Piling ... lin. ft.	204,222	32,675.00	9,045	195,177	...	...
Sticks and stakes ... lin. ft.	157,000	785.00	157,000	...	...	...
Mine-props ... cords	5,078	101,560.00	...	5,078	...	...
Fence-posts ... cords	13,852	207,780.00	3,629	10,223	...	...
Cordwood ... cords	20	180.00	...	20	...	...
Hewn ties ... ties	62,808	84,162.00	...	62,808	...	...
Christmas trees ... trees	889,532	177,906.00	746,910	142,622	...	...
Total value, 1949 ...	...	$5,503,004.37	...	...	...	...
Total value, 1948 ...	...	$4,991,338.58	...	...	...	...

(24)

SUMMARY FOR PROVINCE, 1949.

Product.	Volume.	Value.	Per Cent. of Total Value.
Poles and piling ... lin. ft.	17,485,789	$3,689,720.40	67.05
Fence-posts ... pieces	91,434	22,858.50	0.42
Fence-posts ... cords	19,867	332,006.00	6.03
Cordwood ... cords	20	180.00	0.00
Pulp-wood ... cords	14,190	205,755.00	3.74
Mine-timbers ... lin. ft.	27,809	2,219.92	0.04
Hewn ties ... pieces	436,078	463,075.74	8.41
Mine-props ... cords	5,078	101,560.00	1.85
Sticks and stakes ... lin. ft.	993,830	30,074.00	0.55
Shakes ... pieces	4,518,207	225,910.35	4.10
Stubs ... lin. ft.	3,710	371.00	0.01
Christmas trees ... trees	1,993,258	429,273.46	7.80
Totals ...	25,589,270	$5,503,004.37	100.00

(25)

TIMBER MARKS ISSUED.

	1940.	1941.	1942.	1943.	1944.	1945.	1946.	1947.	1948.	1949.	Ten-year Average, 1940–49.
Old Crown grants	272	211	160	190	280	329	631	738	791	548	415
Crown grants, 1887–1906	101	85	85	98	89	115	200	191	156	128	125
Crown grants, 1906–1914	99	101	92	104	81	106	176	176	150	97	118
Section 55, "Forest Act"	275	282	250	283	234	337	473	489	439	352	341
Stumpage reservations	58	64	79	72	51	53	70	75	82	60	66
Pre-emptions under sections 28 and 29, "Land Act"	1	1	2	2	1	2	3	8	5	.....	3
Timber berths	16	16	9	5	9	3	8	9	4	7	9
Indian reserves	13	5	4	11	10	16	15	18	20	18	13
Timber sales	1,724	1,853	1,709	2,017	1,893	1,898	2,637	2,469	2,612	2,525	2,134
Hand-loggers	4	11	19	9	8	6	.....	.....	.....	.....	6
Special marks	3	6	6	5	6	15	35	32	40	26	17
Pulp leases	2	2	2	1	1	.....	.....	.....	.....	1	1
Pulp licences	20	17	1	4	1	2	.....	1	2	1	5
Totals	2,588	2,654	2,418	2,801	2,664	2,882	4,248	4,206	4,301	3,763	3,253
Transfers and changes of marks	315	307	224	237	251	327	486	655	745	550	410

(26)

FOREST SERVICE DRAUGHTING OFFICE, 1949.

Month.	Number of Drawings prepared or Tracings made.						Number of Blue-prints or Ditto-prints made from Draughting Office Drawings.		
	Timber Sales.	Timber Marks.	Examination Sketches.	Miscellaneous Matters.	Constructional Works, etc.	Totals.	Blue-prints.	Ditto-prints.	Totals.
January	48	89	76	29	7	249	620	910	1,530
February	47	173	79	46	6	351	976	880	1,856
March	54	176	80	19	3	332	829	1,041	1,870
April	34	166	98	15	4	317	965	682	1,647
May	44	175	113	13	5	350	882	965	1,847
June	46	146	82	26	10	310	1,043	990	2,033
July	43	84	58	23	6	214	762	915	1,677
August	49	138	59	90	6	342	875	997	1,872
September	30	83	55	31	6	205	604	700	1,304
October	39	85	112	13	12	261	767	800	1,567
November	51	137	81	24	12	305	951	804	1,755
December	29	95	95	24	3	246	910	660	1,570
Totals, 1949	514	1,547	988	353	80	3,482	10,184	10,344	20,528
Totals, 1948	681	2,300	1,247	241	58	4,327	13,625	12,959	26,401
Totals, 1947	500	2,223	1,238	290	55	4,306	12,026	9,844	21,870
Totals, 1946	604	1,931	1,028	525	48	4,136	9,113	7,300	16,413
Totals, 1945	569	1,193	693	684	75	3,214	6,495	6,701	13,196
Totals, 1944	442	889	459	544	46	2,380	4,159	4,983	9,142
Totals, 1943	356	937	396	293	93	2,075	4,009	3,448	7,457
Totals, 1942	329	868	359	111	73	1,740	†	†	†
Totals, 1941	247	1,087	468	150	70	2,022	†	†	†
Totals, 1940	224	1,151	434	282	*	2,091	†	†	†
Totals for ten-year period	4,466	14,126	7,310	3,473	598	29,773	59,611	55,579	115,007
Average for ten-year period	447	1,413	731	347	66‡	2,977	8,516§	7,940§	16,430§

* Prior to 1941, Constructional Works, etc., included in Miscellaneous Matters. † No record kept prior to 1943. ‡ Average for nine-year period only. § Average for seven-year period only.

(27) CROWN-GRANTED TIMBER LANDS PAYING FOREST PROTECTION TAX.

Year.	Area (Acres).	Year.	Area (Acres).
1921	845,111	1936	515,924
1922	887,980	1937	743,109
1923	883,344	1938	754,348
1924	654,668	1939	719,112
1925	654,016	1940	549,250
1926	688,372	1941	543,632
1927	690,438	1942	527,995
1928	671,131	1943	543,044
1929	644,011	1944	571,308
1930	629,156	1945	591,082
1931	602,086	1946	601,148
1932	552,007	1947	596,900
1933	567,731	1948	571,439
1934	557,481	1949	597,790
1935	535,918		

(28) ACREAGE OF TIMBER LAND BY ASSESSMENT DISTRICTS.

	Acres.		Acres.
Alberni	81,872	Nelson	1,997
Comox	133,646	Omineca	160
Cowichan	97,779	Prince George	1,193
Fort Steele	11,182	Prince Rupert	20,634
Gulf Islands	240	Revelstoke	32,877
Kettle River	315	Slocan	37,842
Nanaimo	131,627	Victoria	46,426

(29) ACREAGE OF CROWN-GRANTED TIMBER LANDS PAYING FOREST PROTECTION TAX AS COMPILED FROM TAXATION RECORDS.

Year.	Acreage assessed as Timber Land.	Coast.		Interior.	
		Logged.	Timber.	Logged.	Timber.
		Acres.	Acres.	Acres.	Acres.
1936	766,186	92,892	352,582	152,846	167,866
1937	766,413	96,598	363,693	153,566	152,556
1938	756,328	106,833	344,858	157,508	147,129
1939	719,111	89,209	338,794	153,032	138,075
1940	549,250	103,486	338,419	24,852	82,493
1941	543,633	105,541	335,468	26,016	76,608
1942	527,995	112,834	322,306	20,072	72,781
1943	543,044	125,313	325,996	20,205	71,529
1944	571,308	134,194	345,378	20,816	70,920
1945	591,082	142,504	357,037	21,536	70,005
1946	601,148	146,331	364,556	23,125	67,136
1947	596,900	153,072	354,207	26,591	63,030
1948	571,439	158,120	326,738	25,485	61,096
1949	597,790	172,024	340,200	30,625	54,941

FOREST REVENUE.

	12 Months to Dec. 31, 1949.	12 Months to Dec. 31, 1948.	12 Months to Dec. 31, 1947.	12 Months to Dec. 31, 1946.	12 Months to Dec. 31, 1945.	Ten-year Average, 1940–49.
Timber-licence rentals	$380,591.52	$384,617.93	$385,167.77	$400,523.71	$395,819.33	$402,629.52
Timber-licence transfer fees	1,380.00	1,855.00	2,635.00	4,205.00	1,265.00	1,892.50
Timber-licence penalty fees	2,319.96	2,915.66	3,682.77	4,357.94	10,812.89	9,195.31
Hand-loggers' licence fees	175.00	100.00	150.00	75.00	150.00	220.00
Timber-lease rentals	50,025.01	49,955.78	51,113.07	51,079.41	50,326.77	51,110.72
Timber-lease penalty fees	79.28	33.52	119.48	60.73	9.28	69.23
Timber-sale rentals	96,808.74	95,180.53	77,234.35	62,881.12	61,643.16	58,240.75
Timber-sale stumpage	4,828,104.08	4,191,699.20	3,064,011.37	1,892,216.67	1,557,196.83	2,047,733.32
Timber-sale cruising	29,988.99	38,233.16	27,444.06	24,571.66	16,004.71	20,688.31
Timber-sale advertising	5,406.60	7,652.90	5,988.95	5,297.25	3,723.25	4,022.32
Timber royalty and tax	2,709,046.42	3,190,078.92	2,834,159.55	2,198,637.87	1,999,997.71	2,356,570.16
Scaling expenses (not Scaling Fund)	3,424.18	2,588.03	1,713.19	1,161.05	1,504.34	1,808.77
Trespass stumpage	.....	.....	100,710.23	48,405.37	48,168.41	32,200.48
Scalers' examination fees	.....	.....	1,095.00	985.00	.....	395.50
Exchange	130.05	78.77	65.40	42.93	69.36	109.00
Seizure expenses	1,013.91	726.18	1,046.24	1,779.06	889.97	812.00
General miscellaneous	24,141.30	26,140.16	18,269.63	14,588.67	11,027.32	12,837.65
Timber-berth rentals	20,784.50	20,043.13	20,154.36	20,823.00	21,551.73	21,011.94
Interest on timber-berth rentals	12.24	14.35	7.53	18.73	39.76	49.27
Transfer fees on timber-berth rentals	104.45	35.66	133.11	131.00	200.04	96.09
Grazing fees and interest	28,324.74	27,106.19	29,293.74	31,412.24	31,465.23	30,805.79
Totals	$8,181,860.97	$8,039,055.07	$6,624,104.80	$4,763,253.41	$4,211,865.09	$5,052,498.63

Amounts Charged against Logging Operations, 1949.

District.	Royalty.	Tax.	Trespass. Stumpage.	Seizure Expenses.	Government Scaling Expenses.	Scaling Fund.		Stumpage.	Rentals, Cruising, Advertising, Transfer Fees.	Stumpage Reservations.	Silviculture Fund.	Total.
						Expenses.	Fees.					
Vancouver	$2,008,009.17	$34,969.03	.....	$412.45	$1,102.88	$88,931.32	$280,071.45	$2,867,198.05	$63,970.76	$79.72*	.....	$5,344,585.39
Prince Rupert	218,073.68	4,993.61	.....	60.39	822.00	5,657.28	15,003.91	391,456.88	39,836.77	206.68*	$54,146.23	729,844.07
Fort George	89,750.17	.....	.....	63.00	383.40	.....	.....	656,302.25	25,509.62	366.78*	183,307.94	954,949.60
Kamloops	140,627.20	4,619.97	.....	355.83	2,212.20	.....	.....	517,306.70	47,178.78	124.48*	114,068.96	826,245.16
Nelson	121,310.74	2,886.90	.....	237.06	422.98	.....	.....	514,434.94	33,616.31	43.57*	127,079.16	799,944.52
Totals, 1949	$2,577,770.96	$47,469.51	.....	$1,128.73	$4,943.46	$94,588.60	$295,075.36	$4,946,698.82	$210,112.24	$821.23*	$478,602.29	$8,655,568.74
Totals, 1948	$3,137,060.09	$36,807.32	.....	$611.36	$3,437.13	$78,846.92	$305,961.62	$4,476,410.64	$246,342.89	$2,681.96	$314,660.90	$8,602,220.83
Totals, 1947	$2,984,978.60	$20,944.06	$123,345.94	$1,227.84	$2,717.46	$63,361.93	$308,652.88	$3,331,244.16	$163,659.81	.....	.....	$7,000,132.68
Totals, 1946	$2,162,183.55	$15,829.93	$51,050.81	$1,815.77	$1,179.85	$43,796.85	$167,064.09	$1,855,151.90	$99,687.89	.....	.....	$4,397,760.64
Totals, 1945	$1,955,757.26	$10,986.85	$48,943.70	$904.56	$1,523.77	$40,280.68	$125,088.36	$1,577,898.98	$73,927.60	.....	.....	$3,835,311.76
Totals, 1944	$1,959,140.27	$11,668.31	$54,647.11	$785.43	$4,450.77	$40,029.30	$128,880.33	$1,395,646.55	$96,626.44	.....	.....	$3,691,874.51
Totals, 1943	$1,860,127.27	$9,283.99	$36,769.22	$353.96	$3,274.72	$33,369.74	$118,265.63	$1,082,866.31	$85,858.24	.....	.....	$3,230,169.08
Totals, 1942	$1,975,067.18	$57,125.20	$19,489.98	$331.56	$1,017.17	$36,944.89	$122,731.57	$949,463.02	$71,684.25	Gov't Scaling Fees. $268.50		$3,234,123.32
Totals, 1941	$2,368,592.99	$100,732.39	$22,424.64	$481.18	$588.26	$38,359.49	$147,441.90	$843,116.13	$64,178.18	$392.44		$3,586,307.60
Totals, 1940	$2,104,949.92	$83,147.74	$15,844.80	$491.70	$295.34	$36,024.08	$145,435.20	$734,472.57	$36,020.04	$549.54		$3,157,230.93
Ten-year average, 1940–49	$2,308,562.81	$39,399.53	$37,251.62	$813.21	$2,342.79	$50,560.25	$186.459.69	$2,119,296.91	$114,809.76	.....		$4,939,070.01

* Credit.

AMOUNTS CHARGED AGAINST LOGGING OPERATIONS, FISCAL YEAR 1948–49.

District.	Royalty.	Tax.	Trespass. Stumpage.	Seizure Expenses.	Government Scaling Expenses.	Scaling Fund.		Stumpage.	Rentals, Cruising, Advertising, Transfer Fees.	Stumpage Reservations.	Silviculture Fund.	Total.
						Expenses.	Fees.					
Vancouver	$2,178,625.74	$29,556.09	.....	$309.86	$590.77	$72,375.95	$270,290.08	$2,409,138.65	$69,029.22	$474.74*	.....	$5,029,441.62
Prince Rupert	253,679.06	3,230.14	.....	53.39	422.00	4,183.49	16,050.65	368,700.24	73,327.47	119.06*	$34,920.28	754,447.66
Fort George	181,530.72	.....	.....	25.00	660.36	.....	.....	736,317.47	28,217.74	817.01*	174,586.80	1,120,521.08
Kamloops	230,288.73	2,796.79	.....	246.50	1,368.20	.....	.....	518,308.20	51,181.60	200.16*	72,026.44	876,016.30
Nelson	187,052.82	2,139.33	.....	90.00	444.36	.....	.....	531,820.22	40,647.80	121.59*	99,971.52	862,044.46
Totals, 1948–49	$3,031,177.07	$37,722.35	.....	$724.75	$3,485.69	$76,559.44	$286,340.73	$4,564,284.78	$262,403.83	$1,732.56*	$381,505.04	$8,642,471.12
Totals, 1947–48	$2,932,284.42	$22,450.07	$92,695.98	$1,260.50	$2,695.01	$70,073.76	$320,438.04	$3,123,738.93	$196,341.75	$3,787.01	$53,260.31	$6,819,025.78
Totals, 1946–47	$2,509,322.95	$18,176.08	$85,269.80	$1,425.15	$2,265.58	$44,310.81	$190,607.89	$1,999,259.67	$142,390.02	.....	.....	$4,993,027.95
Totals, 1945–46	$2,029,589.74	$11,512.06	$56,860.04	$1,082.57	$1,058.56	$49,358.67	$123,522.07	$1,687,500.72	$80,116.11	.....	.....	$4,040,600.54
Totals, 1944–45	$1,935,830.66	$11,705.96	$50,718.61	$878.73	$4,036.46	$40,496.75	$126,724.56	$1,421,693.72	$73,308.83	.....	.....	$3,665,394.28
Totals, 1943–44	$1,952,728.39	$8,425.35	$42,192.20	$361.46	$3,875.98	$35,758.31	$127,794.46	$1,155,680.34	$92,080.19	.....	.....	$3,418,696.68
Totals, 1942–43	$1,839,621.14	$55,929.45	$21,752.85	$343.56	$1,392.68	$34,517.65	$113,543.55	$955,483.46	$75,037.47	Gov't Scaling Fees. $231.63		$3,097,853.44
Totals, 1941–42	$2,310,473.38	$92,980.09	$22,970.78	$421.18	$756.06	$37,798.34	$142,180.70	$879,697.43	$65,137.56	$420.20		$3,552,835.72
Totals, 1940–41	$2,170,897.94	$84,995.42	$14,452.13	$460.20	$305.75	$35,777.90	$144,686.32	$728,543.90	$54,942.02	$459.47		$3,235,521.05
Totals, 1939–40	$1,883,779.34	$74,498.27	$17,516.51	$787.63	$394.61	$33,769.03	$140,435.44	$654,869.07	$31,026.46	$472.86		$2,837,549.22
Ten-year average, 1939–40 to 1948–49	$2,259,570.50	$41,839.51	$40,442.89	$774.57	$2,006.64	$45,842.07	$171,627.38	$1,717,075.20	$107,278.42	.....		$4,430,297.58

* Credit.

(33)

FOREST REVENUE, FISCAL YEAR 1948–49.

		Ten-year Average.
Timber-licence rentals	$387,390.95	$406,188.35
Timber-licence transfer fees	2,050.00	1,895.00
Timber-licence penalty fees	1,628.00	9,771.42
Hand-loggers' licence fees	200.00	230.00
Timber-lease rentals	53,872.17	51,241.75
Timber-lease penalty fees and interest	94.27	88.31
Timber-sale rentals	100,114.68	53,601.85
Timber-sale stumpage	4,270,790.13	1,699,101.99
Timber-sale cruising	38,315.38	19,244.66
Timber-sale advertising	7,065.30	3,725.71
Timber royalty	2,999,897.17	2,253,283.90
Timber tax	38,903.25	33,150.58
Scaling fees (not Scaling Fund)		163.44
Scaling expenses (not Scaling Fund)	2,501.90	155.46
Trespass stumpage*		33,211.67
Scalers' examination fees†		434.50
Exchange	91.94	108.81
Seizure expenses	793.15	778.30
General miscellaneous	22,729.93	10,768.16
Timber-berth rentals, bonus, and fees	21,751.01	21,581.26
Interest on timber-berth rentals	5.93	67.15
Transfer fees on timber berths	162.76	128.20
Grazing fees and interest	29,318.30	30,230.11
	$7,977,676.22	$4,629,150.58
Taxation from Crown-granted timber lands	453,980.08	251,668.23
Totals	$8,431,656.30	$4,880,818.81

* Trespass penalties now included in timber-sale stumpage.

† Scalers' examination fees now included in general miscellaneous.

(34)

Forest Expenditure, Fiscal Year 1948–49.

Forest District.	Salaries.	Expenses.	Total.
Forest Service Marine Station	.....	$28,783.51	$28,783.51
Vancouver	$164,045.85	44,439.87	208,485.72
Prince Rupert	65,670.04	17,633.72	83,303.76
Prince George	72,272.02	15,270.66	87,542.68
Kamloops	130,083.58	22,653.45	152,737.03
Nelson	127,125.50	22,603.44	149,728.94
Victoria	275,097.64	186,015.79	461,113.43
Totals	$834,294.63	$337,400.44	$1,171,695.07
Canadian Forestry Association			4,000.00
Forest management			60,175.43
Forest research			25,075.68
Reforestation			360,994.23
Public relations			21,796.27
Provincial parks			182,593.92
Incidentals and contingencies			4,164.70
Ranger school			34,264.05
Refund to United Kingdom			35,000.00
Insect-control			24,292.54
Grazing Range Improvement Fund*			14,659.15
Forest Protection Fund*			1,650,000.00
Forest Reserve Account*			218,935.56
Grand total			$3,807,646.60

* Contributions from Treasury to special funds detailed elsewhere.

N.B.—The above figures do not include amounts paid as cost-of-living bonus, totalling $199,979.83, made up as follows:—

Salaries	$130,372.41
Expenses	8,456.37
Forest management	5,095.22
Forest research	2,683.42
Reforestation	39,087.55
Provincial parks	10,958.71
Ranger School	3,244.19
Insect-control	81.96
	$199,979.83

(35)

Scaling Fund.

Balance, April 1st, 1948 (debit)	$62,746.58
Collections, fiscal year 1948–49	366,715.31
	$303,968.73
Expenditures, fiscal year 1948–49	379,593.87
Balance, March 31st, 1948 (debit)	$75,625.14
Balance, April 1st, 1949 (debit)	$75,625.14
Collections, nine months, April–December, 1949	323,400.89
	$247,775.75
Expenditures, nine months, April–December, 1949	317,596.28
Balance, December 31st, 1949 (debit)	$69,820.53

(36) SILVICULTURE FUND.

Balance forward, April 1st, 1948	$112,631.90
Collections, fiscal year 1948–49	302,861.08
	$415,492.98
Expenditures, fiscal year 1948–49	50,510.65
Balance, March 31st, 1949	$364,982.33
Balance, April 1st, 1949	$364,982.33
Collection, nine months to December 31st, 1949	381,001.16
	$745,983.49
Expenditures, nine months to December 31st, 1949	111,847.29
Balance, December 31st, 1949 (credit)	$634,136.20

(37) FOREST RESERVE ACCOUNT.

Credit balance brought forward, April 1st, 1948	$454,128.23
Amount received from Treasury, March 31st, 1949 (under subsection (2), section 32, "Forest Act")	218,935.56
Moneys received under subsection (4), section 32, "Forest Act"	255.00
	$673,318.79
Expenditures, April 1st, 1948, to March 31st, 1949	111,641.57
Credit balance, March 31st, 1949	$561,677.22
Expenditures, nine months to December 31st, 1949	79,299.83
Balance, December 31st, 1949 (credit)	$482,377.39

(38) GRAZING RANGE IMPROVEMENT FUND.

Balance, April 1st, 1948 (credit)	$35,024.71
Government contribution (section 14, "Grazing Act")	9,398.26
Other collections	275.80
	$44,698.77
Expenditures, April 1st, 1948, to March 31st, 1949	17,071.86
Balance, March 31st, 1949 (credit)	$27,626.91
Government contribution (section 14, "Grazing Act")	14,659.15
Other collections	59.00
	$42,345.06
Expenditures, April 1st, 1949, to December 31st, 1949	11,428.49
Balance, December 31st, 1948 (credit)	$30,916.57

(39)

FOREST PROTECTION FUND.

Balance (deficit), April 1st, 1948			$2,528.79
Expenditures		$1,491,202.85	
Less refunds		38,638.16	
			1,452,564.69
			$1,455,093.48
Government contribution		$1,650,000.00	
Collections, tax		355,109.81	
Collections, slash and snags	$20,511.18		
Less refunds	7,444.07		
		13,067.11	
			2,018,176.92
Balance (credit), March 31st, 1949			$563,083.44
Balance (credit), April 1st, 1949			$563,083.44
Expenditures, nine months, April to December, 1949	$1,293,950.03		
Less refunds	31,062.91		
		$1,262,887.12	
Repayable to votes (approximately)		420,646.02	
			1,683,533.14
			$1,120,449.70
Collections, tax		$231,797.24	
Collections, miscellaneous		30,290.82	
Government contribution		1,500,000.00	
			1,762,088.06
Estimated credit balance, December 31st, 1949			$641,638.36

FOREST-PROTECTION EXPENDITURE FOR TWELVE MONTHS ENDED MARCH 31ST, 1949, BY THE FOREST SERVICE.

District.	Salaries and Expenses.		Tools and Equipment.		Fires.	Improvements.	Aircraft.	Hazard Reduction.	Planning and Research.	Miscellaneous.	Total.
	Permanent.	Temporary.	New.	Maintenance and Operation.							
Vancouver	$34,547.03	$116,582.23	$34,945.10	$59,142.25	$2,479.00	$31,245.08	.....	$1,774.18	.....	$8,201.81	$288,916.68
Forest Service Marine Station	11,050.72	17,111.72	.....	11,546.02	.....	20,111.14	.....	.....	.....	3,920.46	63,740.06
Prince Rupert	15,460.24	34,714.37	16,246.36	21,455.15	3,017.34	13,468.76	.....	.....	.....	2,702.17	107,064.39
Fort George	13,207.18	51,682.40	25,477.25	25,376.29	24,794.06	24,175.26	$11,391.47	.....	.....	4,461.78	180,565.69
Kamloops	25,053.53	107,160.07	46,502.08	46,466.86	4,991.32	31,814.01	10,514.33	.....	.....	6,458.61	278,960.81
Nelson	25,413.73	115,907.21	78,068.68	51,590.59	6,074.57	57,664.40	8,093.80	.....	.....	6,787.86	349,600.84
Victoria	41,569.80	13,338.01	38,939.25	33,705.15	.....	20,703.12	6,890.71	13,700.00	$10,224.05	4,646.13	183,716.22
Totals	$166,302.23	$456,496.01	$240,178.72	$249,282.31	$41,356.29	$199,181.77	$36,890.31	$15,474.18	$10,224.05	$37,178.82	$1,452,564.69

(41) REPORTED APPROXIMATE EXPENDITURE IN FOREST PROTECTION BY OTHER AGENCIES, 1949.

Forest District.	Expenditures.				
	Patrols and Fire-prevention.	Tools and Equipment.	Fires.	Improvements.	Total.
Vancouver	$205,390.00	$185,450.00	$99,410.00	$12,871.00	$503,121.00
Prince Rupert	1,056.80	4,227.20	829.50	.....	6,113.50
Fort George	.....	.....	6,010.61	.....	6,010.61
Kamloops	.....	.....	4,603.66	.....	4,603.66
Nelson	3,300.00	11,500.00	6,280.07	3,750.00	24,830.07
Totals	$209,746.80	$201,177.20	$117,133.84	$16,621.00	$544,678.84
Ten-year average, 1940–49	$75,394.00	$116,050.00	$150,132.00	$7,205.00	$348,781.00

(42) SUMMARY OF ACREAGE LOGGED, 1949, AND DEALT WITH UNDER SECTION 113, "FOREST ACT."

	Acres.	Acres.
Total area logged, Vancouver Forest District		70,414
1949 slash covered by hazard reports	48,966	
1949 slash logged after September 1st and carried over to 1950	21,448	
		70,414
1949 slash covered by hazard reports		48,966
1949 slash burned intentionally	22,266	
1949 slash burned accidentally	819	
1949 slash on which no burning was required	12,474	
1949 slash on which additional time for burning has been granted	2,505	
1949 slash awaiting decision *re* compensation or additional time for disposal	7,065	
1949 slash on which compensation has been assessed	148	
1949 slash abated by lopping, land-clearing, etc.	153	
1949 slash in zone liable for snag-falling only	3,536	
		48,966

SUMMARY OF SLASH BEING CARRIED TO BE DEALT WITH IN 1950.

	Acres.
Slash accumulated prior to 1949	688
Slash accumulated in 1949 (exclusive of 3,536 acres on which snag-falling only requirement)	31,018
	31,706

(43) SUMMARY OF OPERATIONS, VANCOUVER FOREST DISTRICT.

Total operations, Vancouver Forest District		1,541
Number of intentional slash-burns	459	
Number of operations on which slash was disposed of by lopping or land-clearing, etc.	6	
Number of operations on which slash was accidentally burned	43	
Number of operations not required to burn	467	
Number of operations given further time for disposal	21	
Number of operations not considered necessary to deal with under section 113	447	
Number of operations on which compensation has been assessed for 1949 slash	7	
Number of operations pending decision *re* assessment or further time for slash-disposal	92	
Number of operations inactive in 1949	57	
Number of operations snag-falling area only	37	
Number of operations on which security deposit has been posted	3	
	1,639*	1,541

* Difference noted above is accounted for by slash on some operations being disposed of by both accidental and intentional means and some operators conducting both spring and fall burns.

(44) SUMMARY CHART A—INTENTIONAL SLASH-BURN.

Operations conducting slash-burn		459
Acres slash-burned in 1949—		
Created prior to 1947	614	
Created 1947	11,493	
Created 1948	19,170	
Created 1949	22,266	
		53,543
Broadcast-burned	30,281	
Spot-burned	23,262	
		53,543
Acres of forest-cover burned		1,085
Total acres burned		54,628
Net damage to forest-cover		$5,274.05
Net damage to property and cut products		54,351.84
Total damage		$59,625.89
Cost of slash-disposal—		
Operators		$78,685.12
Forest Service		2.00
Cost to operator per acre		1.47
Cost to operator based on stand of 40 M per acre		3.7c. per M

(45)

RECAPITULATION OF SLASH-DISPOSAL, 1934–49.

Year.	Acres of Slash burned. Accidentally.	Intentionally.
1934	4,927	15,935
1935	11,783	13,239
1936	1,340	7,691
1937	3,015	27,516
1938	35,071	50,033
1939	1,930	51,603
1940	2,265	33,034
1941	3,385	5,524
1942	4,504	80,226
1943	2,046	40,013
1944	5,121	27,278
1945	3,897	46,467
1946	2,174	25,498
1947	2,663	34,414
1948	2,215	30,652
1949	1,468	53,543

(46)

FIRE OCCURRENCES BY MONTHS, 1949.

Forest District.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Total.	Per Cent.
Vancouver	.....	3	84	133	137	53	85	1	496	29.16
Prince Rupert	.....	.....	23	5	6	5	4	1	44	2.59
Fort George	14	3	33	15	65	24	4	.....	158	9.29
Kamloops	.....	18	91	61	166	102	71	1	510	29.98
Nelson	1	26	45	47	181	148	41	4	493	28.98
Totals	15	50	276	261	555	332	205	7	1,701	100.00
Per cent	0.88	2.94	16.23	15.34	32.63	19.52	12.05	0.41	100.00	.....
Ten-year average, 1940–49	3	48	184	169	573	412	157	8	1,554	.....
Per cent	0.19	3.09	11.84	10.88	36.87	26.51	10.10	0.52	100.00	.....

(47)

NUMBER AND CAUSES OF FOREST FIRES, 1949.

Forest District.	Lightning.	Campers.	Railways operating.	Smokers.	Brush-burning (not Railway-clearing).	Road and Power- and Telephone-line Construction.	Industrial Operation.	Incendiarism.	Miscellaneous (Known Causes).	Unknown Causes.	Total.	Per Cent. of Total Fires in Province.
Vancouver	43	34	176	101	19	15	43	8	55	2	496	29.16
Prince Rupert	2	8	.....	11	4	.....	14	.....	5	.....	44	2.59
Fort George	68	33	1	7	12	.....	17	.....	11	9	158	9.29
Kamloops	123	101	65	107	14	.....	5	2	72	21	510	29.98
Nelson	251	39	83	55	11	5	8	3	26	12	493	28.98
Totals	487	215	325	281	60	20	87	13	169	44	1,701	100.00
Per cent	28.63	12.64	19.11	16.52	3.53	1.18	5.11	0.76	9.93	2.59	100.00	.....
Ten-year average, 1940–49	564	185	219	280	63	11	44	16	142	30	1,554	.....
Per cent	36.29	11.91	14.09	18.02	4.05	0.71	2.83	1.03	9.14	1.93	100.00	.....

(48) NUMBER AND CAUSES OF FOREST FIRES FOR THE LAST TEN YEARS.

Causes.	1949.	1948.	1947.	1946.	1945.	1944.	1943.	1942.	1941.	1940.	Total.
Lightning	487	266	326	515	541	408	256	704	871	1,265	5,639
Campers	215	105	193	263	183	203	157	158	142	236	1,855
Railways operating	325	113	270	231	426	329	216	114	73	90	2,187
Smokers	281	140	245	326	356	342	304	220	184	400	2,798
Brush-burning (not railway-clearing)	60	39	51	117	69	51	58	30	81	74	630
Road and power- and telephone-line construction	20	5	8	16	5	10	8	31	4	5	112
Industrial operations	87	45	53	38	32	51	20	38	33	41	438
Incendiarism	13	5	13	10	32	13	7	5	20	38	156
Miscellaneous (known causes)	169	58	144	159	155	210	136	90	134	171	1,426
Unknown causes	44	23	29	32	39	50	23	24	19	18	301
Totals	1,701	799	1,332	1,707	1,838	1,667	1,185	1,414	1,561	2,338	15,542

(49) FIRES CLASSIFIED BY SIZE AND DAMAGE, 1949.

Forest District.	Total Fires.		Under ¼ Acre.			¼ to 10 Acres.			Over 10 to 500 Acres.			Over 500 Acres in Extent.			Damage.		
	Number.	Per Cent. of Total Fires in Province.	Number.	Per Cent. of Total Fires in District.	Per Cent. of Total Fires in this Class.	Number.	Per Cent. of Total Fires in District.	Per Cent. of Total Fires in this Class.	Number.	Per Cent. of Total Fires in District.	Per Cent. of Total Fires in this Class.	Number.	Per Cent. of Total Fires in District.	Per Cent. of Total Fires in this Class.	Under $100.	Between $100 and $1,000.	Over $1,000.
Vancouver	496	29.16	350	70.56	34.38	115	23.19	22.33	28	5.65	19.31	3	0.60	13.04	475	7	14
Prince Rupert	44	2.59	26	59.09	2.56	11	25.00	2.14	7	15.91	4.83	.....	.....	.....	40	2	2
Fort George	158	9.29	95	60.13	9.33	29	18.35	5.63	25	15.82	17.24	9	5.70	39.13	140	12	6
Kamloops	510	29.98	202	39.61	19.84	239	46.86	46.41	59	11.57	40.69	10	1.96	43.48	494	11	5
Nelson	493	28.98	345	69.98	33.89	121	24.54	23.49	26	5.28	17.93	1	0.20	4.35	430	56	7
Totals	1,701	100.00	1,018	.....	100.00	515	.....	100.00	145	.....	100.00	23	.....	100.00	1,579	88	34
Per cent	100.00	.....	59.85	.....	.....	30.28	.....	.....	8.52	.....	.....	1.35	.....	.....	92.83	5.17	2.00
Ten-year average, 1940–49	1,554	.....	869	.....	.....	452	.....	.....	185	.....	.....	48	.....	.....	1,443	73	38
Per cent	100.00	.....	55.92	.....	.....	29.09	.....	.....	11.90	.....	.....	3.09	.....	.....	92.86	4.70	2.44

(50) DAMAGE TO PROPERTY OTHER THAN FORESTS, 1949.*

Forest District.	Forest Products in Process of Manufacture.	Buildings.	Railway and Logging Equipment.	Miscellaneous.	Total.	Per Cent. of Total.
Vancouver	$126,600.50	$20.00	$70,198.00	$3,280.00	$200,098.50	61.22
Prince Rupert	1,000.00	40.00	8,000.00	60.00	9,100.00	2.78
Fort George	3,370.00	1,750.00	85,600.00	1,150.00	91,870.00	28.11
Kamloops	794.00	9,257.50	2,512.00	10,397.80	22,961.30	7.03
Nelson	198.16	460.00	100.00	2,060.50	2,818.66	0.86
Totals	$131,962.66	$11,527.50	$166,410.00	$16,948.30	$326,848.46	100.00
Per cent	40.37	3.53	50.91	5.19	100.00	.....
Ten-year average, 1940–49	$94,223.72	$22,420.85	$94,961.75	$30,684.58	$242,290.90	.....
Per cent	38.89	9.25	39.19	12.67	100.00	.....

* Does not include intentional slash-burns. For this item *see* page 133.

(51) DAMAGE TO FOREST-COVER CAUSED BY FOREST FIRES, 1949—PART I.*

Forest District.	Accessible Merchantable Timber.				Inaccessible Merchantable Timber.			Immature Timber.	
	Net Area killed.	Total Volume killed.	Salvable Volume of Timber killed.	Net Stumpage Loss.	Net Area killed.	Total Volume killed.	Damage.	Net Area killed.	Present Value.
	Acres.	M B.M.	M B.M.	$	Acres	M B.M.	$	Acres.	$
Vancouver	594	2,478	1,265	5,415	5	.....	1	315	2,120
Prince Rupert	7	99	14	249	3	6	12	26	73
Fort George	89	453	15	1,825	98	240	24	2,693	4,602
Kamloops	412	1,457	93	1,655	263	496	522	3,884	1,332
Nelson	36	330	131	235	57	2,058	997	621	393
Totals	1,138	4,817	1,518	9,379	426	2,800	1,556	7,539	8,520
Per cent	0.78	63.24	31.51	28.90	0.29	36.76	4.80	5.19	26.26
Ten-year average, 1940–49	26,490	138,348	21,143	188,847	4,362	10,676	6,296	49,749	149,898
Per cent	8.77	92.84	15.28	47.13	1.44	7.16	1.57	16.47	37.41

* Does not include intentional slash-burns. For this item *see* page 133.

(51) DAMAGE TO FOREST-COVER CAUSED BY FOREST FIRES, 1949—PART II.*

Forest District.	Not satisfactorily restocked.				Non-commercial Cover.		Grazing or Pasture Land.		Non-productive Sites.		Grand Totals.		
	Logged unburned.	Logged and burned.	Burned, not logged.	Damage.	Area burned.	Damage.	Area burned.	Damage.	Area burned.	Damage.	Area.	Quantity.	Damage.
	Acres.	Acres.	Acres.	$	Acres.	$	Acres.	$	Acres.	$	Acres.	M B.M.	$
Vancouver	1,468	484	45	460	138	38	4	.....	699	170	3,752	2,478	8,204
Prince Rupert	22	25	197	88	89	19	2	.....	.....	.....	371	105	441
Fort George	551	299	13	221	18,005	4,456	102,116	5,106	49	13	123,913	693	16,247
Kamloops	395	6	2,221	1,024	1,988	304	4,424	230	1,331	331	14,924	1,953	5,398
Nelson	140	330	59	272	162	47	386	20	798	195	2,589	2,388	2,159
Totals	2,576	1,144	2,535	2,065	20,382	4,864	106,932	5,356	2,877	709	145,549	7,617	32,449
Per cent	1.77	0.78	1.74	6.36	14.00	14.99	73.47	16.51	1.98	2.18	100.00	100.00	100.00
Ten-year average, 1940–49	10,351	3,541	27,052	13,080	81,396	24,776	28,439	1,956	70,758	15,834	302,138	149,024	400,687
Per cent	3.43	1.17	8.95	3.27	26.94	6.18	9.41	0.49	23.42	3.95	100.00	100.00	100.00

* Does not include intentional slash-burns. For this item *see* page 133.

(52) FIRE CAUSES, FOREST SERVICE COST, AND TOTAL DAMAGE, 1949.

Causes.	No.	Per Cent.	Cost.	Per Cent.	Damage.	Per Cent.
Lightning	487	28.63	$43,332.51	45.82	$4,247.33	1.18
Campers	215	12.64	18,888.62	19.97	3,147.08	0.88
Railways operating	325	19.11	154.74	0.16	2,537.42	0.71
Smokers	281	16.52	7,975.61	8.43	37,016.29	10.30
Brush-burning (not railway-clearing)	60	3.53	2,137.05	2.26	2,017.58	0.56
Road and power- and telephone-line construction	20	1.18	.....	.....	126.85	0.04
Industrial operations	87	5.11	16,217.00	17.15	234,415.98	65.24
Incendiarism	13	0.76	313.15	0.33	8,819.32	2.45
Miscellaneous (known causes)	169	9.93	5,079.26	5.37	27,755.59	7.73
Unknown causes	44	2.59	479.54	0.51	39,214.02	10.91
Totals	1,701	100.00	$94,577.48	100.00	$359,297.46	100.00

(53) COMPARISON OF DAMAGE CAUSED BY FOREST FIRES IN LAST TEN YEARS.

	1949.	1948.	1947.	1946.	1945.	1944.	1943.	1942.	1941.	1940.	Total, 10 Years.
Total number of fires	1,701	799	1,332	1,707	1,838	1,667	1,185	1,414	1,561	2,338	15,542
Area burned (acres)	145,549	384,356	142,765	303,395	352,892	506,148	94,842	446,544	154,888	490,003	3,021,382
Standing timber destroyed or damaged (M ft. B.M.)	7,617	31,265	11,017	69,119	534,502	98,075	15,612	128,890	341,636	252,512	1,490,245
Amount salvable (M ft. B.M.)	1,518	13,678	3,846	16,150	120,021	10,937	719	4,341	3,123	37,092	211,425
Damage to forests	$32,449	$287,192	$62,497	$191,669	$1,092,537	$448,180	$63,731	$859,037	$483,002	$486,577	$4,006,871
Damage to other forms of property	326,848	284,271	246,737	166,315	350,516	204,345	69,196	477,459	65,303	231,919	2,422,909
Total damage	$359,297	$571,463	$309,234	$357,984	$1,443,053	$652,525	$132,927	$1,336,496	$548,305	$718,496	$6,429,780

(54) FIRES CLASSIFIED BY FOREST DISTRICT, PLACE OF ORIGIN, AND COST PER FIRE OF FIRE-FIGHTING, 1949.

Forest District.	Total Fires.	Originated on Vacant Crown Lands and Lands contributing to Forest Protection Fund.	Originated on Lands not contributing to Forest Protection Fund.	Total Forest Service Cost.			Extinguished without Cost.			Cost Money to extinguish.							
				Dollars.	Per Cent	Average Expenditure per Cost Fire (Dollars).	Number.	Per Cent. of Total Fires in District.	Per Cent. of Total Fires in Province.	Number.	Per Cent. of Total Fires in District.	Per Cent. of Total Fires in Province.	Cost less than $100 per Fire.	Cost $100 to $1,000 per Fire.	Cost over $1,000 to $5,000 per Fire.	Cost over $5,000 to $10,000 per Fire.	Cost over $10,000 per Fire.
Vancouver	496	236	260	13,838.10	14.63	82.37	328	66.13	33.88	168	33.87	22.92	98	51	13	3	3
Prince Rupert	44	16	28	615.60	0.65	24.62	19	43.18	1.96	25	56.82	3.41	22	3	.....	.....	.....
Fort George	158	139	19	19,596.35	20.72	292.47	91	57.59	9.40	67	42.41	9.14	45	17	4	1	.....
Kamloops	510	383	127	30,070.60	31.80	173.82	337	66.08	34.82	173	33.92	23.60	137	32	2	2	.....
Nelson	493	406	87	30,456.83	32.20	101.52	193	39.15	19.94	300	60.85	40.93	237	56	7	.....	.....
Totals	1,701	1,180	521	94,577.48*	100.00	129.03	968	.....	100.00	733	.....	100.00	539	159	26	6	3
Per cent	100.00	69.37	30.63	.....	.....	.....	56.91	.....	.....	43.09	.....	.....	31.69	9.35	1.53	0.35	0.17
Ten-year average, 1940–49	1,554	1,009	545	142,771.00	.....	.....	758	.....	.....	796	.....	.....	610	146	30	6	4
Per cent	100.00	64.93	35.07	.....	.....	.....	48.78	.....	.....	51.22	.....	.....	39.25	9.39	1.93	0.39	26

* Cost correct to date. Subject to later revision.

Cost to other parties (348 cost fires), $117,133.84. Cost to Forest Service (733 cost fires), $94,577.48.

Detailed final costs are published one year in arrears in the table " Expenditure by Districts " in each Annual Report.

PROSECUTIONS, 1949.

Forest District.	Information laid.	Burning without Permit.	Refusing to render Assistance in Fire-fighting.	Failure to maintain Proper Fire-protection Equipment.	Failure to report Fires.	Fines.		Served Sentence in Gaol.	Suspended Sentence.	Cases dismissed.	Cases withdrawn.
						Number.	Amount.				
Vancouver	14	7	1	5	1	12	$350.00	.....	1	1	.....
Prince Rupert	1	.....	.....	1	.....	.....	.....	.....	1	.....	.....
Fort George	2	1	1	.....	.....	2	50.00	.....	.....	.....	.....
Kamloops	4	3	1	.....	.....	4	100.00	.....	.....	.....	.....
Nelson	10	2	6	2	.....	9	235.00	.....	.....	1	.....
Totals	31	13	9	8	1	27	$735.00	.....	2	2	.....
Ten-year average, 1940–49	30	.....	.....	.....	.....	20	$570.43	1	7	1	1

BURNING PERMITS, 1949.

Forest District.	Clearing Agricultural Land.				Clearing Logging-slash.				Clearing Railway Right-of-way.				Clearing Public Roads.				Grand Totals.			
	Permits issued.	Area burned over.	Fires escaped Control.	Fires set without Permit.	Permits issued.	Area burned over.	Fires escaped Control.	Fires set without Permit.	Permits issued.	Area burned over.	Fires escaped Control.	Fires set without Permit.	Permits issued.	Area burned over.	Fires escaped Control.	Fires set without Permit.	Permits issued.	Area burned over.	Fires escaped Control.	Fires set without Permit.
	No.	Acres.	No.	No.	No.	Acres.	No.	No.	No.	Acres.	No.	No.	No.	Acres.	No.	No.	No.	Acres.	No.	No.
Vancouver	4,424	3,263	7	3	191	19,142	1	.....	6	.....	1	.....	109	5,237	7	.....	4,730	27,642	16	3
Prince Rupert	1,059	2,913	4	.....	63	66	2	1	36	160	.....	.....	23	200	.....	.....	1,181	3,339	6	1
Fort George	1,238	8,678	2	.....	152	298	5	.....	4	280	.....	.....	21	161	.....	.....	1,415	9,417	7	.....
Kamloops	2,184	8,050	.....	.....	90	318	.....	.....	15	184	.....	.....	19	211	.....	.....	2,308	8,763	.....	.....
Nelson	1,085	11,373	.....	1	5	60	.....	.....	47	.....	.....	.....	23	81	.....	.....	1,160	11,514	.....	1
Totals	9,990	34,277	13	4	501	19,884	8	1	108	624	1	.....	195	5,890	7	.....	10,794	60,675	29	5
Per cent	92.55	56.49	44.83	80.00	4.64	32.77	27.58	20.00	1.00	1.03	3.45	.....	1.81	9.71	24.14	.....	100.00	100.00	100.00	100.00
Ten-year average, 1940–49	6,895	17,940	26	10	472	24,834	10	1	85	456	3	.....	137	2,440	6	1	7,589	45,670	45	12
Per cent	90.86	39.28	57.78	83.34	6.22	54.38	22.22	8.33	1.12	1.00	6.67	.....	1.80	5.34	13.33	8.33	100.00	100.00	100.00	100.00

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ENROLMENT AT RANGER SCHOOL, 1949.

Forest District or Division.	Rangers.	Acting Rangers.	Assistant Rangers.	Clerks.	Total.
Vancouver	....	2	3	....	5
Prince Rupert	....	....	3	....	3
Fort George	1	....	3	....	4
Kamloops	1	....	3	....	4
Nelson	....	....	4	....	4
Parks and Recreation	1	....	....	....	1
Totals, 1949	3	2	16	....	21
Totals, 1948	4	2	12	2	20
Totals, 1947	8	....	12	....	20
Totals, 1946	2	9	9	....	20

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MOTION PICTURE LIBRARY.

Stock Records.

	Year.					Totals, 1945–49.
	1945.*	1946.	1947.	1948.	1949.	
Films in library at January 1st	74	75	75	74	77	.....
Films withdrawn during year	4	2	8	2	3	19
New films added during year	5	2	7	5	1	20
Films in library at December 31st	75	75	74	77	75	.....
Films used during year	†	61	77	77	74	.....

Circulation Records.

Number of loans made during year	56	164	235	436	397	1,288
Number of film loans during year (one film loaned one time)	85	328	632	1,122	1,075	3,242
Number of showings during year	76	371	812	1,293	1,505	4,054
Number in audiences—						
Adults	2,341	11,940	8,009	21,633	14,568	58,491
Children	6,676	10,408	25,362	20,455	24,031	86,932
Mixed	8,730	10,285	24,351	42.930	87,506	173,802
Totals	17,747	32,633	57,722	85,018	126,105	319,225

* Recording of film circulation only commenced in 1945. † No record.

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FOREST SERVICE LIBRARY.

Classification.	Items received and catalogued.										
	1940.	1941.	1942.	1943.	1944.	1945.	1946.	1947.	1948.	1949.	Ten-year Average, 1940–49.
Bound volumes	15	5	9	10	12	13	12	14	39	36	16
Government reports and bulletins	283	153	120	85	49	80	126	231	123	100	135
Other reports and bulletins	95	36	29	32	63	61	79	90	140	153	78
Totals	393	194	158	127	124	154	217	335	302	289	229
Periodicals and trade journals	47	55	43	45	50	48	51	72	72	80	57
References indexed	4,278	5,259	1,962	1,170	1,175	1,294	1,523	1,798	3,543	2,074	2,408

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GRAZING PERMITS ISSUED.

District.	Number of Permits issued.	Number of Stock under Permit.		
		Cattle.	Horses.	Sheep.
Kamloops	1,066	102,044	3,271	32,841
Nelson	400	9,879	1,423	1,085
Fort George	30	1,384	138	73
Totals, 1949	1,496	113,307	4,832	33,999
Totals, 1948	1,328	117,133	5,526	31,664
Totals, 1947	1,322	105,723	5,513	26,189
Totals, 1946	1,379	106,273	5,035	31,274
Totals, 1945	1,378	109,201	5,064	39,235
Totals, 1944	1,320	101,696	4,862	40,858
Totals, 1943	1,221	93,497	4,844	39,921
Totals, 1942	1,130	84,788	4,797	36,962
Totals, 1941	881	77,774	4,180	39,552
Totals, 1940	790	74,404	3,958	37,132
Ten-year average, 1940–49	1,224	98,379	4,861	35,678

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GRAZING FEES BILLED AND COLLECTED.

Year.	Fees billed.	Fees collected.	Outstanding.
1940	$23,338.28	$38,146.48	$27,203.90
1941	23,781.19	29,348.82	21,636.87
1942	25,116.02	30,802.23	15,950.56
1943	24,680.37	31,148.36	9,482.57
1944	28,554.02	31,000.34	7,036.25
1945	30,066.34	31,465.28	5,637.36
1946	30,120.38	31,412.24	4,345.50
1947	28,584.74	29,203.74	3,726.50
1948	28,960.42	27,089.74	5,597.18
1949	27,819.65	28,299.94	5,113.39

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