PROVINCE OF BRITISH COLUMBIA

REPORT

OF

THE FOREST BRANCH

OF THE

DEPARTMENT OF LANDS

HON. T. D. PATTULLO, *Minister*

P. Z. CAVERHILL, *Chief Forester*

FOR THE YEAR ENDING DECEMBER 31ST

1923

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1924.

VICTORIA, B.C., April 29th, 1924.

To His Honour WALTER CAMERON NICHOL,

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 Branch of the Department of Lands for the year 1923.

T. D. PATTULLO,

Minister of Lands.

The Hon. T. D. Pattullo,

Minister of Lands, Victoria, B.C.

SIR,—There are submitted herewith statistical tables with a brief comment thereon, covering the main activities of the Branch during the calendar year 1923.

P. Z. CAVERHILL,

Chief Forester.

REPORT OF THE FOREST BRANCH,

DEPARTMENT OF LANDS.

Two outstanding events have to be reported for the year 1923; they are: The visit of the delegates to the second British Empire Forestry Conference to British Columbia; the rapid development in almost all branches of forest exploitation through the Province.

THE BRITISH EMPIRE FORESTRY CONFERENCE.

Major-General Lord Lovat and his confrères giving such an extended time to study of the Canadian forest possibilities and the forestry problems, gives us another indication of the importance to the Empire of an assured wood-supply. Conifers, or soft woods, as they are known in the trade, are the great structural woods. Canada has the one large source of supply within the Empire. British Columbia's position is indicated by the figures brought out at the Conference; she is accredited with 40 per cent. of the total stand of soft woods and 79 per cent. of the stand suitable for sawlogs in Canada.

Three of the resolutions of the Conference are of especial interest as directly applicable to forest conditions here. They are:—

(1.) "Believing them to be well founded, this Conference reaffirms Resolutions 1, 2, and 3 of the 1920 Conference, which emphasize the great importance of each part of the Empire laying down a definite forest policy, surveying its resources of timber, and ensuring that certain elements of stability are secured in the constitution of forest policy. These resolutions are as follows:—

"'1. *Forest Policy.*—In view of the great importance to the Empire as a whole, as well as to each of its component parts, of producing a sustained yield of all classes of timber, of encouraging the most economical utilization of timber and other forest products, and of maintaining and improving climatic conditions in the interests of agriculture and water-supply, each of the Governments of the Empire should lay down a definite forest policy to be administered by a properly constituted and adequate forest service.

"'2. *Survey of Resources.*—The foundation of a stable forest policy for the Empire and for its component parts must be the collection, co-ordination, and dissemination of facts as to the existing state of the forests and the current and prospective demands on them.

"'A note descriptive of the survey which is desired is appended in Appendix A.

"'3. *Constitution and Status.*—In order to attain continuity in the development of forest resources, it is desirable that certain elements of stability be secured in the constitution of the forest policy. This may be done by the following measures:—

"'(1.) The definition (where this has not been done already) of forest policy in a Forestry Act or Ordinance.

"'(2.) The reservation for the purpose of economic management and development of forest land under conditions which prevent the alienation of any which is primarily suitable for forests except for reasons consistent with the maintenance of the forest policy as a whole.

"'(3.) The assurance to the forest authority of funds sufficient to carry out the accepted policy for a series of years.

"'(4.) The grant to members of the forestry service of the status of civil servants, with due provision for pension.

"'(5.) The appointment as the chief officers of the forestry service of persons having a high standard of training in forestry, their selection and promotion being by merit alone.

"'(6.) The establishment in each of the larger parts of the Empire, and for the colonies not possessing responsible Government collectively, of an officer or officers having special duties of advising as to forest policy and surveying its execution.'"

(2.) *Forest-fire Protection, Canada.*—"The widespread damage to timber, property, and life resulting from uncontrolled forest fires is a menace to the economic well-being of the British Empire, and constitutes the greatest single deterrent to the practice of forest-management. The Conference endorses the report of its Forest Fire Protection Committee,* believing that the forest-fire problem, though difficult, is capable of solution if the forest authorities receive full public support and the requisite assistance from the Governments."

(3.) *Silviculture in Canada.*—"In view of the disastrous effects of fires, insects, and fungi upon the supplies of standing timber, and of the results of the existing logging methods in impoverishing the forests of their valuable species and in impairing their regeneration, this Conference strongly recommends the application of more effective silvicultural methods to the Canadian forests and commends the report of the Committee on Silviculture* to the earnest consideration of the Dominion and Provincial Governments and of the timber industry."

The objective set in these resolutions has been the aim of the Forest Branch and many of the requirements have already been met. Further public support in forest-protection to eliminate the man-caused fires, which still account for 80 or 90 per cent. of the total, is needed. Much work also has to be done in laying the foundation for close utilization and for the institution of the practice of silviculture. Limited work has been done on these problems during the past year and future plans call for the extension of this through the organization of Forest Experimental Stations where concentrated effort can be made on the many problems involved. The expansion of the industry shows that the time is rapidly approaching when economic barriers to the above needs will be removed, and the growing of a succession of timber-crops on those areas of the Province incapable of tillage will be accepted by all as the only justifiable policy, even at the expenditure of considerable additional sums in securing reproduction and in protecting it until maturity and the final harvest.

EXPANSION OF INDUSTRY.

The cut of wood products has reached the equivalent of 2,500,000,000 board-feet, or 25 per cent. greater than the boom-year of 1920. In water-borne trade, paper produced, number of firms operating, timber-sales executed by the Forest Branch, and in revenue collected new records were made, details of which will be found in subsequent sections of the report.

This development does not appear to be any mushroom growth induced by high prices such as occurred in 1920. The prices received were only slightly over those prevailing in 1922. The better organization for foreign trade, the lessening of competition from hard pine, the gradual conversion of the Eastern Provinces from lumber to pulp production is giving British Columbia products a place in markets whose demands are reasonably constant and where a safe margin of business is assured. Upon the return of prosperity to the Prairie sections, the development of the Pacific Coast route for wheat, with the closer business relations resulting therefrom, still greater production in lumber may be looked for.

The value of the industry rose 45 per cent., with a total income to the Province of more than $86,000,000. This income is derived from various sources of manufacture and use as shown in the following table:—

ESTIMATED VALUE OF PRODUCTION.

Product.	1920.	1921.	1922.	1923.
Lumber	$46,952,500	$33,533,000	$26,400,000	$47,600,000
Pulp and paper	21,611,681	13,500,000	12,590,000	15,018,000
Shingles	12,081,476	7,032,000	9,750,000	9,869,000
Boxes	2,650,000	2,000,000	1,726,000	2,072,000
Piles, poles, and mine-props	1,543,087	1,479,000	959,000	2,200,000
Cordwood, fence-posts, and mine-ties	1,495,729	1,180,000	1,187,000	1,500,000
Ties, railway	2,250,682	2,314,000	1,526,000	1,715,000
Additional value contributed by the wood-using industry	2,580,000	2,034,000	2,000,000	2,000,000
Laths and other miscellaneous products	847,920	250,000	400,000	500,000
Logs exported	615,732	1,648,000	2,939,000	4,200,000
Totals	$92,628,807	$64,970,000	$59,477,000	$86,674,000

* *See* Appendix.

PULP AND PAPER.

The demand for pulp and paper products has remained strong. Production of newsprint and sulphite both show a considerable advance over last year and constitute new records for the Province. In newsprint the increase is 14 per cent. over the previous year, 5 per cent. over the peak of 1920. In sulphite the increase is 15 per cent. over the previous year, or 8 per cent. over 1920.

PULP AND PAPER.

Pulp.	1919.	1920.	1921.	1922.	1923.
	Tons.	Tons.	Tons.	Tons.	Tons.
Sulphite	80,347	92.299	68,502	86,894	99,878
Sulphate	9,473	16,380	6,519	9,674	9,932
Ground wood	99,769	108,665	89,725	100,759	107,266

The ground wood and some 40,000 tons of sulphite were manufactured direct into newsprint within the Province. The sulphate was also manufactured into paper, the product being:—

Product.	1919.	1920.	1921.	1922.	1923.
	Tons.	Tons.	Tons.	Tons.	Tons.
Newsprint	123,607	136,832	110,176	124,639	142,928
Other papers	7,202	9,792	6,934	7,945	7,709

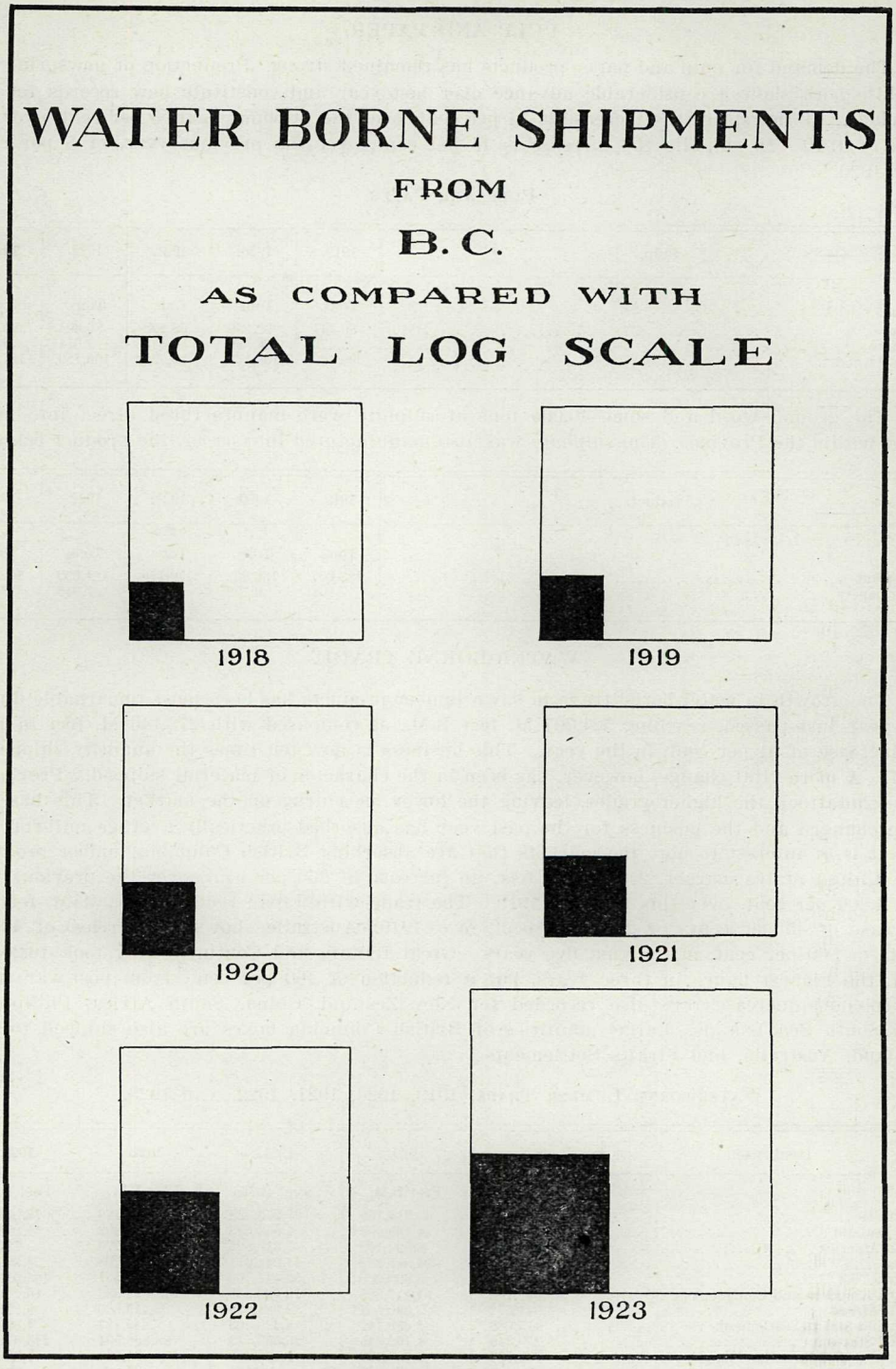
WATER-BORNE TRADE.

The growth in water-borne trade in sawn lumber products has been most remarkable during the year just passed, reaching 521,707 M. feet B.M., as compared with 273,146 M. feet in 1922, an increase of 91 per cent. in the year. This business is now ten times the quantity shipped in 1917. A more vital change, however, has been in the character of material shipped. Previously this grade took the higher grades, leaving the lower as a drug on the market. This has now been changed and the business for the past year has absorbed practically average mill-run.

It is of interest to note the markets that are absorbing British Columbia lumber products. The United States market, 248,611 M. feet, an increase of 200 per cent. over the previous year and 4,800 per cent. over this trade in 1919. The trade with Japan reached 105,961 M. feet, an increase of 45 per cent., or 2,500 per cent. over 1919. Australia shows an increase of 40 per cent., or 800 per cent. in the past five years. Great Britain and Continent only took 16,201 M. feet, the highest figure in three years, but a reduction of 400 per cent. from post-war trade. Conspicuous increases are also recorded for New Zealand, China, South Africa, Philippines, and South Sea Islands. Large quantities of British Columbia boxes are also shipped to New Zealand, Australia, and Straits Settlements.

WATER-BORNE LUMBER TRADE, 1919, 1920, 1921, 1922, AND 1923.

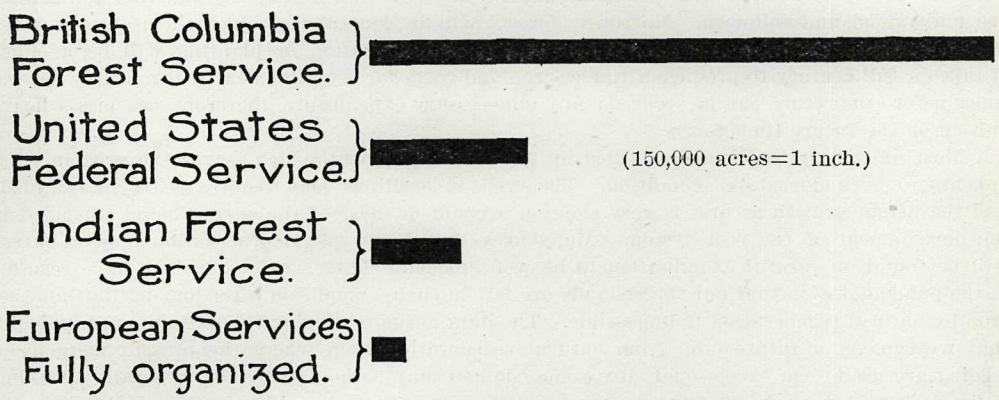
Destination.	1919.	1920.	1921.	1922.	1923.
	Feet B.M.	Feet B.M.	Feet B.M.	Feet B.M.	Feet B.M.
Australia	8,515,600	32,218,155	27,275,928	55,949,129	78,003,423
New Zealand	.....	4,159,099	4,553,603	4,516,862	11,252,890
South America	1,551,574	5,523,102	1,317,825	3,244,776	717,600
China	17,183,430	14,911,232	41,944,011	24,640,268	36,398,234
Japan	4,675,730	5,990,266	52,447,160	72,339,531	105,916,915
United Kingdom and Continent	*65,381,100*	*61,217,805*	*13,592,562*	*12,698,383*	*16,201,290*
South Africa	5,044,672	7,330,531	2,931,969	2,415,500	8,221,032
India and Straits Settlements	475,088	5,619,747	8,429,403	7,249,487	4,803,236
United States	5,259,346	4,162,845	25,553,543	83,856,504	248,611,600
Philippine and Hawaiian Islands	785,726	2,996,123	1,158,805	94,764	4,361,139
West Indies and Cuba	.....	1,479,950	20,668	30,065	994,341
South Sea Islands	.....	.....	941,422	1,841,578	3,665,241
Mexico	.....	1,015,414	.....	.....	677,756
Egypt	.....	.....	8,566,400	4,269,953	1,705,394
Foreign, Unclassified	.....	.....	.....	.....	177,041
Totals	108,872,266	146,624,269	188,733,299	273,146,800	521,707,132



PERSONNEL.

The permanent staff has increased during the year by eleven and now numbers 234. Increase was made in both scaling and office staff to take care of the volume of new work due to increased production. The temporary staff shows an increase of forty-five, of which twenty-seven was due to increase in cruising-work and the balance on account of forest-protection.

It is a matter for congratulation that the staff has been able to handle the greatly increased volume of work in almost every division in an efficient manner without requiring still further increase. While direct comparison without considering intensity of management, volume of business, etc., cannot be made, the following diagram shows the relation of the area covered by one fieldman in British Columbia to that in other forest organizations, and gives an indication of staff which will be required when our forest area is fully organized:—



It also indicates that for the present a much greater responsibility must be placed on our average fieldman, who must be an all-round practical man, capable of undertaking any work which comes up in his district, whether cruising, estimating the cost of logging a certain tract of timber, settling disputed points with an operator, or appraising pre-emption values; he must be familiar with working of mechanical appliances; he must organize and handle fire-fighting crews, supervise construction of trail and look-out, or report on what action is necessary to ensure a future crop of timber after logging or fire; courteously direct a tourist to a good camping-site, with a warning to care for his fire. Much of this work has to be done with only meagre supervision on his own responsibility and initiative.

Careful selection of personnel through competitive examination has laid the foundation for an efficient service, but further means of subsequent training through Rangers' meetings, inspection, and reading courses is essential. I believe a Ranger school is essential if we are to keep up with the demands that the future will place upon the service, and it is hoped that during the coming year it will be possible to arrange for this work to be undertaken.

Distribution of Total Force, British Columbia Forest Branch.

Forest District.	Permanent.													Temporary.				
	Chief Forester, Assistant Chief Forester, and Foresters.	Grazing Commissioner and Assistants.	Lumber Commissioners.	District Foresters.	Supervisors of Scalers and Assistants.	Scalers and Assistant Scalers.	Asst. Foresters, Asst. Dist. Foresters, and Junior Foresters.	Inspectors, Railway, Royalty, and Mechanical.	Supervisor of Rangers and Fire Inspector.	Rangers.	Draughtsmen.	Clerks, Stenographers, and Messengers.	Wireless Telephone Operators.	Assistant Rangers.	Patrolmen and Lookout-men.	Launch Crews and Repairmen.	Cruisers, Compass-men and Packers, etc.	Total.
Cariboo	....	....	...	1	....	....	...	...	....	3	...	1	....	7	4	....	....	16
Cranbrook	....	....	....	1	....	....	1	...	...	5	....	2	....	5	19	....	....	33
Kamloops	....	....	...	1	....	....	1	...	....	3	...	2	....	6	16	....	....	29
Nelson	....	....	....	1	....	....	1	....	....	6	....	3	....	10	13	....	....	34
Prince George	....	....	....	1	...	....	....	....	2	5	1	2	...	8	11	....	....	30
Prince Rupert	1	....	....	..	....	5	2	....	1	7	....	9	....	7	2	6	....	40
Vancouver	1	....	....	....	2	34	3	....	5	20	1	28	3	22	32	17	9	177
Vernon	....	....	....	1	....	....	1	....	....	4	....	2	....	5	5	....	....	18
Toronto	...	....	1	....	....	....	....	....	....	....	....	1	....	....	....	....	....	2
Victoria	4	3	2	....	1	....	5	4	...	....	7	30	....	....	....	....	46	102
Totals	6	3	3	6	3	39	14	4	8	53	9	80	3	70	102	23	55	481

FOREST INVESTIGATION.

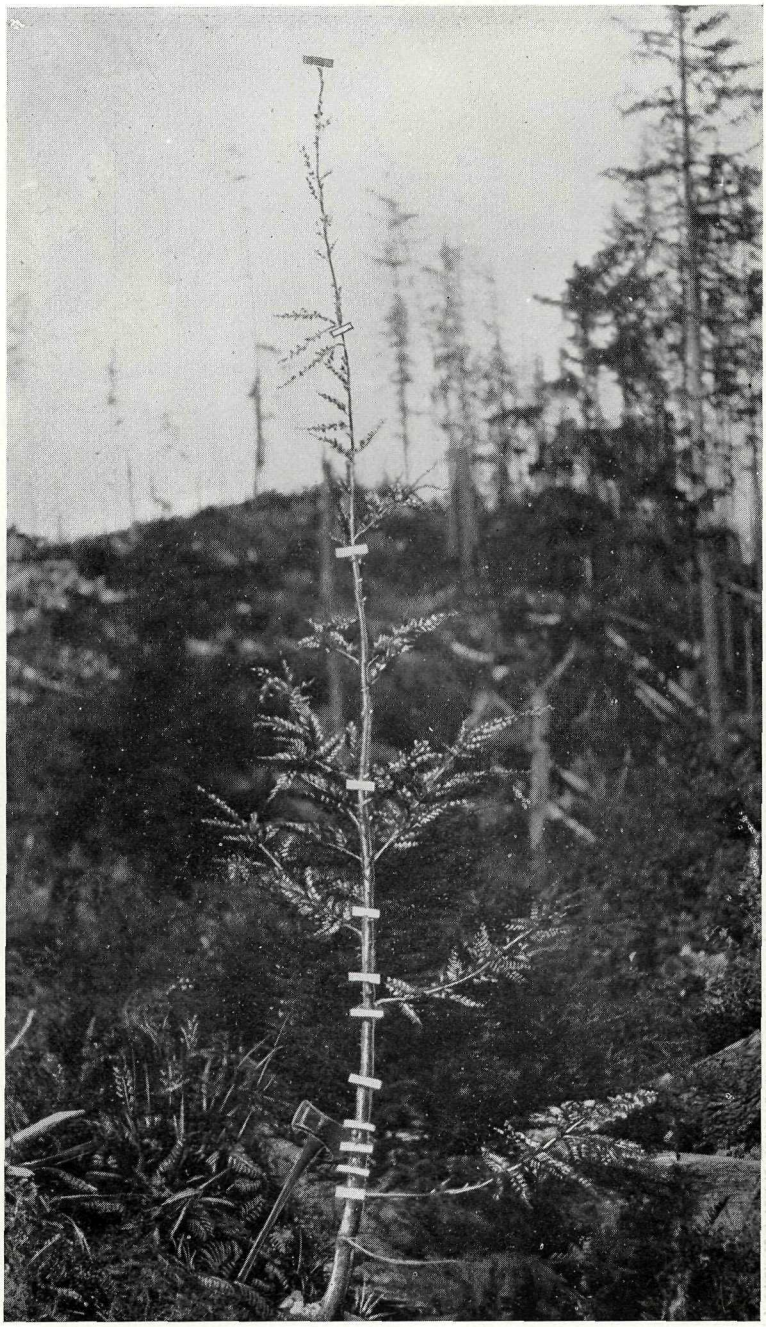
No matter how extensive they may be, the exhaustion of our virgin stands is only a question of time, due to the increasing demands of the lumber market. Depletion in the East and South and consequent shifting of the centre of lumber production to the Pacific Coast has focused attention as never before on the forests of British Columbia. Forests are a crop and, unlike minerals, are renewable, provided that the natural laws governing their reproduction and growth are understood and followed. Moreover, forests will in general reproduce themselves if given a chance, and the expensive operation of artificial regeneration or planting will be avoided. It takes a full century to produce a timber-crop and costs for establishment will multiply several times before the return can be secured; any unnecessary expenditure, therefore, becomes a heavy burden on the future timber-crop.

Most of the virgin timber is logged by powerful equipment which leaves the area in what appears to be a devastated condition. The crop of seedlings may require years to establish, and the height growth at first is very slow on account of most of the energy being expended in the development of the root system. Many areas which on casual observation appear barren will be found on careful examination to be well stocked. These various factors have resulted in the public delusion that our forest lands are left in such a condition after logging that another crop by natural regeneration is impossible. The data gathered during the past summer indicates that we can get a future crop from natural regeneration even where the present methods of logging are used. On exceptional sites some changes may be necessary, but, generally speaking, if fire is kept out of the Douglas fir mixtures the cut-over areas will restock rapidly after the virgin stand has been removed.

One of our most important problems is to determine the source of seed from which reproduction may be expected. It has been proven that there is considerable seed stored in the forest floor, but the proportion which comes from green timber has not been definitely ascertained, and it is essential to isolate and study seed-dissemination separate from the various factors of germination. The logging operations have in the past been segregated by intervening areas of green timber, but these are rapidly being removed and soon there will be large continuous areas of cut-over lands which will make our problem more difficult. Within 6 chains of the margin of settings for fir and 14 chains for hemlock, a marked increase was apparent in the amount of reproduction. Since blocks of green timber will aid in restocking areas in case of successive fires and also aid in their control, logging by alternate settings would help in this problem and also minimize the danger of a general conflagration. The setting which has been left could be logged before close of operation, but in the meantime it would have had an opportunity of seeding down surrounding area.

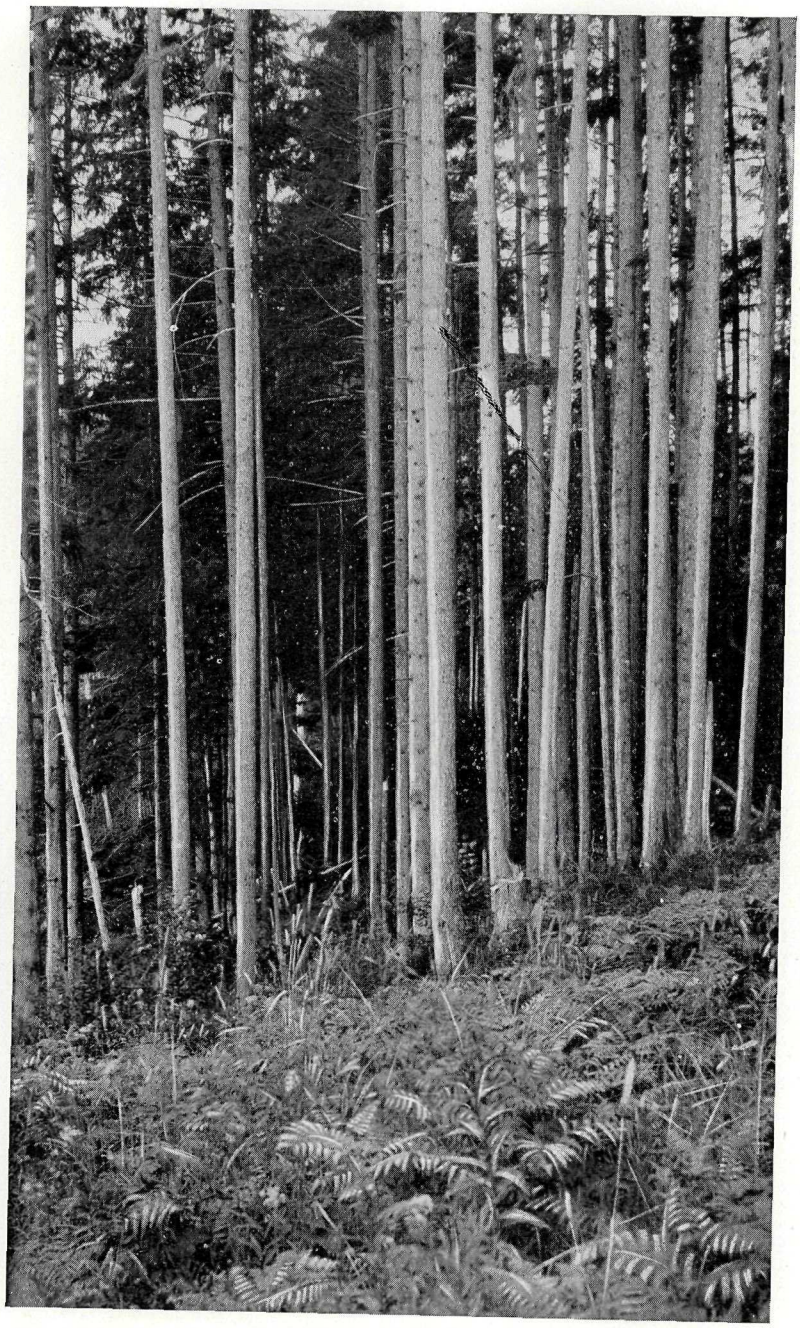
In addition to the supply of seed, the requirements necessary for establishment are a favourable seed-bed and favourable conditions for germination and growth. Nearly all the seedlings were found to germinate among the moss and duff and very few on exposed mineral soil, where evaporation was excessive through lack of humus cover. The northern exposure as a rule showed better reproduction than the southern. Douglas fir establishes most rapidly, about 70 per cent. coming in the first two seasons after logging where the slash is left. This rapid establishment may be due to more food being stored in the larger seed, which enables it to force its rootlets more deeply in search of moisture than those of the smaller seeds of the other species. This enables fir to resist drought where hemlock and cedar could not exist. The mortality among the more shallow-rooted species is enormous the first year, but these may require the formation of a nurse-crop of weeds and brush before any large amount can survive. The delayed establishment may also be due to the loss of vitality through storage, or the uncovering by erosion of seed at first buried too deeply to germinate, or seeds may be blown in long distances from green timber. On account of these various factors the possibility of an area restocking cannot be determined until several years after logging.

Closely related to question of seed-bed is that of "debris" left from our logging operations. Every one is familiar with this on the Coast. It covers a large part of the forest floor and exercises a greater or less influence on restocking, depending on species and whether they will germinate and develop in rotting wood or in shade under the debris. There is also the hazard from fire which is increased by the accumulation of dry, inflammable material. A study was undertaken to determine the quantity and character of this material and results show that in total volume this often reaches 25 per cent. of the wood material in the stand. In character



Hemlock showing recovery from suppression. Height between each marker is one year's growth.

Reproduction among unburned slash. Each tag shows position of a seedling.



One hundred and ten years ago this stand was small seedlings amid the debris of a wind-throw or fire-swept area.

it is smaller, inferior material and broken chunks. Lcak of local markets, long freight-hauls, and keen competition in foreign markets prevents the utilization of this material at present except in isolated cases, such as present strong demand for poles which has induced some operators to log these prior to the main operation. The fact that there is sufficient wood material left after logging is completed to maintain ten pulp plants of 100 tons daily capacity, however, should be sufficient to focus attention on this problem until the difficulties of handling, manufacturing, and marketing have been solved.

In considering the effect of burning this refuse broadcast on reproduction, the area was divided into two main types.

In the pure Douglas-fir type with deep soil, burning decreased the amount of hemlock to a greater degree than fir and increased the percentage of the latter species. The cedar and hemlock seed cannot germinate when buried to as great a depth as fir, and a fire may destroy practically all the hemlock and cedar seed capable of development and at the same time a large amount of fir seed may escape injury. This would account for a larger percentage of fir in the mixture coming in after burns than where the slash is left. In the spring the slash dries from the top down, the surface layers becoming highly inflammable while the soil is still moist, and fires at this season destroy least of the potential seedlings stored in the forest floor. These studies show that broadcast burning of slash lessens the amount of reproduction, but even though slash is burned the first season after logging when the ground is moist, there will be sufficient seed left capable of sprouting to satisfactorily stock the areas in the pure-fir type.

In the fir-hemlock-cedar type 17 per cent. of the areas not burned and 47 per cent. of the areas burned had less than 500 seedlings per acre. Burning in this type decreased the amount of fir 52 per cent., hemlock 78 per cent., and cedar 80 per cent. The greater mortality of seedlings following burns in this type compared with the pure-fir type is probably due to the shallow, peaty soil characteristic of the regions where only a small proportion of fir occurs in the stand and where little seed can be protected by the soil, as fires very often burn to rock. The studies indicate that burning in hemlock-cedar mixtures will increase the percentage of fir, but decrease the total amount of reproduction to a very great degree, and in many cases make a satisfactory natural regeneration very doubtful.

On account of the great area to be covered, the many variations in type and character of country, and the careful details necessary to the work, it was only possible during the season to secure information sufficient to show the tendency of the various types in their reactions to logging under different soil, climatic and topographic conditions. Further detailed studies will be necessary to establish definitely the relation between the various single factors and the reproduction of the stand.

Some 40,000 to 60,000 acres are cut over annually on the Coast alone, the replanting of which would require an annual budget of $750,000 to $1,250,000. Can this expenditure be avoided and a new crop still assured is the problem facing our investigators. If we are to depend on natural regeneration, what is to be required of the logging operator that will be practicable and effective for ensuring seed-supply, a satisfactory seed-bed and protection from the hazard of the operation?

Following on preliminary survey of the year, plans are being developed for the establishment of Forest Experimental Stations, when still closer study can be given to these important subjects.

FOREST ENTOMOLOGY AND PATHOLOGY.

During the spring of 1923 the work of controlling the epidemic of bark-beetles which is infesting the western yellow pine was continued. This control has been carried on since 1920. The following areas were worked over during the year:—

(1.) *Voght Valley.*—A recleaning of areas worked during 1922 and an extension to uncontrolled areas adjacent. Total trees treated by felling and burning numbered 1,904, scaling 690 M.B.M.

(2.) *Pike Mountain.*—This area was also worked in 1922. A recleaning and extension was made in 1923, covering 3,120 trees, scaling 1,635 M.B.M.

(3.) *Coutlee Plateau.*—Recleaned and area extended, involving the treatment of 1,352 trees, scaling 144 M.B.M.

(4.) *Twelve-mile.*—An entirely new area of infestation, on which 1,999 trees were treated, scaling 596 M.B.M.

(5.) *Adams Lake, Kamloops District.*—A recleaning of 1921 and 1922 control areas between Momich Creek and the head of the lake, involving the treatment of the following numbers of trees over 5½ square miles: White pine, 238 trees; Douglas fir, 586 trees; lodgepole pine, 8 trees; total, 834 trees.

(6.) *Midday Valley.*—A crew hired by the Nicola Pine Mills, Limited, but technically supervised by the Forest Entomologist and Forest Branch officers, treated 1,435 trees on the south side of Midday Creek, scaling 143 M.B.M.

Additional control-work was done by the holders of Timber Licences 12907, 12908, and 12909 under direction and technical supervision of the Forest Entomologist and Forest Branch officers.

The total cost of the work was $16,952.62, or $2.02 per tree.

The work was carried on as previously under the direction of Ralph Hopping, of the Division of Entomology, Ottawa. Some excerpts from his annual report are interesting and throw considerable light on this problem:—

"Epidemics of forest insects, generally bark-beetles, have caused much loss in the pine areas of British Columbia since, or at least shortly after, logging operations commenced. Losses undoubtedly occurred before this period due to infestations which were the result of fires and wind-thrown timber, but these epidemics were few and far between. Our history of these outbreaks all over the world show that epidemic losses result from upsetting the balance provided by nature. In our logging operations we have upset this balance. For instance, the logging operations in Europe during the war have resulted in epidemics which are now being controlled, and must be controlled, before their forests can be re-established. This is true not only in France, but also in England.

"The Provincial losses, although existing in white pine, spruce, Douglas fir, and balsam types of timber, have been greatest in lodgepole and yellow pine types, especially in the latter. About 1912 an epidemic infestation started in yellow pine 5 miles from Princeton, which in seven years resulted in the loss of about 130,000,000 feet, board measure, of yellow pine (*Pinus ponderosa*) before it died out, due probably to the slow increase of parasitic and predaceous enemies. The highest percentage of yellow pine killed on 1 square mile was 90 per cent., the lowest 40 per cent. Dr. J. M. Swaine visited this area several times between 1913 and 1919, as well as the areas around Merritt, which were just beginning to be epidemic."

An extract from the Report of the Dominion Entomologist for the year ended March 31st, 1915, page 29, gives an idea of the situation at that time, four years before any control-work was undertaken.

"The bark-beetle infestation in yellow pine in the Okanagan District is more extensive than at this time last year, and has spread rapidly in some parts of the infested area, while at others, notably about Princeton, the spread appears to be less rapid than during the season of 1913. The infested region surrounds Okanagan Lake and extends as far west as Princeton and Nicola. The bark-beetles causing this outbreak, *Dendroctonus monticolæ* and *Dendroctonus brevicomis*, are not known to be causing serious damage east of the divide between Okanagan Lake and the Arrow Lakes; but their appearance in any body of yellow pine, black pine, or western white pine is to be expected sooner or later wherever these trees occur in large stands in British Columbia. Isolated dying trees in considerable numbers or clumps of dying trees of these species should receive prompt attention. In the districts which have been infested longest the destruction is enormous."

Causes of Epidemic Infestations.—"The great loss already caused by the bark-beetle outbreaks and the apparent certainty of still greater destruction demands vigorous control measures in many districts. The proper disposal of pine-slash is a very important factor, for the beetles frequently breed to immense numbers in such abundant supplies of breeding material and spread thence into the green timber. It should be a settled policy in British Columbia *to burn all pine-slash each season between October and May*, as an aid to bark-beetle control. The activity of other species of bark-beetles in spruce and Douglas fir will apparently soon render the burning of spruce and fir slash equally necessary."

During the period of the writer's control-work in the Western United States there were numerous examples of epidemics occurring from the non-burning of yellow-pine slash. In the Tres Ritos (Three Rivers) District of Northern New Mexico a timber-sale was made to a lumber company to manufacture lumber and ties. The sale covered four tributaries of the river, which we will call 1, 2, 3, and 4. The saw-timber was marked for cutting. The lumber

company then cut the ties from 1, 2, and 4, but did not cut the saw-timber marked. At the end of three years this saw-timber marked for cutting was nearly all dead except in tributary 3, where no tie-timber was cut. Tributary 3 was between tributaries 2 and 4. In other words, the epidemic infestation existed only in the tributaries where the slash from the tie-cutting was left and not burned. Again, in California a power company slashed the reservoir-site and left it unburned. During the next three years the pine timber on the mountain above was about 80 per cent. killed from *Dendroctonus* infestation starting in the reservoir slash, as evidenced by the infestation spreading fan-shaped from the slash, as well as the evidence of the breeding of *Dendroctonus* in the slash the first year after cutting.

Here in British Columbia the epidemics have followed the centres of lumbering operations, epidemics first occurring in our yellow pine west of Okanagan Lake, then at Princeton, and finally in the Coldwater near Merritt.

Outside of a few infestations caused by wind-thrown timber and trees weakened by fire, we may designate two causes as chiefly responsible for our epidemic infestations: (1) Sawlogs left in the bush; (2) unburned slash.

Epidemics caused by slash—i.e., cull logs, tops, and *sawlogs left on cut-over land*—do not immediately become epidemic. The rise of the infestation is at first slow, but after several years it begins to increase rapidly. To the ordinary observer the killed area, therefore, does not become noticeable until three or four years after the logging operation. Consequently areas of infestation are continually appearing, either contiguous to cut-over areas or from the natural comparatively slow spread from uncontrolled infestations, which have already started from past logging operations. Certainly no one factor, even unburned slash, has been as responsible for causing epidemics as that of leaving sawlogs in the bush over one year. Every year to the present this happens, not a few logs, but often 200,000 or 300,000 feet, board measure, to 1,000,000 or 1,500,000 feet. *No control operations can be thoroughly successful until these two causes are absolutely eliminated.*

The lumber companies are regularly penalized, paying not only for the logging operations, but double stumpage for sawlogs they never get to the mill. *No penalty should be too great for neglect to utilize sawlogs already cut.*

Control.—While the two factors, the leaving of sawlogs in the bush and the non-burning of slash in the past, have caused the control-work to be not as effective as it should be, nevertheless an indication of the effectiveness may be shown in the remark of one of the oldest logging contractors in the Midday Valley, who said, "If no insect-control work had been done here, I am convinced we should not be logging to-day in the Midday." And this man thought our insect-control work when we began in 1920 to be "bunk," as he expressed it.

The area on the west side of the Coldwater, including the Midday Valley but not Spius Creek, was estimated to contain about 200,000,000 feet of yellow pine, of which at least 20,000,000 has been killed, 10,000,000 of which has been cut and burned by direct control operations; and probably between 40,000,000 and 45,000,000 cut and milled. There is therefore over 100,000,000 feet yet to be cut.

In the Aspen Grove area on the east side of the Coldwater, including Pike Mountain, is an estimated stand of 300,000,000 feet, of which about 5,000,000 has been killed and 5,000,000 cut and milled.

J. W. Munro, D.Sc., Entomologist, Forestry Commission, London, England, substantiates the findings of Mr. Hopping. He states:—

"The importance of the bark-beetle problem in Canada has long been recognized, and to judge from the large output of literature from Canada and the United States, one might justifiably assume that the North American bark-beetles were a race apart in their capacity for destruction. It is therefore extremely interesting to find that while a vast amount of timber is killed by bark-beetles, especially by members of the genus *Dendroctonus*, the conditions under which these losses occur are remarkably similar to those which favour bark-beetle outbreaks in Europe, and that except that they must be conducted on a larger scale, the same control measures are effective in Canada as are employed in Europe.

"The chief causes of bark-beetle outbreaks are forest fires, extensive felled or logged areas, wind and snow storms, and the presence in the forest of a high proportion of mature or over-mature slow-growing trees. This last factor affecting bark-beetle infestation is not always sufficiently realized, and it may be of interest to note that the recent outbreak of the spruce

bark-beetle (*Ips typographus*) in the Salzburg District in Austria has recently been traced to a severe wind-storm which occurred in 1916, and resulted in the development of an attack which, aided by warm weather, spread by means of mature and overmature spruce growing on first-class quality soil. One could almost apply Forstmeister Lichtenberg's account of the Austrian outbreak to that which the delegates to the Canadian Conference saw in the Merritt District of the Dry Belt, and my belief is that, except in extent, bark-beetle infestations in Canada in no way differ from similar outbreaks in Europe. I feel convinced that the bark-beetle problem in Canada and in Europe, and probably also in the Himalayas, is almost wholly a question of clean forestry. That view is by no means a new one. It was held by Altum and Nordlinger forty years ago, but it appears to have found little support in North America until comparatively recently. The fact is that we know more of the factors affecting bark-beetle increase, in temperate regions at least, than we do of those affecting any other forest insects, and the most important factor in this respect is the accumulation of large quantities of material suitable as food and breeding-grounds. Abnormal supply may be produced in various ways—fellings are the chief source of it in Europe, forest fires in Canada—but any factors which reduce the vigour and vitality of the forest trees may produce it, and the bark-beetle question has been the first to indicate that in forest entomology the forest conditions must be studied as closely as the insect pests themselves.

"It is well known that the bark-beetles prefer sickly or felled trees to those in full vigour, but what particular attributes such sickly or felled trees possess which are so attractive to the bark-beetles we do not know.

"Mr. Hopping's work in British Columbia undoubtedly shows that improved logging methods, removal of overmature timber, and better forest management are the chief and only practicable means of preventing bark-beetle outbreaks."

Enough has been said to show the effect on the spread of these insects of logging and the leaving of cut logs or logging-slash in the woods. In order that the direct control-work might not be negatived, the Department passed the following regulations governing the logging of timber or special timber licences in the yellow-pine region of the Vernon District:—

1. Notice in writing of the intention to cut must be given the Forest Branch before cutting begins on any special timber licence.

2. Forest officers may enter upon any special timber licence and mark or otherwise designate the infested trees that must be cut during the course of logging.

3. On special timber licences where logging operations are being carried on, trees so designated must be cut and disposed of in one of the following ways:—

(*a.*) If in the opinion of the operator the tree will not produce merchantable lumber, the tree, including limbs and the bark on the stumps, must be burnt so as to consume the bark and outer layers of wood, in which there may be insects, and at such times and in such manner as directed by the District Forester.

(*b.*) Otherwise the logs shall be immersed in water, or sawn into lumber and the bark burned immediately or removed from the woods as provided in section 4.

4. All logs cut on any special timber licence after April 1st of any year must be removed and milled or floated before April 1st of the succeeding year. Exception to this rule may be made in the case of logs declared by a competent forest officer to be free from infestation.

5. Slash resulting from any operation must be piled for burning concurrently, so far as practicable, with the cutting of the timber, and all slash and debris must be burned by the operator at his own expense, when instructed to do so by the District Forester.

6. Stumps must be utilized to as low a diameter as practicable and must not be cut higher than the diameter of the tree at the point where it is cut, and in no case higher than 18 inches, except in unusual cases. The bark from stumps infested with bark-beetles must be removed and burnt.

7. Penalties for the contravention of these regulations are incorporated in Part XII., sections 132 to 135, of the "Forest Act," being chapter 17 of the Statutes of 1923.

White-pine Blister-rust.—Following the preliminary scouting-work carried on during 1922 to discover the extent of the spread of white-pine blister-rust, a full season was occupied by the scouts covering the pine-belt in the Interior of the Province. As a result it was found that the rust had spread over the Interior west of the Columbia River Valley. It was found on white pine in the vicinity of Canoe, Revelstoke, and Beaton, but on the alternate host (*Ribes*)

it was found scattered along the main line of the C.P.R. throughout the entire Okanagan and Shuswap Valleys and along the Arrow Lakes.

The scouting during 1923 confirmed the location of infection as above, and also found it widely scattered on *Ribes* south as far as Nelson, Kootenay Lake, and Grand Forks. Infection on *Ribes* has been found more than 100 miles from the nearest white pine, which shows conclusively that the spread of æciospores is practically unlimited in its range. It has not been shown, however, that the teliospores will spread more than a few hundred yards. The cultivated black currants are the most susceptible to infection, and the long-distance spread of the disease seems to be from pine to black currant. The other cultivated species as well as the native species will, however, become infected when in close proximity to infected white pines.

There are two courses we might pursue, one of which is known as "direct control," in which all *Ribes*, both wild and cultivated, are eradicated in and near valuable white-pine stands, and the other the eradication of cultivated *Ribes*. It seems inadvisable to start on an active campaign along either course until further information is obtained regarding the location of valuable stands of white pine, especially white-pine reproduction, and figures as to the number and value of cultivated black currants in close association with white pine. It is proposed during the season of 1924 to obtain the required information.

I have here to gratefully acknowledge the work of Mr. A. T. Davidson, of the Pathologist Bureau, Department of Agriculture, Ottawa, who supervised the survey, and to Dr. H. T. Gussow, Botanist for the Department of Agriculture, for consultation and advice.

FOREST RECONNAISSANCE.

During the field season 1923 six projects were completed, and a seventh, the survey of the timber of a complete watershed as yet untouched by operations, well started. These projects are discussed in some detail below. They may be segregated into classes as follows:—

(1.) *Cruising.*—Queen Charlotte Island Cruises; Kootenay Lake Cruise; Horsefly Cruise; Fraser River Cruise.

(2.) *Exploratory Reconnaissance.*—Area west of Pacific Great Eastern Railway; area east of Pacific Great Eastern Railway.

CRUISING.

Queen Charlotte Cruise No. 1.—The Queen Charlotte Islands have long been noted for their fine stands of spruce and the more accessible timber is held under licence. The islands are, however, remote from manufacturing centres, necessitating a long tow over treacherous waters if logs are to be marketed at existing plants. This has limited operations up to the present. With some prospect of greater activity in the lumber business on the islands and the prospect of one or more mills being established thereon, application for practically all the remaining Crown timber on Skidegate Inlet and the east coast of Moresby Island was received early this year. These applications, consisting of comparatively small isolated blocks, constituted the area covered by this cruise. Fifteen areas were covered, aggregating 13,549 acres, 4,119 acres of which do not carry a merchantable stand. The total estimate on the fifteen sales was 228,505,000 feet, board measure—45 per cent. spruce, 44 per cent. hemlock, and 11 per cent. cedar.

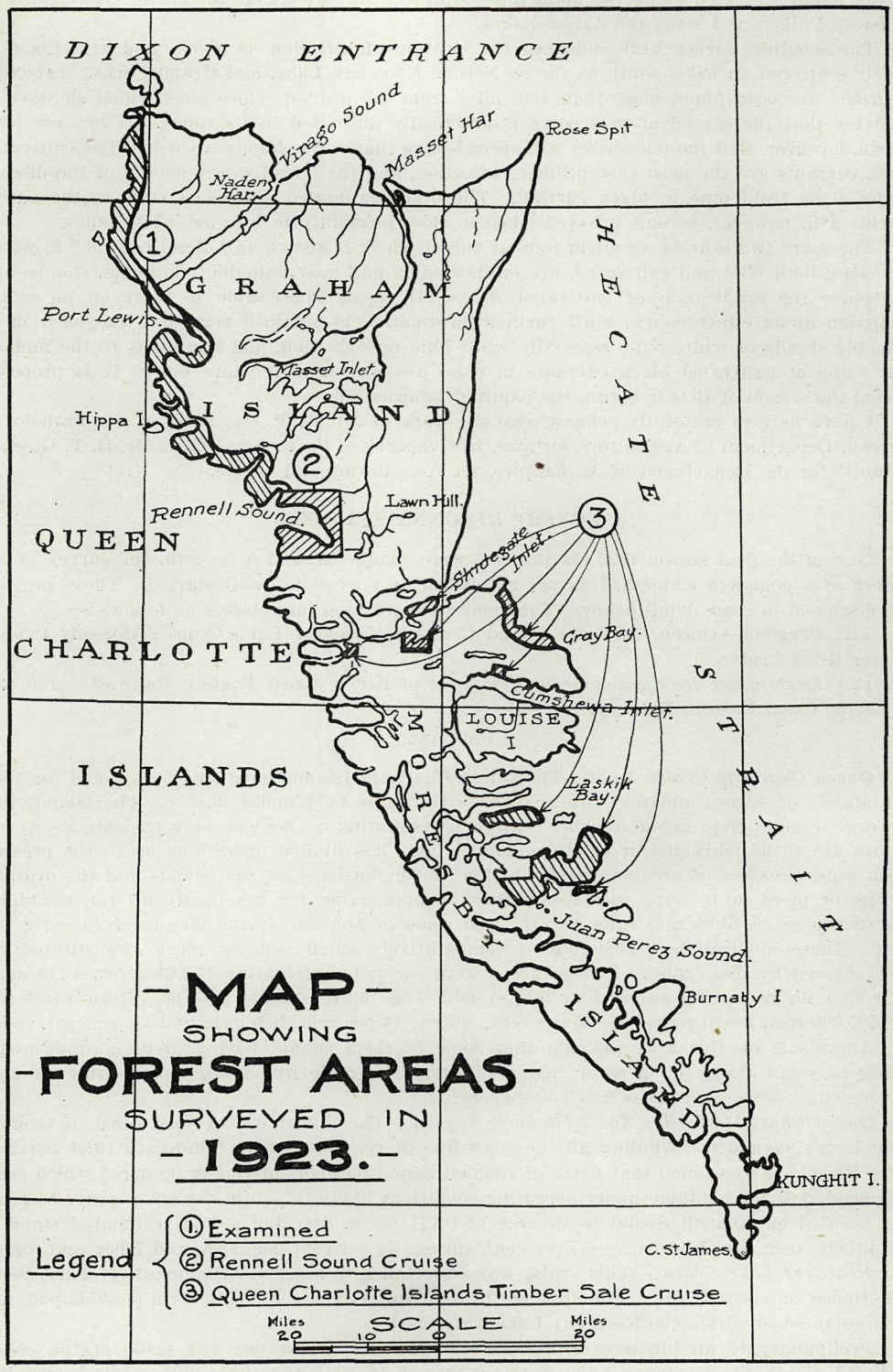
Appraisals on this area indicate that some of them cannot be logged at a profit owing either to small stand per acre or inaccessibility. The majority, however, constitute as good logging chances as other areas now being operated.

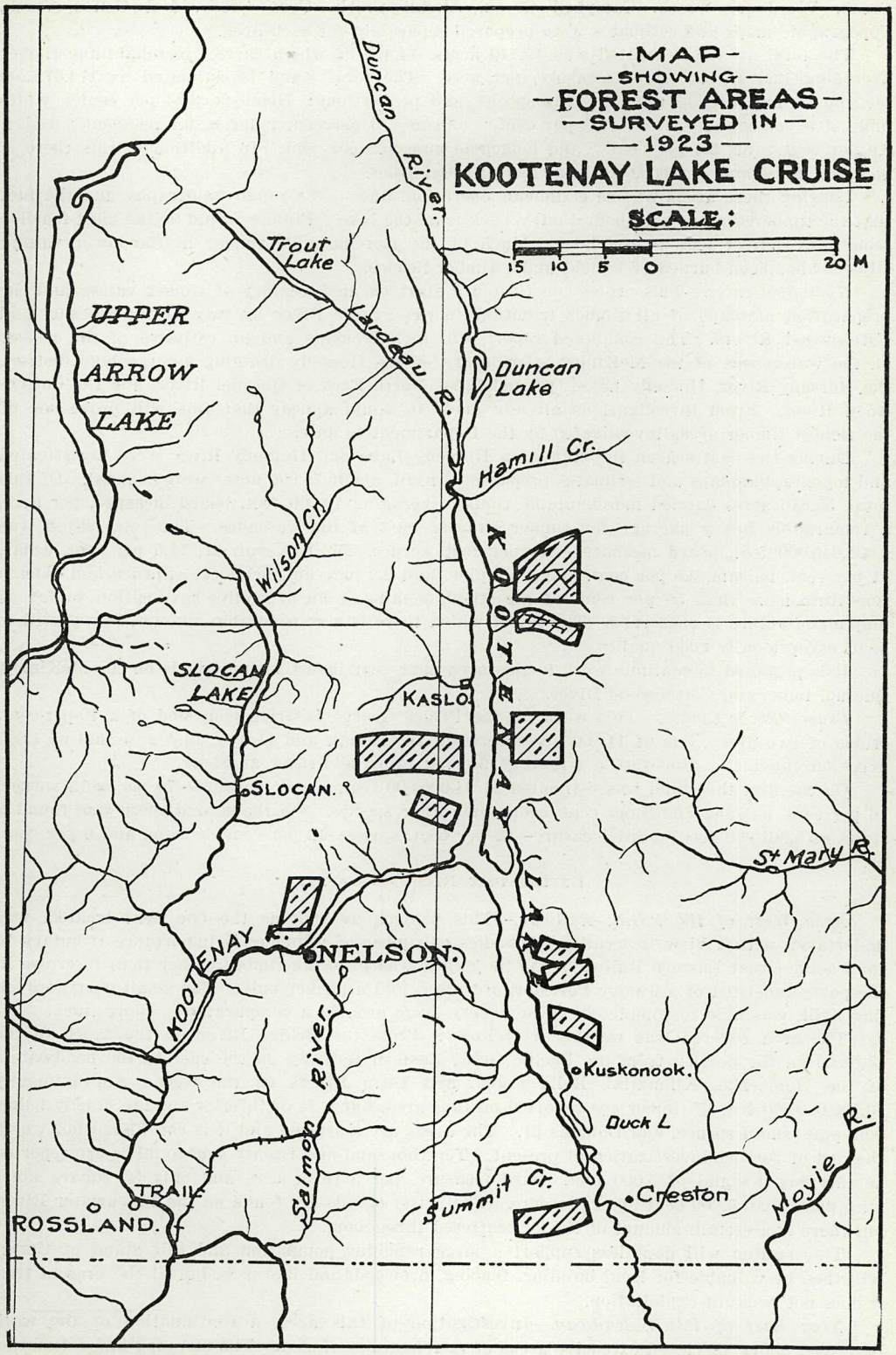
Queen Charlotte Cruise No. 2 (Rennell Sound).—The timber on the west coast of Graham Island was examined, including all the coast-line of the island from Skidegate Inlet north to Cape Knox. It was found that north of Rennell Sound no areas of timber occurred which could be considered merchantable under operating conditions likely to obtain for many years to come.

Located on Rennell Sound is an area of 9,171 acres, carrying a total estimated stand of 235,494,000 feet, board measure—55 per cent. spruce, 38 per cent. hemlock, and 7 per cent. cedar.

Kootenay Lake Cruise.—This cruise was undertaken to ascertain the quantity of merchantable timber on vacant Crown land adjacent to Kootenay Lake as a supply for a possible pulp-mill to be established within the Kootenay Lake watershed.

Preliminary to an intensive cruise an extensive reconnaissance was made of the creeks included within the Kootenay Lake drainage system in 1921 and 1923. The areas warranting closer investigation were covered by a 5-per-cent. cruise this season. They included Graham


DIXON ENTRANCE
Virago Sound
Masset Har
Rose Spit
Naden Har
GRAHAM
ISLAND
Port Lewis
Masset Inlet
Hippa I
Rennell Sound
Lawn Hill
QUEEN
CHARLOTTE
ISLANDS
Shrodegate Inlet
Gray Bay
Cumshewa Inlet
LOUISE I
Laskik Bay
Juan Perez Sound
Burnaby I
KUNGHIT I.
C. St James
HECATE STRAIT
MAP
SHOWING
FOREST AREAS
SURVEYED IN
1923.
Legend
1 Examined
2 Rennell Sound Cruise
3 Queen Charlotte Islands Timber Sale Cruise
SCALE
Miles 20 10 0 Miles 20


-MAP-
-SHOWING-
-FOREST AREAS-
-SURVEYED IN-
-1923-
KOOTENAY LAKE CRUISE
SCALE:
15 10 5 0 20 M
Duncan River
Trout Lake
Lardeau R.
UPPER ARROW LAKE
Duncan Lake
Hamill Cr.
Wilson Cr.
KOOTENAY LAKE
SLOCAN LAKE
KASLO
SLOCAN
St Mary R.
KOOTENAY R.
NELSON
Salmon River
Kuskonook
Duck L
Moyie R.
TRAIL
ROSSLAND
Summit Cr.
Creston

Creek, Woodbury Creek, Campbell Creek, Akokli Creek, Corn Creek, and Coffee Creek, Topographic maps and estimates were prepared separately for each area.

The total area investigated was 19,440 acres, 14,491 of which carries merchantable timber averaging 12,000 feet, board measure, per acre. The total stand is estimated as 174,679,200 feet, board measure, in the following species and proportions: Hemlock, 33.4 per cent.; white pine, 20.9 per cent.; spruce, 11.5 per cent.; balsam, 10 per cent.; larch, 9.7 per cent.; cedar, 8.9 per cent.; fir, 5.4 per cent.; and lodgepole pine, 0.2 per cent. In addition to this there is an estimated stand of 5,600,000 lineal feet of cedar poles.

Logging these areas will be a difficult operation, due to the rough topography and the fact that the timbered areas are about 5 miles back from the lake. Flumes would be the most feasible scheme to deliver logs to the lake. Much of the merchantable timber in the lower valleys adjacent has been burned or is held under timber licence.

Horsefly Cruise.—This cruise constituted a start on an inventory of timber values and the preparation of maps of all timber tributary to the Fraser River by way of the Quesnel and Cottonwood Rivers. The completed report will include maps and an estimate of the timber on the watersheds of the McKinley, a tributary of the Horsefly draining a large lake district, the Horsefly River, Horsefly Lake, Quesnel Lake, North Fork of Quesnel River, and the Cottonwood River. From investigations already made it would appear that this will prove one of the richest timber areas investigated by the Department to date.

During the past season the stands on Horsefly Lake and Horsefly River were investigated and topographic maps and estimates prepared. In all, about 75,000 acres were covered. Of this total, 55,876 acres carried merchantable timber averaging 19,000 feet, board measure, per acre, a remarkably heavy average for timber situated east of the Cascades. The total stand was 1,091,646,000 feet, board measure—43.6 per cent. spruce, 25.2 per cent. fir, 11.5 per cent. cedar, 11 per cent. balsam, 6.5 per cent. lodgepole pine, and 2.2 per cent. hemlock. Spruce and balsam constitute more than 50 per cent. of the stand, making it an attractive proposition so far as pulp-manufacture is concerned. The fir, of which there is a considerable amount, is reported to be of exceptionally good quality.

It is proposed to continue work in this area next year investigating stands on the McKinley, Quesnel Lake, and Cottonwood River.

Fraser River Cruise.—This work, in the Prince George District, consisted of a 10-per-cent. cruise of two areas, one of 11,800 acres between Longworth and Dewey, and a second of 1,000 acres on the Little Shuswap, a tributary flowing into the Fraser at Shere.

On the first the stand was estimated at 94,000,000 feet, board measure—79 per cent. spruce, 16 per cent. balsam, and 5 per cent. cedar and other species. On the second there was found a stand of 8,361,000 feet, board measure—82 per cent. spruce, 12 per cent. balsam, and 6 per cent. fir.

EXPLORATORY RECONNAISSANCE.

Area West of the P.G.E. Railway.—This project, as well as the one next treated, was undertaken with a view to locating all bodies of timber of commercial importance tributary to the Pacific Great Eastern Railway. As the object was to locate timber rather than to cruise it, the party consisted of a Junior Forester, a cruiser, and a packer only. The small party, travelling light, was able to completely cover a very large area in a comparatively short time.

The area covered was roughly as follows: From the Bridge River on the south to the Chilako on the north; from the Pacific Great Eastern Railway on the east to the headwaters of the Homathko, Klinaklini, Bella Coola, and Dean Rivers on the west. Approximately 13,500,000,000 feet of timber are reported on that area, but it is of inferior species, chiefly lodgepole pine, small spruce, and Douglas fir. The areas are scattered and it is considered not worth the cost of further investigation at present. Ten thousand and twenty square miles are reported as carrying a stand of 5,000 feet, board measure, per acre or less, and only 55 square miles with more than 5,000 board-feet per acre. The better stands are found on the Blackwater River, but there is a certain amount of timber scattered throughout.

This section will doubtless support a large ranching population and this stand of timber will then be valuable for local building, fencing, firewood, and like uses, but at the present time it does not warrant exploitation.

Area East of P.G.E. Railway.—Investigation of this area, a continuation of the work described above, disclosed extensive areas of merchantable timber. The mapping and estimating

of these stands required a longer time than spent on the area west of the Pacific Great Eastern Railway, and it was found impossible to complete the work before the end of the field season. The remainder of the area will be covered during the winter of 1923–24, after which sufficiently definite data will be at hand to warrant plans for the accurate cruising of the more accessible stands.

The total area covered extends roughly from the McKinley basin on the south to Barkerville on the north, and from the Pacific Great Eastern Railway on the west to Isaac Lake, Swamp River, Ghost Lake, and the head of Quesnel Lake on the east. The south half of this area, already carefully covered by extensive reconnaissance, including Swamp River, Cariboo Lake, and Quesnel Lake, is reported to be in part as follows:—

	Acres.	M. Ft. B.M.
Vacant Crown timber land	235,180	3,769,720
Timber limits	79,280	2,050,240
	314,460	5,819,960
Non-merchantable timber land	70,900	
Burned	121,700	
Water	99,100	

Species occurring in order of abundance are as follows: Spruce, cedar, hemlock, balsam, fir, lodgepole pine.

Average stand per acre appears to be about 15,000 board-feet, which an accurate cruise may raise, as the stand average on the Horsefly River, which adjoins, averages 19,000 board-feet per acre.

FOREST RESERVES.

The only reserve created during the year was the Inkaneep Forest, covering 244,480 acres in the south-eastern portion of the Okanagan Valley. This reserve, established by proclamation under section 12 of the "Forest Act," serves a double purpose, since it is covered not only with a valuable stand of young timber which will be of future commercial value, but also covers the headwaters of Vaseaux, Sawmill, and Incaneep Creeks, the waters of which are important for irrigation purposes, and the conservation of the timber on the reserve is essential for regulating the stream-flow therein.

Two other areas were prepared for reservation, but which have not yet been set aside. They are:—

The Kettle Valley Forest, covering 1,552,640 acres of the upper valley of the Kettle River, and the Yahk Forest, covering that portion of the Yahk Valley lying north of the International Boundary, covering an area of 490,000 acres.

It might be well here to reiterate that the word "reserve" may create a wrong impression. There is no idea of locking these areas up and withholding them from use, but rather the proclamation dedicates them to the purpose for which they are best suited—timber production—with which may be coupled watershed-protection, prevention of floods, game, and æsthetic purposes.

LUMBER TRADE EXTENSION.

Besides installing an entirely new exhibit at the Canadian National Exhibition, in the form of a bungalow of British Columbia woods, the Trade Extension Branch put up exhibits at Windsor, Ont.; Mount Forest, Ont.; Paris, Ont.; and 518 Yonge Street, Toronto; while an exhibit was prepared for the Canadian Exhibit Train now touring France.

As many as 2,000 people in one hour viewed the British Columbia Timber Exhibit at the Canadian National Exhibition.

A complete grade exhibit of British Columbia commercial woods was installed at the office of the Lumber Commissioner in Toronto and is proving very valuable in educational work amongst architects and the building trade generally.

Thousands of stained British Columbia red-cedar shingles were distributed to architects, builders, and retail lumbermen, and active work carried on in favour of British Columbia shingles as against patent roofing.

Arrangements were made for the manufacture and distribution of a special type of shingle-nail for wholesale distribution in Eastern Canada, with excellent results. The Department arranged for testing these nails and for their introduction to the building trades.

A new booklet, "How to Finish British Columbia Woods," was published and freely distributed amongst all branches of the timber industry, with splendid results.

Experiments in finishing British Columbia woods were continued and architects and builders may now be supplied from our Toronto office with formulæ to meet any shade or tone required.

Feature articles on British Columbia woods were prepared for all the leading lumber and building trade journals and a steady publicity campaign for British Columbia woods has been maintained.

Towards the end of the year, in co-operation with the lumber-manufacturers of the Province, a comprehensive exhibit of British Columbia woods was sent to England for display at the British Empire Exhibition, and a bungalow, constructed throughout of British Columbia woods, is now being erected at Wembley Park, London.

WOODS OPERATIONS.

The year was one of great activity in the woods. The weather was favourable for logging, although many of the camps closed down late in the season, partially on account of fire hazard and partially because of a surplus of logs on the market. The camps remained shut down for about two months, September and October. The production exceeded all previous years by 25 per cent., reaching equivalent to 2,500,000,000 feet B.M. This increase was general throughout the Province, as shown by district records, which are:—

Increase over 1922—	Per Cent.
Cranbrook	11
Nelson	6
Vernon	66
Kamloops	18
Cariboo	90
Fort George	57
Prince Rupert	61
Vancouver	32

Sawlogs show an increase of 36 per cent. and minor forest products 12½ per cent. By species the increase is shown as follows:—

	Per Cent.
Fir	34
Cedar	24
Spruce (all varieties)	40
Hemlock	39
Balsam	83
Yellow pine	41
Larch	13
Others	10

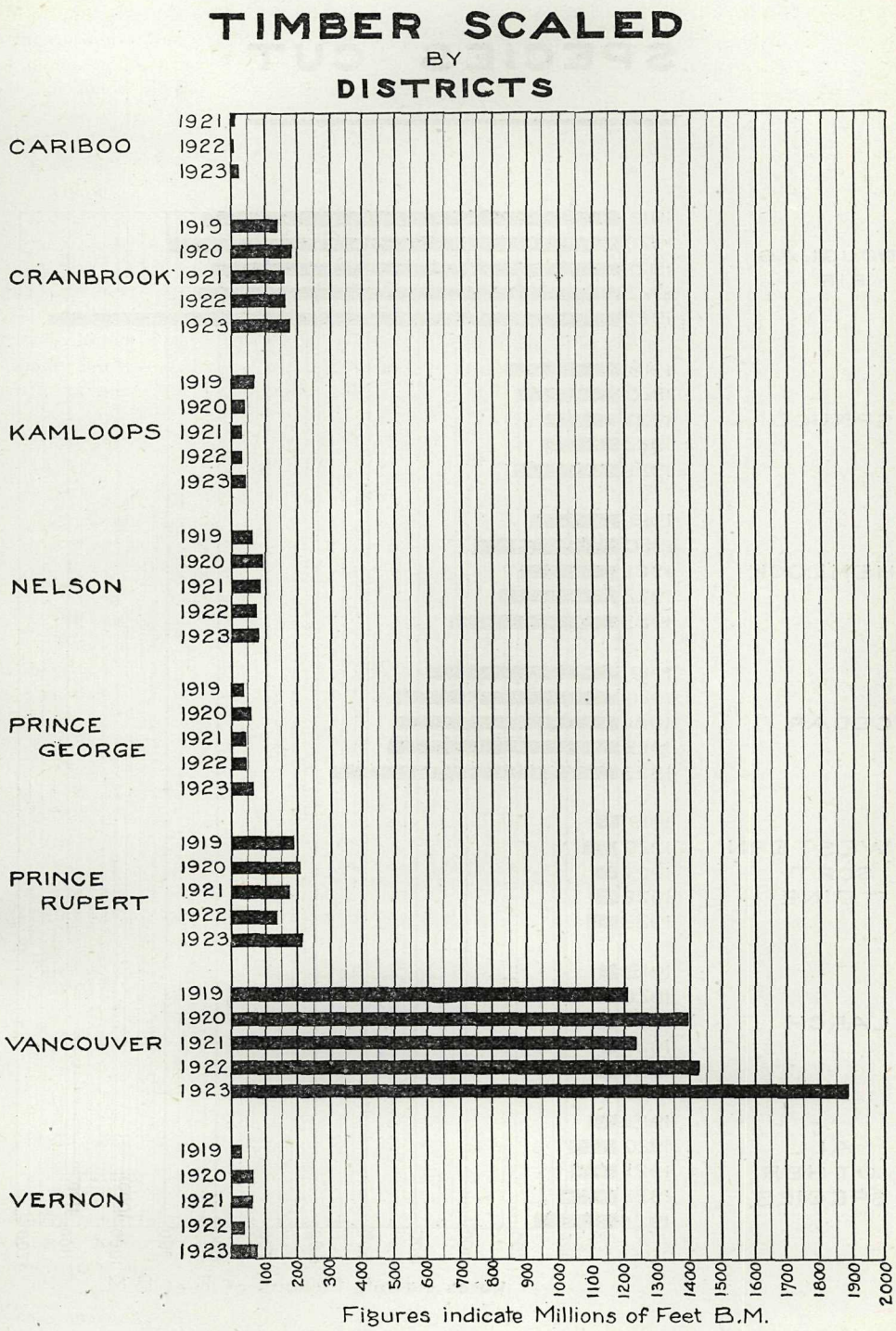
It may be of interest to note what the year's cut represents in proportion to the total stand as estimated by the Commission of Conservation. The following percenages give this information:—

	Per Cent.
Douglas fir	1.5
Cedar	0.7
Spruce	0.3
Hemlock	0.5
Balsam	0.2
Yellow pine	1.4
White pine	1.2
Lodgepole pine	0.4
Larch	1.4

In presenting these figures it must be pointed out that the estimates of the Commission include all grades and qualities that it may be expected to log without regard of present-day logability. We are to-day logging the more accessible and better shows, so the real depletion of our original timber stand is faster than the above percentages indicate.

These figures also show that we are cutting our better timber faster than the so-called inferior species, but that the inferior species are gradually growing in percentage.

To maintain this output the number of operations increased from 2,652 to 3,316, or 25 per cent. Most of this increase was in the smaller class of operators.


TIMBER SCALED
BY
DISTRICTS
CARIBOO
1921
1922
1923
CRANBROOK
1919
1920
1921
1922
1923
KAMLOOPS
1919
1920
1921
1922
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NELSON
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PRINCE GEORGE
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PRINCE RUPERT
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VANCOUVER
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VERNON
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1100
1200
1300
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1500
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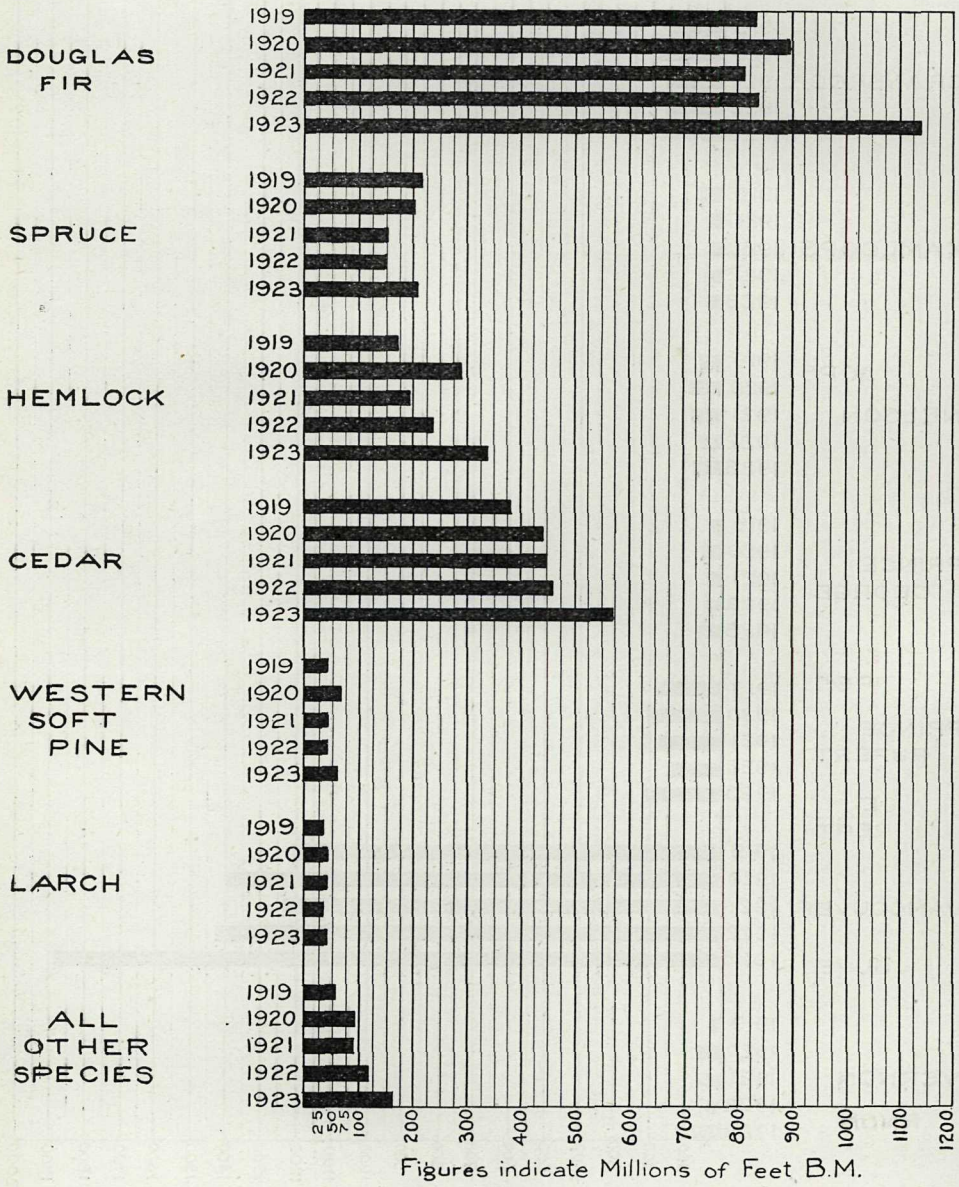
1700
1800
1900
2000
Figures indicate Millions of Feet B.M.

SPECIES CUT


DOUGLAS FIR
SPRUCE
HEMLOCK
CEDAR
WESTERN SOFT PINE
LARCH
ALL OTHER SPECIES
1919
1920
1921
1922
1923
25
50
75
100
200
300
400
500
600
700
800
900
1000
1100
1200
Figures indicate Millions of Feet B.M.

Timber scaled in British Columbia in 1923 (by Months and Districts).

		Cranbrook.	Fort George.	Cariboo.	Kamloops.	Nelson.	Vernon.	Prince Rupert.	Vancouver.	Total Logs, M.B.M.	Total Lineal Feet, Thds.	Total Cords.	Total Ties.
January	logs, M.B.M.	7,398	2,576	17	727	1,561	2,398	10,345	75,495	100,517	.....	.....	.....
"	lineal ft., thds.	80	24	.....	15	151	71	91	259	.....	691	.....	.....
"	cords	4,798	754	124	269	873	215	.....	5,883	.....	.....	12,916	.....
"	ties, number	49,361	58,124	104	.....	2,181	.....	107	.....	.....	.....	.....	109,877
February	logs, M.B.M.	10,838	1,007	.....	447	1,672	3,387	4,642	127,305	149,298	.....	.....	.....
"	lineal ft., thds.	22	10	.....	87	378	71	58	307	.....	933	.....	.....
"	cords	2,440	326	.....	199	691	232	.....	5,699	.....	.....	9,587	.....
"	ties, number	37,837	178,441	.....	2,832	2,588	.....	61,101	.....	.....	.....	.....	282,799
March	logs, M.B.M.	6,017	4,897	.....	5	.....	3,910	5,366	117,881	138,076	.....	.....	.....
"	lineal ft., thds.	91	74	.....	55	.....	35	72	108	.....	435	.....	.....
"	cords	2,393	203	.....	143	.....	283	24	6,541	.....	.....	9,587	.....
"	ties, number	36,681	175,007	.....	.....	.....	4,487	32,852	.....	.....	.....	.....	249,027
April	logs, M.B.M.	7,594	2,997	.....	449	2,411	5,444	7,783	168,744	195,422	.....	.....	.....
"	lineal ft., thds.	25	20	.....	87	421	127	213	353	.....	1,246	.....	.....
"	cords	6,425	366	.....	48	1,034	611	131	12,322	.....	.....	20,937	.....
"	ties, number	22,490	212,219	.....	27,935	7,730	2,066	207,584	.....	.....	.....	.....	480,024
May	logs, M.B.M.	7,528	1,667	.....	.....	8,143	6,940	7,694	179,657	211,629	.....	.....	.....
"	lineal ft., thds.	58	53	.....	.....	451	14	56	340	.....	972	.....	.....
"	cords	1,937	266	.....	.....	2,286	10	53	31,518	.....	.....	36,070	.....
"	ties, number	49,449	61,605	.....	.....	68,264	385	34,648	.....	.....	.....	.....	214,351
June	logs, M.B.M.	11,965	2,936	.....	7,400	5,302	6,342	18,410	198,664	251,019	.....	.....	.....
"	lineal ft., thds.	93	19	.....	111	696	207	17	642	.....	1,785	.....	.....
"	cords	1,565	64	.....	88	1,283	48	326	23,759	.....	.....	27,133	.....
"	ties, number	15,000	91,057	.....	26,541	24,479	4,418	76,091	29,340	.....	.....	.....	266,926
July	logs, M.B.M.	.....	3,565	198	305	4,692	5,159	19,375	149,576	182,870	.....	.....	.....
"	lineal ft., thds.	.....	24	.....	149	281	81	300	417	.....	1,252	.....	.....
"	cords	.....	328	105	4	1,784	155	178	25,047	.....	.....	27,601	.....
"	ties, number	.....	19,707	26,513	8,690	12,103	2,098	24,265	7,849	.....	.....	.....	101,225
August	logs, M.B.M.	23,179	3,225	329	13,141	4,010	4,145	13,897	199,466	261,392	.....	.....	.....
"	lineal ft., thds.	49	81	.....	233	316	174	218	1,006	.....	2,077	.....	.....
"	cords	3,440	274	95	.....	200	355	32	18,314	.....	.....	22,710	.....
"	ties, number	404,543	5,050	890	17,505	21,239	4,079	87,329	7,912	.....	.....	.....	548,547
September	logs, M.B.M.	16,408	5,239	22	.....	4,014	3,325	25,379	127,917	182,304	.....	.....	.....
"	lineal ft., thds.	.....	61	4	.....	501	41	124	701	.....	1,432	.....	.....
"	cords	347	.....	55	.....	383	76	171	10,977	.....	.....	12,009	.....
"	ties, number	131,393	8,729	597	.....	6,350	1,137	77,318	967	.....	.....	.....	226,491
October	logs, M.B.M.	9,349	2,791	22	3,264	4,079	5,222	27,522	144,663	196,912	.....	.....	.....
"	lineal ft., thds.	49	20	.....	126	198	115	60	853	.....	1,421	.....	.....
"	cords	1,915	174	145	7	288	302	5,834	10,798	.....	.....	19,463	.....
"	ties, number	119,759	.....	.....	.....	7,160	3,540	2,592	10,058	.....	.....	.....	143,109
November	logs, M.B.M.	12,571	4,536	313	.....	3,335	1,919	22,958	141,229	186,861	.....	.....	.....
"	lineal ft., thds.	228	4	19	.....	1,104	139	283	556	.....	2,333	.....	.....
"	cords	1,457	106	22	.....	38	154	308	7,820	.....	.....	9,905	.....
"	ties, number	84,456	.....	981	.....	10,587	1,451	.....	7,570	.....	.....	.....	105,045
December	logs, M.B.M.	13,911	2,028	118	1,465	1,200	5,819	19,915	136,472	180,928	.....	.....	.....
"	lineal ft., thds.	38	27	4	464	416	367	226	752	.....	2,294	.....	.....
"	cords	1,998	48	59	178	3,566	231	199	7,434	.....	.....	13,713	.....
"	ties, number	55,482	1,858	600	.....	11,585	602	58,743	2,500	.....	.....	.....	131,370
Totals for year	logs, M.B.M.	126,758	37,464	1,019	27,203	40,419	54,010	183,286	1,767,069	2,237,228	.....	.....	.....
"	lineal ft., thds.	733	417	27	1,327	4,913	1,442	1,718	6,294	.....	16,871	.....	.....
"	cords	28,715	2,909	605	936	12,426	2,672	7,256	166,112	.....	.....	221,631	.....
"	ties, number	1,006,451	811,797	29,685	83,503	174,266	24,263	662,630	66,196	.....	.....	.....	2,858,791

Total scaled, 2,521,735,281 feet B.M.

SPECIES CUT IN 1923.

Forest District.	Douglas Fir, M.B.M.	Red Cedar, M.B.M.	Spruce, M.B.M.	Hemlock, M.B.M.	Balsam, M.B.M.	Yellow Pine, M.B.M.	White Pine, M.B.M.	Jack-pine, M.B.M.	Larch, M.B.M.	Cottonwood, M.B.M.	Other Species, M.B.M.	Total, M.B.M.
Cranbrook	77,585	2,841	31,089	154	1,720	10,726	5,119	8,552	38,447	1	....	176,234
Fort George	6,635	2,525	31,511	135	2,579	.....	.....	22,980	.....	4	4	66,373
Cariboo	2,176	40	28	.....	.....	2	.....	139	.....	....	....	2,385
Kamloops	21,324	8,152	2,563	.....	108	2,209	2,544	15	.....	....	....	36,915
Nelson	9,727	32,406	2,505	7,631	69	5,449	13,168	.....	5,557	80	50	76,642
Vernon	11,529	3,570	1,770	254	.....	43,404	.....	1,893	883	11	...	63,314
Totals, Interior	128,976	49,534	69,466	8,174	4,476	61,790	20,831	33,579	44,887	96	54	421,863
Prince Rupert	5,651	29,970	98,030	49,004	13,920	.....	.....	19,235	.....	364	37	216,211
Vancouver	1,004,522	494,111	41,521	275,039	53,142	.....	10,352	677	.....	4,075	222	1,883,661
Totals, Coast	1,010,173	524,081	139,551	324,043	67,062	.....	10,352	19,912	.. .	4,439	259	2,099,872
Grand totals, 1923	1,139,149	573,615	209,017	332,217	71,538	61,790	31,183	53,491	44,887	4,535	313	2,521,735
Grand totals, 1922	846,171	461,265	149,247	238,891	38,904	43,630	34,405	43,774	39,759	2,869	243	1,899,158
Grand totals, 1921	821,025	450,368	151,792	195,005	32,023	41,869	18,838	30,785	45,245	2,961	106	1,790,017

TOTAL AMOUNTS OF TIMBER SCALED IN BRITISH COLUMBIA FOR YEARS 1922–23.

(Comparative Statement in Board-feet.)

Forest District.	1922.	1923.	Gain.
Cranbrook	159,200,392	176,233,923	17,033,531
Fort George	42,030,343	66,372,353	24,342,010
Cariboo	1,262,836	2,384,447	1,121,611
Kamloops	31,255,790	36,915,462	5,659,672
Nelson	72,201,521	76,642,450	4,440,929
Vernon	37,992,757	63,314,250	25,391,493
Totals, Interior	343,873,639	421,862,885	77,989,246
Prince Rupert	134,434,962	216,211,036	81,776,074
Vancouver	1,420,849,672	1,883,661,360	462,811,688
Totals, Coast	1,555,284,634	2,099,872,396	544,587,762
Totals for B.C.	1,899,158,273	2,521,735,281	622,577,008

LOGGING INSPECTION.

The inspection of logging operations is undertaken by the Forest Branch in order to prevent trespass on areas not controlled by operators, to prevent infractions of the "Marking Act," and to see that regulations and contract conditions are carried out. Reports received during the year number a total of 6,892, an increase of 48 per cent. over 1922, or 265 per cent. over 1919.

This inspection accounted for securing information on 105 cases of trespass against the Crown, on which penalties to the extent of $27,860.08. In addition, forty-five cases of trespass on privately controlled timber were found and reported to owners for settlement.

LOGGING INSPECTION, 1923.

Forest District.	Operations.				No. of Inspections.
	Timber-sales.	Hand-loggers' Licences.	Leases, Licences. Crown Grants, and Pre-emptions.	Totals.	
Cariboo	22	...	33	55	58
Cranbrook	55	...	42	97	135
Kamloops	43	...	120	163	266
Nelson	115	...	240	355	561
Fort George	107	...	296	403	722
Prince Rupert	265	125	277	667	1,333
Vancouver	315	41	933	1,289	3,279
Vernon	88	...	199	287	538
Totals, 1923	1,010	166	2,140	3,316	6,892
Totals, 1922	914	159	1,579	2,652	4,654
Totals, 1921	691	186	1,331	2,208	4,053
Totals, 1920	605	220	1,961	2,796	2,703
Totals, 1919	365	200	757	1,322	1,884

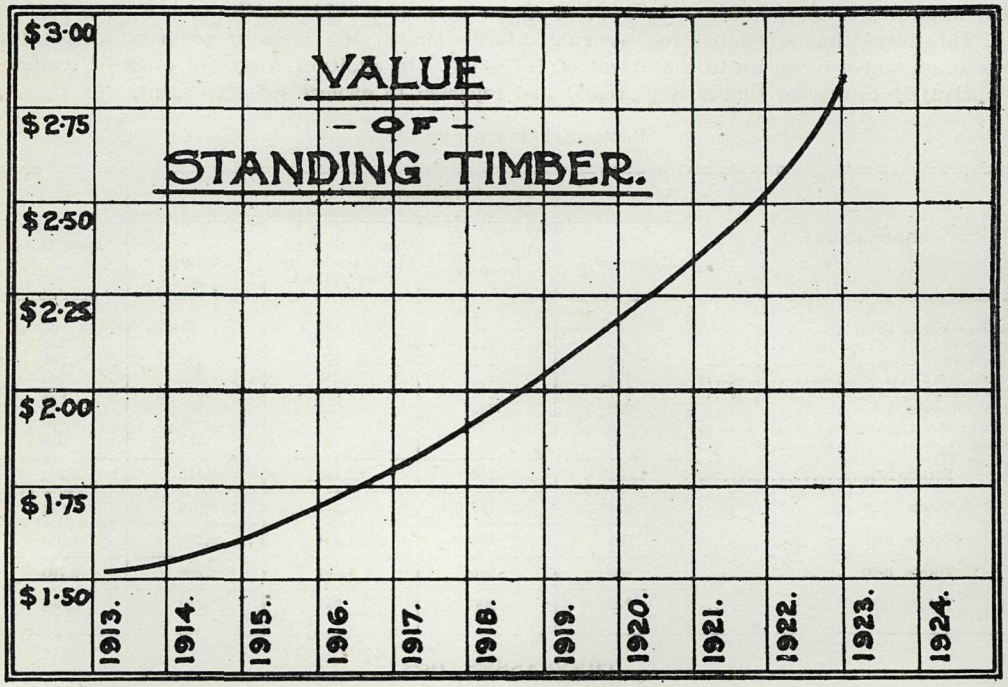
TRESPASSES, 1923.

Forest District.	No. of Cases.	Areas cut over (Acres).	Quantity cut.				No. of Resulting Seizures.	Amount.
			Feet B.M.	Lineal Feet.	Cords.	Ties.		
Cariboo	8	24	53,653	4,475	145	480	1	$ 264 40
Cranbrook	1	30	160,000	.....	....	.....	..	482 00
Kamloops	2	6	65,000	1,650	....	.....	..	255 00
Nelson	8	44	12,500	5,190	....	5,622	..	817 58
Fort George	7	26	232,691	.....	....	262	..	480 58
Prince Rupert	43	496	1,491,973	48,320	....	13,468	2	5,669 74
Vernon	6	48	294,772	36,378	14	.....	1	1,896 44
Vancouver	30	341	4,402,279	25,189	1,439	250	4	17,994 34
Totals, 1923	105	1,015	6,712,868	121,202	1,598	20,082	8	$27,860 08
Totals, 1922	98	1,059	3,002,881	98,903	2,591	27,022	16	$16,406 30
Totals, 1921	98	1,938	3,222,673	209,395	1,639	21,605	10	$15,924 22
Totals, 1920	73	1,788	4,904,079	104,048	1,882	6,716	10	$17,119 85
Totals, 1919	87	2,454	12,708,365	48,860	88	87,120	8	$21,730 12

TIMBER-SALES.

The sale of Crown timber during the year shows a considerable increase. Eight hundred and fifty-two sales, covering 163,464 acres, were completed, as compared with 671 sales and 108,501 acres the previous year. These sales consist of small fractions and areas adjacent to existing operations or sales for specialized products, such as poles, ties, etc. Sales are made for immediate operation and short terms only. The Branch is not desirous of disposing of any large independent bodies of timber while there is ample private stumpage offering to meet any ordinary requirements.

An increase in stumpage prices equivalent to 20 per cent. is shown for all sales of log material made. The increasing value of timber as it stands in the forest is indicated in the following diagram, based on Government sales, and includes both stumpage and royalty:—



The cut of timber from areas operated under sale remains at approximately 10 per cent. of the total cut for the Province, and for the past year was 204,000,000 feet of sawlogs, 2,750,000 lineal feet of poles, piling, etc., 17,666 cords of bolts and wood, and 856,000 railway-ties. It is of interest to note that most of these railway-ties are made from lodgepole (or jack-pine), a species looked upon with contempt by laymen and until recently considered of no value. One sale made was bid in at 16 cents per tie in addition to royalty, or the equivalent of $5.75 per M. ft. B.M. There are hundreds of thousands of acres of lodgepole-pine stands throughout fne Interior which will provide a large part of railway requirements in the future and which will be an increasing source of industry and revenue for the Province. The revenue from stumpage charged on timber cut for the twelve months was $467,048.15, 25 per cent. over the previous year.

The Branch, in addition to above, cruised and prepared for sale some 228 areas, covering 76,000 acres, contracts for which were not executed. These areas contained equivalent to 560,000,000 feet.

TIMBER-SALES AWARDED BY DISTRICTS, 1923.

District.	No. of Sales.	Acreage.	Saw-timber (Ft. B.M.).	Poles and Piles (Lineal Feet).	No. of Posts.	Shingle-bolts and Cordwood (No. of Cords).	No. of Railway-ties.	Estimated Revenue.
Cariboo	22	2,212	682,000	16,800	.....	585	21,405	$ 3,917 90
Cranbrook	42	8,580	14,066,284	31,800	.....	500	97,261	49,225 72
Fort George	108	22,868	65,008,550	432,250	.....	850	691,123	234,466 38
Kamloops	33	5,126	7,923,691	1,177,040	.....	390	66,250	56,269 90
Nelson	95	13,830	18,446,535	1,986,245	.....	8,185	292,020	119,226 60
Prince Rupert	227	33,457	82,693,915	1,199,405	.....	162	1,054,702	313,812 03
Vancouver	281	67,093	291,604,363*	332,222	.....	11,137	75,000	633,620 83
Vernon	44	10,298	35,972,100	1,058,580	.....	1,341	6,400	103,431 48
Totals, 1923	852	163,464	516,397,438*	6,234,342	.....	23,150	2,304,161	$1,513,970 84
Totals, 1922	671	108,501	249,572,808	3,304,254	.....	41,580	880,307	$ 862,888 49
Totals, 1921	531	91,614	188,971,774	2,479,095	.....	34,291	993,417	$ 646,487 65
Totals, 1920	594	121,690	440,649,755	2,811,095	149,300	86,726	6,415,349	$1,799,039 03
Totals, 1919	356	61,809	245,209,300	2,899,000	5,000	52,557	957,804	$ 654,372 99
Totals, 1918	227	34,257	159,659,000	378,080	20,000	18,478	701,654	$ 380,408 33
Totals, 1917	255	44,914	240,307,057	1,517,450	40,000	43,756	381,200	$ 483,281 50
Totals, 1916	133	23,318	136,345,000	435,810	.....	26,666	92,000	$ 259,765 12

* Includes 171,315,000 feet pulp-timber at special rates.

AVERAGE SALE PRICE BY SPECIES.

Saw-timber.	FIGURES FOR 1923.		FIGURES FOR 1922.		FIGURES FOR 1921.	
	Board-feet.	Price per M.	Board-feet.	Price Per M.	Board-feet.	Price per M.
Douglas fir	75,915,023	$1 72	58,467,465	$1 43	44,835,675	$1 65
Cedar	61,303,504	2 25	62,788,240	1 66	41,980,000	1 57
Spruce	101,703,592	1 58	42,207,248	1 46	22,588,143	1 60
Hemlock	43,956,950	1 14	42,987,260	1 01	40,866,166	1 08
Balsam	17,580,743	1 10	16,757,880	1 04	12,834,000	98
White pine	4,184,830	2 85	4,304,380	1 93	1,662,500	1 55
Western soft pine	28,211,030	1 88	9,704,385	1 47	11,009,710	1 82
Tamarack	5,824,365	1 80	2,998,750	1 75	8,679,480	1 79
Other species	6,402,401	1 34	9,357,200	78	4,516,100	1 31
Totals	345,082,438*	$1 68	249,572,808	$1 39	188,971,774	$1 46

* 171,315,000 feet pulp saw-timber not included in this total.

AREAS CRUISED FOR SALE BUT NOT AWARDED.

Forest District.	Number cruised.	Acreage.	Saw-timber (M.B.M.).	Poles and Piles (Lineal Feet).	Shingle-bolts and Cordwood (Cords).	Railway-ties (No.).
Cariboo	3	213	.....	.....	.....	6,700
Cranbrook	11	11,135	25,045	1,500	5,731	10,990
Fort George	15	15,088	68,096	17,000	855	96,673
Kamloops	6	432	1,100	29,070	.....	2,800
Nelson	24	7,206	28,352	823,960	131,450	850
Prince Rupert	66	13,603	27,883	637,894	424	104,921
Vancouver	87	25,799	288,927	541,190	54,635	.....
Vernon	16	2,448	8,447	88,000	205	10,900
Totals	228	75,924	447,850	2,138,614	193,300	233,834

TIMBER CUT FROM TIMBER-SALES DURING 1923.

Forest District.	Feet B.M.	Lineal Feet.	Cords.	Ties.
Cariboo	327,773	6,350	279.00	16,175
Cranbrook	7,941,349	19,726	2,651.50	22,158
Fort George	17,119,199	311,151	908.50	335,383
Kamloops	5,827,744	348,633	60.00	32,273
Nelson	6,608,987	873,357	859.20	68,674
Prince Rupert	54,045,435	456,007	294.50	359,299
Vancouver	104,114,873	324,404	11,769.47	13,839
Vernon	11,488,488	413,904	844.38	8,827
Totals, 1923	207,473,848	2,753,532	17,666.55	856,628
Totals, 1922	187,217,151	1,523,744	37,345.91	495,672
Totals, 1921	179,780,056	2,169,550	10,483.00	831,423
Totals, 1920	168,783,812	1,638,549	17,703.00	654,829
Totals, 1919	107,701,950	672,699	12,208.00	573,286
Totals, 1918	113,927,610	499,589	15,539.00	146,807
Totals, 1917	99,078,832	545,429	14,862.00	34,937
Totals, 1916	63,055,102	225,799	8,425.00	.....

SAW AND SHINGLE MILLING.

Greater activity was also recorded in the milling end of the industry. Eighty-three per cent. of the sawmills, representing 88 per cent. of the mill capacity, operated to a greater or less extent, as compared with 75 per cent. of mills and 83 per cent. of capacity in 1922. In the same time 80 per cent. of the shingle-mills, representing 95 per cent. of capacity, operated during the year, as compared with 94 per cent. of mills, representing 96 per cent. capacity, in 1922.

SAW AND SHINGLE MILLS OF THE PROVINCE, 1923.

Forest District.	Sawmills.		Shingle-mills.		Sawmills.		Shingle-mills.	
	No.	Operating, Estimated Daily Capacity, M.B.M.	No.	Operating, Estimated Daily Capacity, Shingles, M.	No.	Shut down, Estimated Daily Capacity, M.B.M.	No.	Shut down, Estimated Daily Capacity, Shingles, M.
Cariboo	10	56	..	....	14	59	..	....
Cranbrook	25	1,060	..	....	10	380	..	....
Kamloops	15	395	..	....	3	73	1	120
Nelson	32	715	9	485	13	330	3	160
Fort George	22	561	..	....	1	50	..	....
Prince Rupert	17	585	..	....	18	414	..	....
Vancouver	206	7,514	98	15,659	11	122	12	465
Vernon	25	387	..	....	2	65	..	....
Totals for 1923	352	11,273	107	16,144	72	1,493	16	745
Totals for 1922	292	9,683	108	15,544	90	2,054	8	680
Totals for 1921	289	8,912	79	10,885	78	2,029	6	788
Totals for 1920	341	10,729	109	13,426	37	909	2	30

TIMBER EXPORTS.

EXPORT OF LOGS DURING YEAR 1923.

Species.	Grade No. 1.	Grade No. 2.	Grade No. 3.	Ungraded.	Totals.
	F.B.M.	F.B.M.	F.B.M.	F.B.M.	F.B.M.
Cedar	15,167,315	49,562,141	29,093,686	.....	93,823,142
Fir	6,839,180	53,704,655	12,043,974	.....	72,587,809
Spruce	4,051,438	3,535,298	3,969,260	.....	11,555,996
Hemlock	.....	.....	.....	40,777,272	40,777,272
White pine	23,138	1,013,855	864,680	.....	1,901,673
Other species	.....	.....	.....	13,012,149	13,012,149
Totals, 1923	26,081,071	107,815,949	45,971,600	53,789,421	233,658,041
Totals, 1922	11,894,693	66,347,295	34,930,525	38,346,199	151,518,712

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

Forest District.	Quantity exported.		Approximate Value, F.O.B.	Where marketed.	
				United States.	Canada.
Cranbrook—					
Cordwood	Cords,	257	$ 1,285	13	244
Poles	Lin. ft.,	672,663	80,719	522,275	150,388
Cogwood	Cords,	160	960	.....	160
Mine-ties	Cords,	16	160	.....	16
Railway-ties	No.	908,651	499,758	.....	908,651
Mine-props	Cords,	8,147	81,470	.....	8,147
Fence-posts	Cords,	7,561	68,049	.....	7,561
Prince George—					
Poles	Lin. ft.,	382,735	45,928	295,690	87,045
Mine-props	Cords,	1,494	14,940	.....	1,494
Mine-ties	Cords,	14	140	.....	14
Railway-ties	No.	622,249	373,828	.....	622,249
Fence-posts	Cords,	512	4,608	.....	512
Kamloops—					
Poles	Lin. ft.,	1,177,570	117,757	1,157,300	20,270
Mine-props	Cords,	233	3,263	.....	233
Railway-ties	No.	50,000	27,500	.....	50,000
Prince Rupert—					
Poles	Lin. ft.,	869,282	113,006	640,435	228,847
Piling	Lin. ft.,	332,205	46,508	.....	332,205
Fence-posts	Cords,	77	770	.....	77
Railway-ties	No.	530,104	311,701	.....	530,104
Nelson—					
Poles	Lin. ft.,	5,025,397	523,318	4,217,325	808,072
Fence-posts	Cords,	5,006	35,042	3,346	1,660
Vancouver—					
Poles	Lin. ft.,	4,652,932	615,410	4,652,932	.....
Piling	Lin. ft.,	259,467	36,325	259,467	.....
Shingle-bolts	Cords,	179	1,343	179	.....
Cordwood	Cords,	736	4,416	736	.....
Fence-posts	Cords,	25	225	25	.....
Pulpwood	Cords,	223	1,338	223	.....
Vernon—					
Poles	Lin. ft.,	200,905	27,598	200,905	.....
Total value, 1923	.....		$3,037,365	.....	.....
Total value, 1922	.....		$1,684,648	.....	.....

PRE-EMPTION REPORTS.

The Forest Branch during the year supplied the Lands Branch with 3,406 reports on active pre-emptions, showing amount of improvements, extent of residence, etc. These reports are made at an average cost of $2.50 each.

Pre-emption records examined by districts are:—

Cariboo	1,122
Cranbrook	144
Fort George	261
Kamloops	199
Nelson	183
Prince Rupert	450
Vancouver	677
Vernon	370
Total	3,406

CLASSIFICATION OF LAND FOR ALIENATION.

Examinations made of various applications for alienation under the "Land Act" to determine if areas are timber land or not within the meaning of the Act, and whether lands are suitable for purposes of the applicant, account for 778 reports received by the Forest Branch, covering 125,353 acres. Of this area, 41,901 acres were reported as agricultural land and 15,659 acres as timber land, which is estimated to contain 156,057 M. board-feet, or an average of 10 M. to the acre. This represents a stumpage value in excess of $250,000 saved to the Province through the operation of the reserve section of the "Forest Act."

LAND CLASSIFICATION.

AREAS EXAMINED, 1923.

Forest District.	Applications for Crown Grants.		Applications for Grazing and Hay Leases.		Applications for Pre-emption Records.		Applications to Purchase.		Miscellaneous.	
	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.
Cariboo	2	170	57	7,452	92	13,556	35	2,288	9	925
Cranbrook	4	600	..	.....	5	618	7	1,388	5	10,242
Fort George	6	912	1	1,920	96	14,705	20	3,194	14	1,974
Kamloops	5	719	2	325	15	2,411	6	740	6	318
Nelson	..	.....	..	.....	31	3,756	27	4,352	5	2,580
Prince Rupert	..	.....	1	160	32	4,803	22	2,765	17	1,028
Vancouver	11	973	..	.....	73	9,197	35	4,253	66	13,001
Vernon	9	1,535	1	160	32	5,736	12	1,852	17	4,905
Totals	37	4,909	62	10,017	376	54,782	164	20,832	139	34,973

CLASSIFICATION OF AREAS EXAMINED, 1923.

Forest District.	Total Area.	Agricultural Land.	Area recommended for Reserve.	Estimate of Timber on Reserved Area.
	Acres.	Acres.	Acres.	M.B.M.
Cariboo	24,391	4,408	....	....
Cranbrook	12,848	1,708	....	....
Fort George	22,705	16,579	4,954	40,745
Kamloops	4,513	1,694	....	....
Nelson	10,688	4,421	1,043	5,756
Prince Rupert	8,756	3,581	390	2,504
Vancouver	27,424	6,559	7,797	103,790
Vernon	14,188	2,951	1,475	3,262
Totals	125,513	41,901	15,659	156,057

DRAUGHTING.

The work of the Draughting Office during 1923 has increased considerably in every department over that of the previous year, particularly in sketches to accompany timber-marks and timber-sales. In regard to the latter, the use of the Ditto machine has proved of great value, no less than 4,328 Ditto prints having been made, nearly all of which were of timber-sales. In addition to the routine work, an analysis of which is given below, the staff has been engaged in making plans for cruising parties and in the preparation of new atlas sheets, using the reference maps of the Surveyor-General's Branch as a basis, all sheets in use being kept up to date.

Much work has been done in regard to the furnishing of designs for auto camps, standardized garages, workshops, tool-caches, and boat-houses, and in alterations to the structural designs for standard launches. This, in many cases, necessitated making practically fresh designs and sets of complete working drawings.

Analysis of Routine Work.

Month.	Number of Tracings made.						Blue-prints made from S.G. Ref. Maps.
	Timber-sales.	Timber-marks.	Examination Sketches.	Hand-logger Licences.	Miscel-laneous.	Totals.	
January	23	207	35	12	12	289	16
February	11	110	42	3	22	188	48
March	19	126	44	17	30	236	49
April	21	123	31	39	45	259	99
May	63	111	39	14	44	271	166
June	30	97	44	41	25	237	160
July	34	88	38	20	13	193	30
August	50	71	29	12	45	207	56
September	50	63	25	19	23	180	48
October	52	99	44	5	27	227	27
November	46	99	44	13	23	225	29
December	32	114	50	6	18	220	29
Totals	431	1,308	465	201	327	2,732	757

TIMBER-MARKS ISSUED FOR THE YEAR 1923.

	1922.	1923.
Old Crown grants	129	146
Crown grants, 1887–1906	120	147
Crown grants, 1906–1914	132	188
"Royalty Act"	291	392
Stumpage reservations	26	64
Pre-emptions under sections 28A and 28B, "Land Act"	20	45
Timber leases (50 cents royalty)	3	1
Dominion lands	58	115
Timber-sales	671	853
Hand-loggers	58	55
Special marks	3	1
Totals	1,511	2,007
Transfers and changes of marks	345	267
Hand-loggers' licences issued	288	198

CORRESPONDENCE.

Letters inward, numbered and recorded	35,500
Letters, reports, etc., received, not numbered or recorded	14,500
Total	50,000
Outward typed letters	22,000
Outward circulars, form letters, etc.	25,000
Total	47,000

REVENUE AND EXPENDITURE.

The revenue and expenditure of the Branch are in a most satisfactory condition as shown by tables below. Revenue increased 8.5 per cent., reaching $3,482,365.29 during the year, which exceeds estimates and constitutes a record within the history of the Branch.

Revenue is derived from two sources: First, ground rentals and renewal fees on timber licences. This money is tendered to the Branch on the initiative of a timber-holder for renewal of his rights, and requires little work on behalf of the Branch except book-keeping. There has been a gradual shrinkage in amount so received from this source, due to the cutting-over or dropping of timber licences. The amount on this account for the past year was $1,517,554.74, as compared with $2,269,441 ten years ago. On the other hand, revenue, as charged, from active operations has increased and now amounts to $2,119,033.72, as compared with $533,751 in 1914,

an increase of 300 per cent. in the ten years, 119 per cent. in the past five years, and 27 per cent. over previous year.

Administration costs during the year amounted to $374,194 or 17½ per cent. of the revenue from operations, and thus shows a reduction of 4 per cent. over previous year and approximately one-half of what it was prior to 1917. The expediture as shown in percentage of revenue from operations being as follows:—

	Per Cent.
Average for five years, 1913–17	34.0
Average for five years, 1917–21	22.0
The year 1922	21.5
The year 1923	17.5

A still better showing would have resulted but for the taking-on of new work from time to time by the Branch, which was done in some cases under separate votes as far as field-work was concerned.

The supervision and permanent personnel is included in the administration salaries. Among these new lines may be mentioned:—

Grazing, first undertaken 1919
Pre-emption inspection prior to 1919 was done by Lands Branch.
Insect-control 1920
Forest investigation and reconnaissance 1920

FOREST REVENUE.

	12 Months to Dec. 31, 1923	12 Months to Dec. 31, 1922.	12 Months to Dec. 31, 1921.	12 Months to Dec. 31, 1920.	12 Months to Dec. 31, 1919.	12 Months to Dec. 31, 1918.
Timber-licence rentals	$1,283,300 77	$1,390,999 64	$1,193,654 58	$1,654,747 43	$1,236,530 41	$1,372,789 28
Timber-licence transfer fees	3,750 00	1,950 00	3,735 00	4,855 00	2,790 00	4,625 00
Timber-licence penalty fees	100,045 86	83,376 60	50,859 19	232,309 85	49,259 95	79,605 09
Hand-loggers' licence fees	5,300 00	6,050 00	9,175 00	6,525 00	7,250 00	2,975 00
Timber-lease rentals	102,062 40	94,392 31	81,840 61	81,989 68	85,101 37	77,748 25
Interests	72 22	247 77	21 85	12 59	345 10	69 67
Timber-sale rentals	28,383 49	26,790 12	12,659 91	17,881 40	10,045 26	7,753 84
Timber-sale stumpage	431,007 99	358,984 19	317,488 77	247,234 71	219,012 08	151,598 86
Timber-sale cruising	9,933 97	8,699 50	4,640 39	7,642 80	3,763 49	1,921 73
Timber-sale advertising	3,509 00	2,188 63	1,695 08	2,749 93	1,929 71	1,152 40
Timber royalty and tax	1,477,027 24	1,203,884 89	990,326 99	879,003 16	788,746 69	698,059 27
Scaling fees	1,160 89	3,138 05	2,015 83	25,476 91	64,571 19	56,304 90
Scaling expenses	667 53	1,061 94	765 98	5,041 71	13,072 79	9,753 29
Trespass penalty	11,362 99	13,397 91	11,245 86	18,114 34	7,464 12	1,599 38
Scalers'examination fees	495 00	175 00	455 00	670 00	205 00	315 00
Exchange	3,168 40	357 14	291 03	2,519 43	3,550 80	1,637 91
Seizure expenses	1,559 17	454 35	330 80	530 03	280 12	2,813 82
General miscellaneous	5,907 36	3,135 47	1,972 33	3,363 90	1,055 67	1,980 70
	$3,468,714 28	$3,199,283 51	$2,683,174 20	$3,190,667 87	$2,494,973 75	$2,472,703 39
Grazing fees	13,651 01	8,171 21	11,221 79	15,617 44	9,500 41	.....
Taxation from Crown-grant timber lands	308,041 92	319,410 51	261,896 49	302,557 26	251,264 82	258,105 14
Total revenue from forest sources	$3,790,407 21	$3,526,865 23	$2,956,292 48	$3,508,842 57	$2,755,738 98	$2,730,808 53

Revenue from Logging Operations, 1923.

(Amounts charged.)

Forest District.	Royalty and Tax.	Trespass Penalties.	Seizure Expenses.	Government Scale.		Scaling Fund.		Stumpage.	Total.
				Scaling Expenses.	Scaling Fees.	Scaling Expenses.	Scaling Fees.		
Vancouver & Is.	$1,067,827 34	$16,043 83	$391 07	$216 67	$805 84	$14,119 65	$97,781 95	$ 219,137 26	$1,416,323 61
Cariboo	1,454 56	186 65	.....	.....	.....	.....	.....	1,358 50	2,999 71
Cranbrook	108,822 17	564 00	21 16	155 79	.....	.....	.....	19,224 51	128,787 63
Prince Rupert	159,644 70	5,210 81	45 45	213 59	369 38	1,624 31	10,931 71	89,761 47	267,801 42
Nelson	52,644 25	470 19	15 05	33 50	.....	.....	.....	31,991 13	85,154 12
Vernon	38,425 36	1,920 15	18 90	39 90	.....	.....	.....	25,991 66	66,395 97
Fort George	52,026 25	537 86	249 96	39 06	.....	.....	.....	65,609 84	118,462 97
Kamloops	18,511 20	575 26	5 00	43 05	.....	.....	.....	13,973 78	33,108 29
Totals	$1,499,355 83	$25,508 75	$ 746 59	$ 741 56	$1,175 22	$15,743 96	$108,713 66	$467,048 15	$2,119,033 72
Totals, 1922	$1,149,745 76	$14,926 63	$1,326 80	$1,933 72	$1,940 08	$12,407 50	$103,774 90	$375,607 42	$1,661,662 81
Totals, 1921	$1,005,261 61	$14,297 39	$ 516 85	$ 769 08	$1,256 70	$11,396 11	$114,450 43	$396,303 19	$1,544,251 36

FOREST EXPENDITURE, 1922–23.

Forest District.	Salaries.	Temporary Assistance.	Expenses.	Total.
Headquarters	$ 81,083 55	$ 885 50	$ 24,954 52	$106,923 57
Cariboo	5,339 04	165 32	3,836 44	9,340 80
Cranbrook	9,691 22	1,521 80	5,700 47	16,913 49
Kamloops	6,355 00	1,106 66	3,647 76	11,109 42
Nelson	11,745 61	1,197 00	6,178 27	19,120 88
Prince George	12,121 41	1,923 36	4,490 22	18,534 99
Prince Rupert	22,184 12	1,514 08	24,211 17	47,909 37
Vancouver	47,923 62	2,641 49	43,004 87	93,569 98
Vernon	7,883 32	728 39	4,335 35	12,947 06
Totals	$204,326 89	$11,683 60	$120,359 07	$336,369 56

Lumber-trade extension	19,757 91
Reconnaissance, etc	28,444 49
Insect-control	15,070 28
Publicity	773 27
Contingencies	100 00
Grazing: range improvement	3,602 38
Grand total	$404,117 89

The sums estimated as being required for the fiscal year 1923–24 were as follows:—

Salaries	$217,415 00
Travelling expenses and wireless telephone	44,000 00
Lumber-trade extension	30.000 00
Reconnaissance, etc.	50,000 00
Insect damage: investigation and control	25,000,00
Grazing: range improvement	6,000 00
	$372,415 00

In addition to this total, sums were available from the main Lands Department votes for temporary assistance, office supplies, maintenance of launches and autos, and miscellaneous expenses; publicity, general investigations, and contingencies. The sum of $300,000 was also voted as the amount of the contribution of the Government to the Forest Protection Fund.

FOREST PROTECTION ACCOUNT.

Collection of the regular and second instalment of the special levy for forest-protection was satisfactory.

The season's expenditure on fire-fighting accounts showed a marked reduction, amounting to $327,997.60 for the nine months, which is the lowest figure for the past five years, as against collections of $457,532.87 for the same period. The special advance made to cover deficits of 1919 and 1920 was repaid in full and the overdraught reduced by $80,766.64. When the Government contribution on behalf of the special levy becomes available on April 1st, 1924, the fund will have a substantial surplus to its credit. The present standing of the fund is as follows:—

FOREST PROTECTION FUND.

The following statement shows the standing of the Forest Protection Fund as of December 31st, 1923:—

Balance (deficit) at April 1st, 1922			$ 50,013 16
Expenditure, fiscal year 1922–23	$841,407 28		
Less refunds	18,251 96		
		$823,155 32	
Refunds of revenue		361 19	
			823,516 51
			$873,529 67
Collections, fiscal year 1922–23		$203,559 77	
Collections under special levy, fiscal year 1922–23		163,958 11	
Carried forward		$367,517 88	$873,529 67

FOREST PROTECTION FUND—*Continued.*

Brought forward	$367,517 88	$873,529 67
Government contribution	313,697 16	
Government contribution under special warrant	100,000 00	
	$781,215 04	
Less amount transferred to Special Advance Account	191,301 47	
		589,913 57
Balance (deficit)*		$283,616 10

* In addition to this deficit, the sum of $59,195.45 was owing to the Government on March 31st, 1923, in respect of Special Advance Account.

Balance (deficit) at April 1st, 1923			$283,616 10
Expenditure, April–Dec., 1923 (nine mos.)	$327,997 60		
Less refunds	10,994 76		
		$317,002 84	
Refunds of revenue		567 94	
			317,570 78
			$601,186 88
Collections, April–Dec., 1923 (nine months)		$160,540 85	
Collections, special levy, April–Dec., 1923 (nine months)		70,022 17	
Government contribution, April–Dec., 1923 (nine mos.)		226,969 85	
		$457,532 87	
Less amount transferred to Special Advance Account		59,195 45	
			398,337 42
Balance (deficit)			202,849 46

Forest Protection Expenditure.

	FISCAL YEARS.							
	1916–17.	1917–18.	1918–19.	1919–20.	1920–21.	1921–22.	1922–23.	1923–24 (9 mos., April 1st to Dec. 31st).
Patrols	$144,251	$100,304	$159,030	$198,172 35	$267,402 76	$339,163 85	$319,315 25	$237,941 06
Improvements	3,747	20,111	36,913	28,397 43	85,548 87	25,286 68	13,100 02	72,706 16
Fires	7,124	91,470	50,293	165,688 80	292,890 66	106,891 17	508,992 01	17,350 38
Totals	$155,122	$211,885	$246,236	$392,258 58	$645,842 29	$471,341 70	$841,407 28	$327,997 60

Expenditure by Districts for Nine Months ended December 31st, 1923.

Forest District.	Patrols.	Fires.	Improvements.	Total.
Victoria	$ 23,570 78	.....	.....	$ 23,570 78
Cariboo	11,379 03	$ 3,668 84	$ 1,244 55	16,292 42
Cranbrook	20,641 59	12,926 58	2,097 88	35,666 05
Kamloops	18,278 10	1,406 55	1,820 77	21,505 42
Nelson	24,911 86	12,081 44	2,392 42	39,385 72
Prince George	17,906 55	4,208 10	812 94	22,927 49
Prince Rupert	10,940 15	4,959 86	918 58	16,818 59
Vancouver	57,846 72	31,983 87	5,877 97	95,708 56
Vernon	12,466 28	1,470 92	2,185 37	16,122 57
Undistributed	40,000 00	.....	.....	40,000 00
Totals	$237,941 06	$72,706 16	$17,350 38	$327,997 60

For Twelve Months, April 1st, 1922, to March 31st, 1923.

Forest District.	Patrols.	Fires.	Improvements.	Total.
Victoria	$34,624 42	.....	.....	$ 34,624 42
Cariboo	14,438 42	$ 9,495 16	$ 765 13	24,698 71
Cranbrook	25,790 33	52,310 50	864 70	78,965 53
Kamloops	21,088 28	21,922 34	1,675 57	44,686 19
Nelson	30,872 28	107,678 13	1,415 16	139,965 57
Prince George	22,503 98	34,532 13	642 60	57,678 71
Prince Rupert	17,790 91	90,777 44	584 75	109,153 10
Vancouver	124,213 55	179,600 04	6,072 69	309,886 28
Vernon	19,471 00	12,676 27	1,079 42	33,226 69
Undistributed	8,522 08	.....	.....	8,522 08
Totals	$319,315 25	$508,992 01	$13,100 02	$841,407 28

THE SCALING FUND.

This fund, maintained by scaling fees and from which is paid all scaling expenses, remains in a healthy condition and shows a credit balance of $47,793.48 at December 31st, 1923, as against $50,092.72 on April 1st, 1923.

When the scaling fee was reduced to 6 cents per thousand feet, board measure, it was recognized that this fee would not cover cost of scaling, and it was considered that the surplus, which then stood at $59,504.89, would be very materially reduced. The increased volume of material scaled, especially during the past year, however, has somewhat reduced the per M. cost of scaling, with the result shown above. We have now, however, reached a point where new launches and other equipment are necessary to maintain the efficiency of the scaling organization, and it is pleasing to report that these can be provided from the surplus on hand.

Expenditure, fiscal year 1920–21	.....	$102,351 10
Charges, fiscal year 1920–21	$119,464 55	.....
Balance	.....	17,113 45
	$119,464 55	$119,464 55
Balance brought down	$ 17,113 45	.....
Expenditure, fiscal year 1921–22	.....	$ 89,837 94
Charges, fiscal year 1921–22	132,229 38	.....
Balance	.....	59,504 89
	$149,342 83	$149,342 83
Balance brought down	$ 59,504 89	.....
Expenditure, fiscal year 1922–23	.....	$122,963 11
Charges, fiscal year 1922–23	113,550 94	.....
Balance	.....	50,092 72
	$173,055 83	$173,055 83
Balance brought down	$ 50,092 72	.....
Expenditure, 9 months, April–December, 1923	.....	$104,277 00
Charges, 9 months, April–December, 1923	101,977 76	.....
Balance, being excess of charges over expenditure	.....	47,793 48
	$152,070 48	$152,070 48

CROWN-GRANT TIMBER LANDS.	Area of Private Timber Lands (Acres).	Average Value per Acre.
1911	824,814	$ 8 72
1912	874,715	8 60
1913	922,948	9 02
1914	900,464	9 66
1915	913,245	9 55
1916	922,206	9 73
1917	916,726	9 61
1918	896,188	9 60
1919	883,491	9 48
1920	867,921	11 62
1921	845,111	10 33
1922	887,980	11 99
1923	883,344	11 62

The extent and value of timber land in the various assessment districts are shown by the following table:—

Assessment District.	Acreage, 1923.	Increase or Decrease in Acreage over 1922.	Average Value per Acre.	Change in Value per Acre since 1922.
Alberni	49,337	+4,086	$25 27	-$0 62
Comox	189,270	+1,576	14 05	- 1 56
Cowichan	92,917	-932	19 57	- 11
Fort Steele	29,732	No change.	11 83	No change.
Golden	81,101	+3	4 77	No change.
Kettle River	4,908	No change.	3 92	No change.
Nanaimo	83,191	-4,581	16 65	+ 72
Nelson	195,711	-5,733	3 58	- 59
Prince Rupert	1,660	+560	13 90	- 7 00
Revelstoke	48,610	+1	14 42	+ 02
Slocan	80,901	+1	5 10	- 05
Vancouver	2,660	No change.	31 25	No change.
Victoria	23,346	+383	20 46	- 33
Totals	883,344	-4,636	$11 62	-$0 37

FOREST-PROTECTION.

The fire season of 1923 was slightly below normal. The early spring brought on a fresh growth of herbs and grasses and so reduced the early fire hazard. On the North Coast, however, a decided lack of precipitation in this usually wet region brought in its wake a crop of fires and a season more dangerous than usual.

A more complete system of organization was put into effect during the year. Each field officer completed a chart of the resources (both human and material) of his district which could be used in case of a fire emergency. This did away to a very large extent with the wasteful use of valuable time in gathering together men and equipment once a fire was reported. A very large measure of co-operation was extended to the Department by the general public, and especially by members of logging, telephone, and railway companies.

Perhaps the most pleasing feature of the year's development was the increase in the number of volunteer fire wardens who consented to take the first steps to control fires which might break out in their vicinity. Not only did the number increase, but the value of service performed also showed improvement, and the thanks not only of this Branch but of the general public is due to these men who from their sense of responsibility as citizens of the Province and their realization that timber is a national asset undertook to carry out their functions without other reward than the satisfaction gathered in performing a public duty well. The number of volunteer fire wardens enrolled was 650, a remarkable growth when it is realized that this movement started only three years ago.

The results obtained are shown in the various tables under this section.

Publicity.—It is now well established that forest-protection must be "sold" to the general public in the same way as any marketable commodity, and to do this it becomes necessary to keep the objective always to the front. This means that we must have constant publicity, and that publicity must take new and attractive forms until "Prevent Forest Fires—It Pays" becomes an every-day thought to the average citizen.

In addition to the usual publication of fire-law notices, advertising in the daily press and various periodicals, publicity during the past year took the form of a "Forest-protection Week" proclaimed by the Dominion Government. The Branch made the most of this week to give the subject wide publicity. Through co-operation with the press many articles and editorials dealing in a very striking manner with the necessity of protecting the forests from fire and showing the relationship between a prosperous British Columbia and the lumbering industry carried the message to the reading public. There can be no question that the lumbering industry should for all time be the mainstay of prosperity in this Province, and that there cannot be a prosperous country if this industry is robbed of raw material through burning it in large quantities yearly.

The various service clubs and boards of trade gladly received members of the staff who addressed them on our forestry problems. The subject of forest-protection was preached from the pulpits; it was taught in the schools. Commercial houses gave window displays portraying the necessity of preserving the forests, and in their advertising carried our slogan, "Prevent Forest Fires—It Pays." The general result was that the safety of our forests became a subject more alive to the man on the street than it had been hitherto.

Later an essay competition for school-children on the subject "Our Forests and Why We Should Protect Them from Fire" was held, forty-eight prizes being given to those who were adjudged to have written the best essays. The prizes were divided into three groups: (1) Juniors up to the High School Entrance class; (2) the Entrance class; and (3) High School pupils. In each class the first prize was a cup on which was engraved the competition subject and the name of the winner. Five second prizes, gold medals especially designed, were presented, and for third prize ten silver medals of similar design. The competition brought 10,000 competitors who showed a keen insight into the subject, and the high standard of the essays made the selection of the winners a rather difficult task. All this threw an immense amount of extra work on the field staff, but they rose loyally to the occasion. The result of this school essay competition is that in 10,000 homes the subject of forest-protection is a live issue, and the reason why we should protect our forests receives the concerted thought of the whole family.

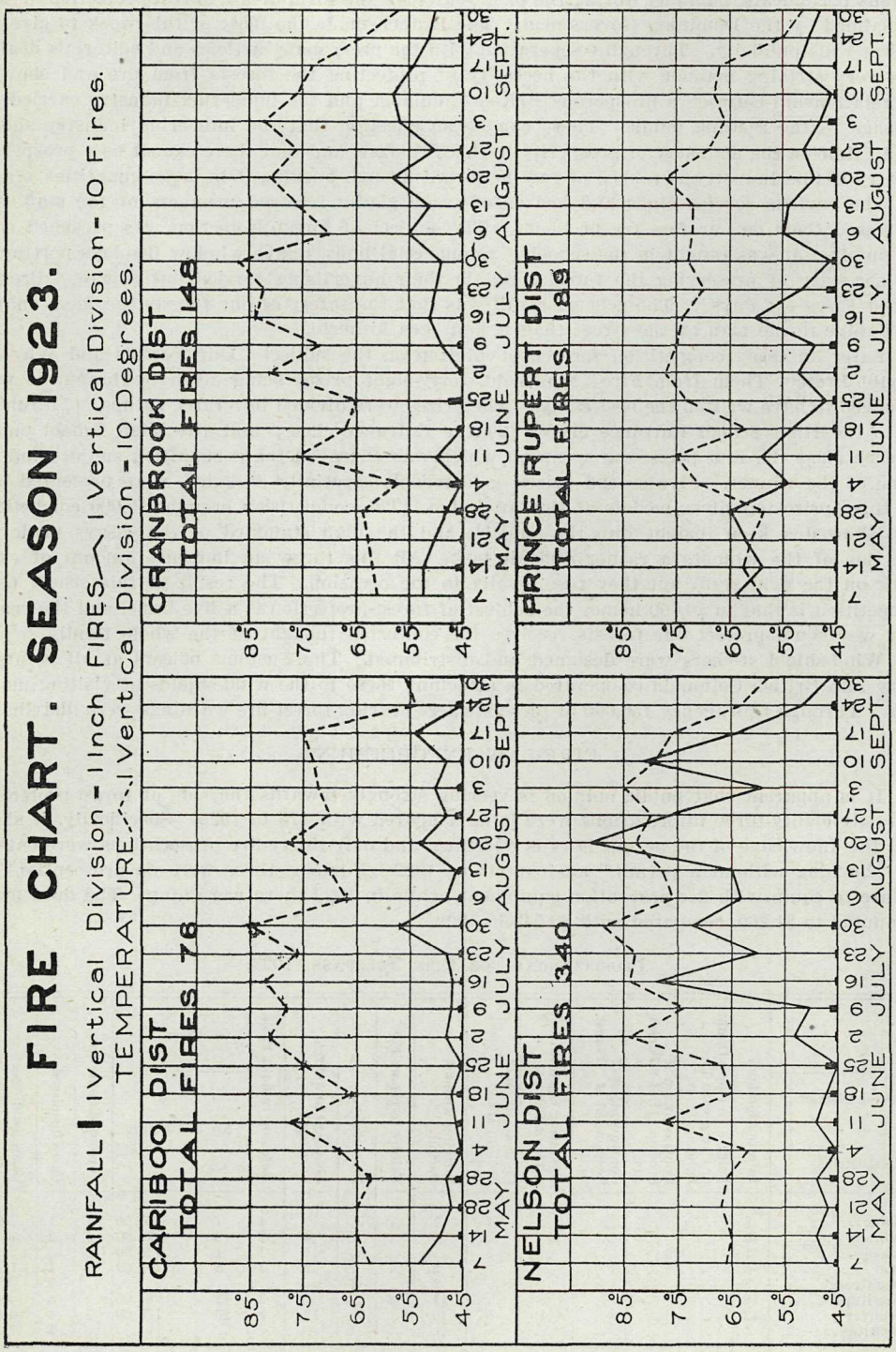
Wind-shield stickers were designed and distributed. The Customs officers at all points of entry into British Columbia co-operated in attaching these to the wind-shields of visiting motor-cars. Through this agency 150,000 of these stickers bearing forest-fire warnings were distributed.

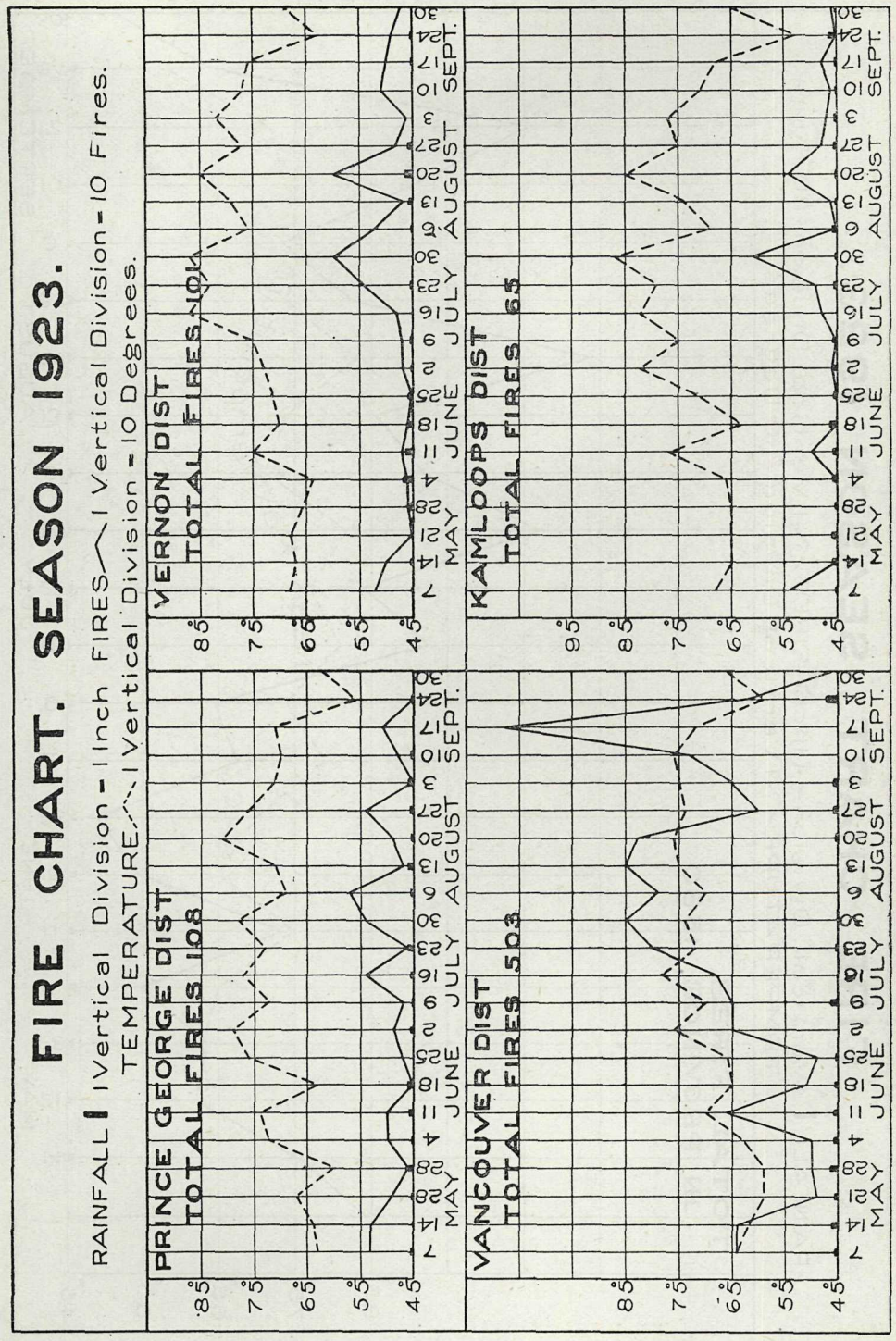
FIRE-LAW ENFORCEMENT.

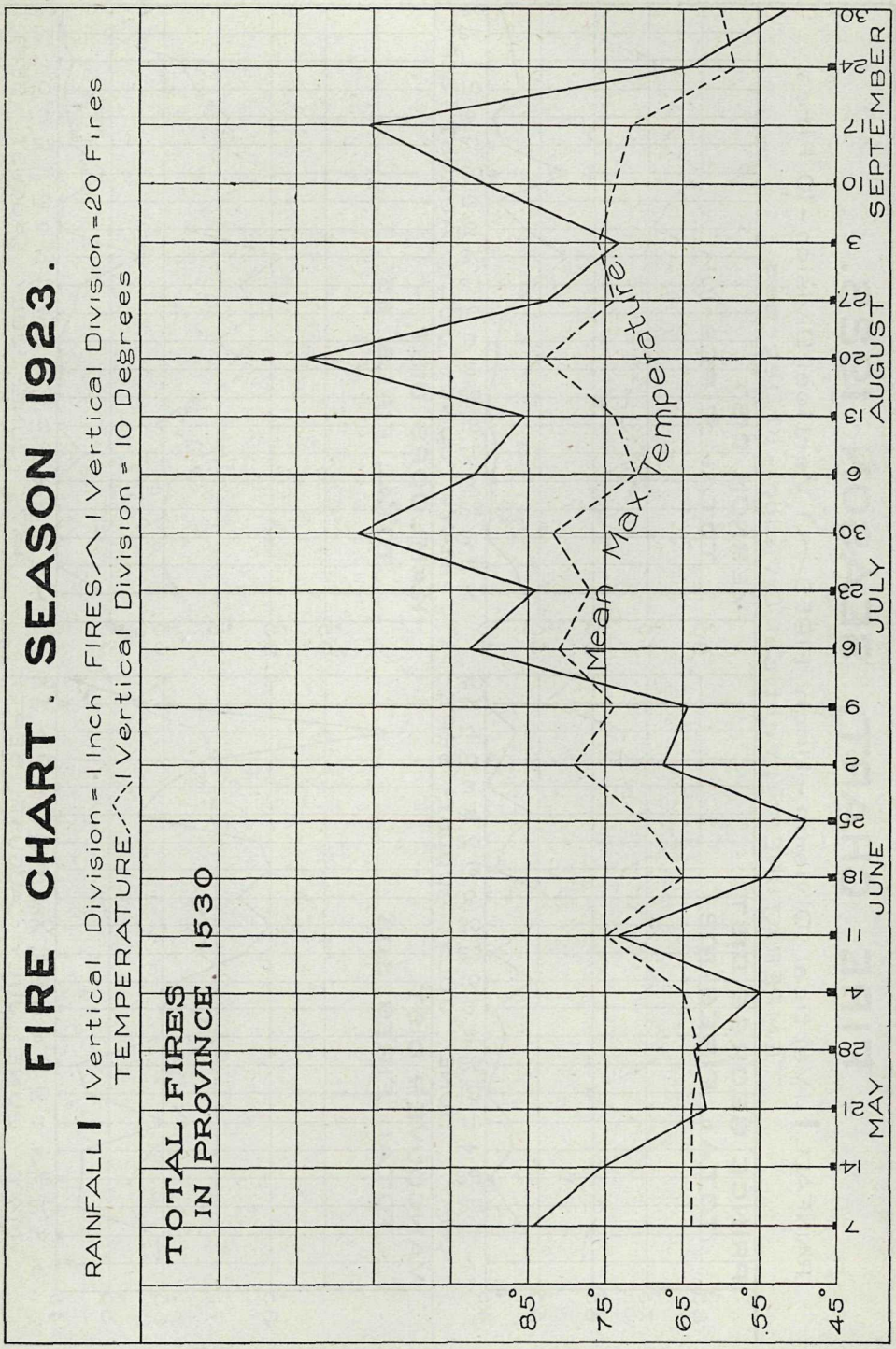
It is apparent that public opinion is veering strongly towards the side of forest-protection, and only eighty-three informations were laid, compared with 173 in 1922. Specifically, it shows that the knowledge of the permit laws is widening, and only thirty-five prosecutions were entered for "burning without a permit," against 111 of 1922. Further, there were no prosecutions for failure to equip with fire-prevention equipment, while in 1922 there were nine. The fines levied amounted to $1,260, compared with $2,543 in 1922.

PROSECUTIONS FOR FIRE TRESPASS, 1923.

Forest District.	Information laid.	Failure to equip Donkey or Camp with Fire-fighting Tools.	Contravention of Section 111 of "Forest Act."	Contravention of Section 121 of "Forest Act."	Operating Open Burner without Permit.	Contravention of Section 127 of "Forest Act."	Burning without Permit.	Failure to report Fire.	Incendiary.	Leaving Camp-fires burning.	Refusing to fight Fires.	Fines.		Supended Sentence.	Cases dismissed.	Cases pending.	Cases withdrawn.
												No.	Amount.				
Cariboo	3	..	..	..	..	1	1	..	..	..	1	1	$ 25 00	1	1	..	..
Cranbrook	10	..	..	..	..	..	3	..	..	4	3	3	75 00	5	2	..	..
Kamloops	1	..	..	..	..	..	..	..	..	..	1	1	25 00	..	..	..	..
Nelson	5	..	..	..	..	..	2	..	..	2	1	3	75 00	..	1	1	..
Prince George	3	..	..	..	..	..	2	..	1	..	..	..	.....	..	3	.	..
Prince Rupert	18	..	..	..	..	..	11	4	..	..	3	12	285 00	..	3	..	3
Vancouver	42	..	..	..	1	8	16	..	..	12	5	25	775 00	7	4	6	..
Vernon	1	..	..	..	..	..	..	..	1	..	..	..	.....	..	1	..	..
Totals	83	..	..	..	1	9	35	4	2	18	14	45	$1,260 00	13	15	7	3
Totals, 1922	170	..	13	1	1	17	111	..	2	10	15	126	$2,543 00	6	26	2	7


FIRE CHART. SEASON 1923.
RAINFALL 1 Vertical Division - 1 Inch FIRES 1 Vertical Division - 10 Fires.
TEMPERATURE 1 Vertical Division - 10 Degrees.
CARIBOO DIST
TOTAL FIRES 76
CRANBROOK DIST
TOTAL FIRES 148
NELSON DIST
TOTAL FIRES 340
PRINCE RUPERT DIST
TOTAL FIRES 189
85°
75°
65°
55°
45°
7 14 21 28 4 11 18 25 2 9 16 23 30 6 13 20 27 3 10 17 24 30
MAY JUNE JULY AUGUST SEPT.


FIRE CHART. SEASON 1923.
RAINFALL 1 Vertical Division - 1 Inch FIRES 1 Vertical Division - 10 Fires.
TEMPERATURE 1 Vertical Division = 10 Degrees.
PRINCE GEORGE DIST
TOTAL FIRES 108
VERNON DIST
TOTAL FIRES 101
VANCOUVER DIST
TOTAL FIRES 503
KAMLOOPS DIST
TOTAL FIRES 65
85°
75°
65°
55°
45°
7 14 21 28 4 11 18 25 2 9 16 23 30 6 13 20 27 3 10 17 24 30
MAY JUNE JULY AUGUST SEPT.


FIRE CHART . SEASON 1923.
RAINFALL 1 Vertical Division = 1 Inch FIRES 1 Vertical Division = 20 Fires
TEMPERATURE 1 Vertical Division = 10 Degrees
TOTAL FIRES IN PROVINCE 1530
Mean Max. Temperature
85°
75°
65°
55°
45°
7
14
21
28
4
11
18
25
2
9
16
23
30
6
13
20
27
3
10
17
24
30
MAY
JUNE
JULY
AUGUST
SEPTEMBER

FIRE OCCURRENCE.

The number of fires which occurred in 1923 was 1,530, compared with 2,591 in 1922, or a decrease of 40.95 per cent. Of this number, 673, or 43.99 per cent., were extinguished under a quarter of an acre; 519, or 33.92 per cent., were extinguished under 10 acres. This means that 1,192 fires, or 77.91 per cent. of the fires which occurred, were extinguished before they had spread over a larger area than 10 acres. Again, 1,085, or 71 per cent., of the fires were extinguished without cost other than patrol force.

Further classification shows that 1,396 fires, or 91.2 per cent., did less than $100 worth of damage; 82 fires, or 5.36 per cent., did damage between $100 and $1,000; and 52 fires, or 3.4 per cent., damaged over $1,000 worth of property.

This outline is a very striking commentary on the fire risk which yearly endangers our forests, for any one of the fires which occurred during the summer of 1923 might have fallen into the latter class, except for the care which was exercised by the whole force, permanent, temporary, and volunteer. The figures also show a record for fire-control with minimum damage and expense.

NUMBER AND CAUSES OF FIRES, 1923.

Forest District.	Lightning.	Campers and Travellers.	Railway Operation.	Railways under Construction.	Smokers.	Brush-burning not Railway-clearing.	Public Road-construction.	Industrial Operation.	Incendiary.	Miscellaneous (Known Causes).	Unknown Causes.	Total.	Per Cent. of Total Fires in Province.
Cariboo	4	42	..	..	1	8	2	..	12	1	6	76	4.97
Cranbrook	32	24	28	..	13	5	..	2	2	8	34	148	9.67
Kamloops	28	7	18	..	1	6	..	..	1	..	4	65	4.25
Nelson	153	17	112	..	15	11	..	7	5	5	15	340	22.22
Prince George	9	28	8	..	10	19	4	8	..	6	16	108	7.06
Prince Rupert	5	41	2	..	37	33	1	27	5	4	34	189	12.35
Vancouver	16	90	16	..	86	69	4	121	4	38	59	503	32.88
Vernon	27	13	15	..	17	3	1	5	6	9	5	101	6.60
Totals	274	262	199	..	180	154	12	170	35	71	173	1,530	100.0
Per cent	17.91	17.12	13.01	..	11.77	10.06	0.78	11.11	2.29	4.64	11.31	100.0	

FIRES, 1923, CLASSIFIED BY PLACE OF ORIGIN AND COST OF FIRE-FIGHTING.

Forest District.	Total Fires.	Originated on Vacant Crown Lands and Lands paying F.P. Tax.	Originated on Lands not paying F.P. Tax.	Extinguished without Cost.			Cost Money to extinguish.			Total Cost of fighting Fire.		Average Cost per Fire.
				No.	Per Cent. of Total Fires in District.	Per Cent. of Total Fires in Province.	No.	Per Cent. of Total Fires in District.	Per Cent. of Total Fires in Province.	Dollars.	Per Cent. of Total spent in fighting Fires in Province.	Dollars.
Cariboo	76	46	30	51	67.1	3.33	25	32.9	1.64	3,668 84	5.05	48 27
Cranbrook	148	35	113	102	69.0	6.66	46	31.0	3.00	12,926 58	7.78	87 34
Kamloops	65	9	56	44	68.0	2.88	21	32.0	1.38	1,406 55	1.93	21 64
Nelson	340	108	232	218	64.1	14.25	122	35.9	7.98	12,081 44	16.62	35 53
Prince George	108	44	64	69	63.9	4.52	39	36.1	2.54	4,208 10	5.79	38 96
Prince Rupert	189	79	110	134	70.9	8.76	55	29.1	3.59	4,959 86	6.82	26 24
Vancouver	503	189	314	387	77.0	25.29	116	23.0	7.59	31,983 87	43.99	63 58
Vernon	101	31	70	81	80.2	5.29	20	19.8	1.30	1,470 92	2.02	14 55
Totals	1,530	541	989	1,086	....	70.98	444	....	29.02	72,706 16	100.00	47 53
Per cent	100.0	35.36	64.64	70.98	....	...	29.02	....	....	.....	....	.....
Totals, 1922	2,591	766	1,826	1,665	....	64.29	926	....	35.71	479,800 85	....	185 17
Per cent	100.0	29.5	70.5	64.29	....	....	35.71	....	....	.....	....	... .
Totals, 1921	1,330	415	915	891	....	67.0	439	....	33.0	98,476 00	....	74 04
Per cent	100.0	31.2	68.8	67.0	....	....	33.0	....	....	.....	....	.....

CAUSES OF FIRES.

For the second year in the history of forest-protection in British Columbia lightning was the biggest single cause of forest fires, being responsible for 274, or 17.91 per cent., of the fires set in 1923, closely followed by those set by campers, with 262, or 17.12 per cent. Those set by the operation of railways were 199, or 13.01 per cent., while smokers were responsible for 180, or 11.77 per cent. Industrial operations set 170 and brush-burning 154, being respectively 11.11 and 10.06 per cent. of the total; the remainder being caused by public road-construction, miscellaneous known and unknown causes, and incendiary fires are shown to be 35, or 2.29 per cent.

NUMBER AND CAUSES OF FOREST FIRES FOR THE LAST NINE YEARS.

Causes.	1923.	1922.	1921.	1920.	1919.	1918.	1917.	1916.	1915.
Lightning	274	246	164	304	115	134	48	67	100
Campers and travellers	262	626	308	246	310	158	209	268	305
Railway operation	199	332	283	227	146	104	335	121	82
Railways under construction	....	....	2	1	22	1	....	....	17
Smokers	180	....	....	....	....	....	....	....	....
Brush-burning (not railway-clearing)	154	355	126	96	97	100	48	148	267
Public road-construction	12	22	20	7	5	2	5	12	20
Industrial operation	170	203	119	104	129	80	59	59	28
Incendiary	35	69	40	32	21	15	13	22	28
Miscellaneous known	71	202	64	69	140	72	55	19	24
Unknown causes	173	536	204	165	156	224	214	148	160
Totals	1,530	2,591	1,330	1,251	1,141	910	986	864	1,031

DAMAGE BY FIRE.

The quantity of timber killed by fire is shown as 87,271 M. feet, of which 37,891 M. feet is salvable, leaving a net stumpage loss of 48,380 M. feet, valued at $41,110. In addition, 12,800 acres of valuable reproduction and immature forests were destroyed of a present value estimated at $32,400, and of much greater importance when we consider that it is this class of material which is most needed to sustain our industry forty to sixty years hence, when our present mature timber will have been largely cut. Other forms of property destroyed were logs and forest products in the course of manufacture, $98,124; buildings, $135,995; railway and logging equipment, $185,565; and miscellaneous damage, $197,965; or a total of approximately $700,000, equivalent to 28 cents per M. feet on the year's production. The question, how much this loss could be reduced by spending a part of the money involved in prevention, clearing up hazard, improving equipment, special watchman during periods of weather hazard, is one worth the serious consideration of every one who comes in contact with the forests and is subject to the risk involved.

Damage caused by Forest Fires.

Forest District.	Merchantable Timber destroyed or damaged.				Valuable Reproduction.		Cut-over Land, Unmerchantable Timber, Old Burn, not restocking.			Grazing Range.		Area of Slash burned.		Grand Totals.					
	Area.	Quantity killed.	Quantity salvable.	Net Stumpage Loss.	Area.	Estimated Present Damage.	Area.	Quantity killed.	Damage to Standing Timber.	Area.	Damage.	Area burned.	Cost to Deparment.	Area.		Quantity.		Damage.	
	Acres.	M. Ft. B.M.	M. Ft. B.M.		Acres.		Acres.	M. Ft. B. M.		Acres.		Acres.		Acres.	Per Cent.	M. Feet B.M.	Per Cent.		Per Cent.
Cariboo	74	164	.....	$ 374	.....	.....	5,894	....	...	2,326	$ 172	229	.....	8,523	5.41	164	0.18	$ 546	0.74
Cranbrook	6,395	31,460	30,950	522	2,346	$ 125	12,313	....	....	1,319	23	2,767	.....	25,140	15.96	31,460	36.07	670	0.90
Kamloops	71	180	.....	285	390	2,355	533	....	....	2,214	155	553	.....	3,761	2.38	180	0.20	2,795	3.76
Nelson	246	924	12	797	255	977	5,831	..	....	52	.....	279	.....	6,663	4.23	924	1.04	1,774	2.39
Prince George	904	1,654	.....	1,880	1,116	284	11,198	....	$ 100	597	28	795	.....	14,610	9.28	1,654	1.88	2,292	3.09
Prince Rupert	15,910	41,249	668	24,066	6,988	14,774	27,591	....	....	1,707	48	1,447	.....	53,643	34.04	41,249	47.21	38,888	52.38
Vancouver	2,250	11,375	6,231	12,871	1,586	13,808	21,819	100	100	404	81	16,814	.....	42,873	27.18	11,475	13.12	26,860	36.18
Vernon	91	265	30	307	126	78	614	....	....	679	28	878	.....	2,388	1.52	265	0.30	413	0.56
Totals	25,941	87,271	37,891	$ 41,102	12,807	$ 32,401	85,793	100	$ 200	9,298	$ 535	23,762	.....	157,601	100.0	87,371	100.0	$ 74,238	100.0
Per cent	16.46	99.89	43.37	55.38	8.12	43.64	54.46	0.11	0.26	5.89	0.72	15.07	.....	100.0	.....	100.0	.....	100.0	.....
Totals, 1922	174,988	728,941	117,006	$955,772	210,474	$569,303	833,472	1,000	$1,210	245,951	$5,015	103,700	$ 106,343	1,568,585	100.0	729,941	100.0	$1,531,300	100.0
Per cent	11.2	99.9	16.03	62.4	13.4	37.2	53.1	0.1	0.1	15.7	0.3	6.6	.....	100.0	.....	100.0	.....	100.0	.....
Totals, 1921	29,993	68,076	39,553	$ 73,011	8,912	$ 18,262	68,921	400	$ 730	38,012	$5,329	.....	.....	145,838	.....	68,476	.....	$ 97,332	.....
Per cent	20.6	99.9	57.7	75.0	6.1	18.8	47.3	0.1	0.7	26.0	5.5	.....	.....	100.0	.....	100.0	.....	100.0	.....

FIRES, 1923, CLASSIFIED BY SIZE AND DAMAGE.

Forest District.	Total Fires.		Under ¼ Acre.			¼ Acre to 10 Acres.			Over 10 Acres in Extent.			Damage.		
	No.	Per Cent. of Total Fires in Province.	No.	Per Cent. of Total Fires in District.	Per Cent. of Total Fires in this Class.	No.	Per Cent. of Total Fires in District.	Per Cent. of Total Fires in this Class.	No.	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.
Cariboo	76	4 96	21	27.6	3.13	21	27.6	4.05	34	44.8	10.07	71	5	....
Cranbrook	148	9.67	76	51.0	11.29	37	25.0	7.13	35	24.0	10.35	144	3	1
Kamloops	65	4.25	31	47.7	4.61	20	30.8	3.85	14	21.5	4.14	61	3	1
Nelson	340	22.23	214	62.9	31.79	91	26.8	17.53	35	10.3	10.35	315	23	2
Prince George	108	7.06	29	26.9	4.31	52	48.1	10.02	27	25.0	7.99	100	6	2
Prince Rupert	189	12 35	54	28.6	8.02	62	32.8	11.95	73	38.6	21.60	165	14	10
Vancouver	503	32.88	214	42.54	31.79	183	36.38	35.26	106	21.08	31.36	444	23	36
Vernon	101	6.60	34	33.7	5.06	53	52.4	10.21	14	13.9	4.14	96	5	....
Totals	1,530	100.0	673	....	100.0	519	....	100.0	338	....	100.0	1,396	82	52
Per cent	100.0	....	43.99	....	....	33.92	....	....	22.09	....	....	91.24	5.36	3.40
Totals, 1922	2,591	....	637	....	....	909	....	....	1,045	....	....	2,171	253	167
Per cent	100.0	....	24.6	....	...	35.1	....	....	40.3	....	....	83.8	9.8	6.4
Totals, 1921	1,330	....	554	....	....	436	....	....	340	....	....	1,169	134	27
Per cent	100.0	....	41.6	....	....	32.8	...	....	25.6	....	....	88.0	10.0	2.0

DAMAGE TO PROPERTY OTHER THAN FORESTS, 1923.

Forest District.	Products in Process of Manufacture.	Buildings.	Railway and Logging Equipment.	Miscellaneous.	Total.	Per Cent. of Total.
Cariboo	.....	.....	.....	$ 972	$ 972	0.15
Cranbrook	$ 3,729	$ 10	.....	6	3,745	0.60
Kamloops	150	.....	.....	55	205	0.04
Nelson	.....	50	.....	455	505	0.08
Prince George	2,747	26,100	$ 900	120	29,867	4.83
Prince Rupert	2,800	23,250	.....	190,115	216,165	34.99
Vancouver	87,658	86,585	184,315	6,205	364,763	59.07
Vernon	1,040	.....	350	37	1,427	0.24
Totals	$98,124	$135,995	$185,565	$197,965	$617,649	100.00

COMPARISON OF DAMAGE CAUSED BY FOREST FIRES IN THE LAST SEVEN YEARS.

	1923.	1922.	1921.	1920.	1919.	1918.	1917.
Total number of fires	1,530	2,591	1,330	1,251	1,141	910	986
Area burned (acres)	157,601	1,568,585	145,838	389,846	433,797	140,085	237,289
Standing timber destroyed or damaged (M. ft. B.M.)	87,371	729,941	68,476	229,253	287,520	42,886	267,186
Amount salvable (M. ft. B.M.)	37,891	117,006	39,553	49,575	93,559	22,387	48,133
Damage to forests	$74,238	$1,531,300	$97,332	$485,963	$393,183	$25,930	$129,125
Damage to other forms of property	617,649	693,016	195,221	473,900	345,787	200,335	162,333
Total damage	$691,887	$2,224,316	$292,553	$959,863	$738,970	$226,265	$291,457

SLASH-BURNING.

The number of permits issued during the year 1923 showed a decrease over the preceding year. This was due to the early spring, which allowed settlers to fire and destroy large areas of slash before the fire season opened, and in part due to the fact that the terrible fire season of 1922 put a stop to the desire to burn during the height of the season. The total number of permits issued was 11,554, compared with 12,120 in 1922. The total area burned over was 48,431 acres. Of the fires set under authority of burning permits, 87, or 0.75 per cent., escaped control. Of the total acreage burned over under permit, 35,028 acres were agricultural land, 7,786 acres of logging-slash were destroyed, 4,619 acres of railway rights-of-way cleared, and 998 acres of road-slash was destroyed.

BURNING PERMITS, 1923.

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.
Cariboo	615	3,366	2	1	30	271	....	....	....	....	....	....	33	415	2	....	678	4,052	4	1
Cranbrook	396	986	....	1	42	3,010	....	....	12	198	1	....	22	154	....	....	472	4,348	1	1
Kamloops	321	847	7	....	10	19	....	....	14	2	....	....	6	1	....	....	351	869	7	....
Nelson	1,004	1,541	2	3	38	195	1	....	16	963	....	....	32	119	2	....	1,090	2,818	5	3
Prince George	1,552	4,704	11	6	51	249	2	....	31	178	2	1	36	83	2	....	1,670	5,214	17	2
Prince Rupert	1,392	7,369	15	14	64	340	1	1	27	73	....	1	10	41	....	1	1,493	7,823	16	17
Vancouver	5,142	14,386	34	21	20	2,699	1	....	34	2,395	...	....	13	5	...	....	5,209	19,485	35	21
Vernon	561	1,829	....	....	19	1,003	1	3	7	810	1	....	4	180	....	1	591	3,822	2	4
Totals	10,983	35,028	71	41	274	7,786	6	4	141	4,619	4	2	156	998	6	2	11,554	48,431	87	49
Per cent	95.06	72.31	81.6	83.67	2.37	16.08	6.9	8.17	1.22	9.54	4.6	4.08	1.35	2.07	6.9	4.08	100.0	100.0	100.0	100.0
Totals, 1922	11,621	43,222	134	134	289	11,897	6	2	125	3,726	9	....	85	551	14	8	12,120	59,396	163	144
Per cent	95.8	72.7	82.2	93.1	2.4	20.1	3.7	1.4	1.1	6.3	5.5	....	0.7	0.9	8.6	5.5	100.0	100.0	100.0	100.0

SPARK-ARRESTERS.

Following an Order in Council which made compulsory the use of spark-arresters of a type which had passed inspection, the necessary inspections were made, and five types of spark-arresters were registered for donkey-engines and two types for locomotives. Although this order was not too favourably received at first, the results showed that such an order was necessary, and when it proved itself, as it did, many favourable comments were received from operators.

WIRELESS TELEPHONE.

The wireless telephone service continued to give good service, and the total number of words transmitted was 138,400. In view of the fact that Department launches would otherwise be out of touch with headquarters, the value of this method of communication is apparent.

FOREST IMPROVEMENTS.

The most ambitious project undertaken was the construction of a launch for Vancouver headquarters to replace the "R. J. Skinner," which has been in commission for the past fifteen years. The new boat, "B.C. Forester," was built at the marine repair station of the Branch, Thurston Bay. She has a length of 57 feet over all and 12.8 feet beam. The engine, of 50-horse-power, full Diesel type, is a new venture for the Branch, but this type has already proven itself on Coast waters in other crafts. The engine will use less than half the fuel consumed by the ordinary gas-engine, and as the crude oil is much cheaper than gas or distillate the economy in fuel will mean a material saving in operating expenses. The launch will be ready for commission early in the year 1924.

When it was definitely known that the expenditure for fire-fighting would be materially reduced as compared with previous years, a programme which had for its object the opening-up of the back areas of timber and making them accessible in case of fire was started upon. During the summer and fall, when work of this nature could be carried on at a reasonable expense, 110 miles of new trail was constructed and 754 miles of old trail improved, and in some cases relocated. One new look-out was erected on the top of Moyie Mountain. This now completes the chain of Baker, Casey, and Moyie, covering the south-centre part of the East Kootenay territories. Each look-out is connected by telephone with the main trunk lines and a fire when spotted may be readily reported. Six cabins were built for housing Forest Branch officials when travelling in the back country.

The fuelling arrangements at Thurston Bay Marine Station were remodelled and two tanks erected so as to give the launches direct fuel instead of, as hitherto, refilling the launches' fuel-tanks from drums. In addition, six new speeder-houses and garages, which also include store-houses for fire-fighting equipment, were erected and a house was constructed for the purpose of the District Forester at Williams Lake.

MECHANICAL TRANSPORT AND EQUIPMENT.

Mechanical transport was called upon for service as follows: Railway speeders, of which the Branch now operates fifteen, ran to the extent of 38,500 miles. The fifty-two motor-cars in the service ran 275,000 miles, or an average of 5,288 per car, whereas the forty launches now in commission sailed during the year 106,500 miles, making an average of 2,662 miles per boat. In connection with our launch fleet, it is to be noted that all our repairs for the Coast section are made at the Thurston Bay Marine Station, and as a criterion of the work done there in the overhaul prior to the fire season it may be cited that not a single launch was out of commission during the whole of the danger period.

The portable fire-pumps again demonstrated their value, being run to the extent of 2,554 hours, which means that an excess of 4,000,000 gallons of water was used in extinguishing bush fires.

The following equipment was added during the year: Two light-weight power-pumps; twelve geared pumps for use on lake launches, the power being derived from the launch-engine; fifty-two hand-pumps, equipped with pack-boards for carrying purposes; two railway speeders of the heavier type.

EQUIPMENT, IMPROVEMENTS, AND MAINTENANCE.

Cariboo.

Equipment—	
Three Ford cars	$ 1,900 00
One geared fire-fighting pump	85 00
Three hand-pumps and pack-boards	54 00
Fire-fighting tools	427 00
One canoe	143 00
Hose for fire-fighting pumps	347 00
Total	$ 2,956 00
Improvements—	
Canim Lake Boat and Tool House	$ 118 00
Horsefly Lake Boat and Tool House	150 00
Quesnel Lake Boat-house and Shelter	925 00
Clinton Speeder-house	175 00
Clinton Garage	625 00
Mount Begbie Lookout	417 00
District Forester's house at Williams Lake	4,309 00
Repairs to Williams Lake Ranger Station	175 00
Total	$ 6,894 00
Maintenance—	
Miscellaneous	$ 118 00

Cranbrook.

Equipment—	
Four Ford cars	$ 2,748 00
Two hand tank pumps and pack-boards	46 00
Hose for fire-fighting pumps	47 00
Total	$ 2,841 00
Improvements—	
Bridge Creek Trail	$ 463 00
Elk Valley Ranger Station	227 00
Moyie Mountain Lookout	1,029 00
Moyie Mountain Ranger Station	200 00
Sheep Creek Trail	600 00
East Fork Yahk River Trail	288 00
Camp-sites	88 00
Lizard Creek Pasture	61 00
Wigwam River Ranger Station Cabin	16 00
Total	$ 2,972 00
Maintenance—	
Bridge Creek Trail	$ 82 00
Elk Valley Telephone Line	256 00
Wigwam River Trail	264 00
Gold Creek Trail	192 00
Casey Mountain Telephone Line	65 00
Lamb Creek Trail	52 00
Carried forward	$ 911 00

CRANBROOK—*Continued.*

Brought forward	$ 911 00
Maintenance—*Continued.*	
Goat Mountain Trail	96 00
East Fork St. Mary River Trail	120 00
West Fork St. Mary River Trail	72 00
Elk River Trail	280 00
Flathead Valley Trail	252 00
Kootenay River Trail	155 00
Wildhorse Trail	252 00
Dutch Creek Trail	90 00
Total	$ 2,228 00

KAMLOOPS.

Equipment—	
Two Ford cars	$ 1,266 00
One geared fire-fighting pump	85 00
Three hand tank pumps and pack-board	64 00
Seymour Arm Evinrude and Boat	201 00
Seymour Arm Scow	151 00
Five rowboats	215 00
Total	$ 1,982 00
Improvements—	
Seymour Arm–Columbia River Trail	$ 229 00
Myrtle River Bridge	370 00
Grizzly Mountain Trail	275 00
Canyon Ranger Station Cabin	197 00
Camp 1 Ranger Station Cabin	59 00
Clearwater–Blue River Trail	511 00
Adams Lake Marine Ways	221 00
Total	$ 1,862 00
Maintenance—	
Barriere–Adams Lake Trail	$ 378 00
Canoe River Trail	180 00
Adams River Wagon-road	492 00
Adams River–North Thompson Trail	184 00
Clearwater–Blue River Trail	104 00
Little Clearwater Ranger Station Cabin	95 00
Camp Creek Ranger Station Cabin	72 00
Trail, Main Columbia	64 00
Canoe River Trail	155 00
Myrtle Crossing–Clearwater Lake Trail	122 00
Upper Thompson River Trail	56 00
Miscellaneous	458 00
Total	$ 2,360 00

Nelson.

Equipment—	
One Ford car	$ 612 00
One Evinrude fire-fighting pump and hose	535 00
One trailer for speeder	100 00
One hand tank pump and pack-board	37 00
Fire-fighting hose	531 00
Six geared fire-fighting pumps	503 00
Total	$ 2,318 00
Improvements—	
Chairs for Duncan River Crossing	$ 73 00
Cariboo Creek Trail	50 00
Blueberry Creek Trail	220 00
Cambridge–Dry Creek Trail	112 00
Big Sheep Creek Trail	213 00
Hamil Creek Trail and River Crossing	93 00
Cabin at Duck Lake	212 00
West Fork Little Slocan–Grizzly Creek–Wilton Creek Trail	175 00
West Fork Little Slocan–Wilton Creek–O.P. 4 Trail	255 00
Miscellaneous	107 00
Total	$ 1,510 00
Maintenance—	
March Creek–Champion River Trail	$ 56 00
Cable Crossing at Pend d'Oreille River	53 00
Haley's Landing–East River Trail	141 00
James Lake–Fish Lake Trail	50 00
Repairs to Ymir Tool-store	60 00
Miscellaneous	257 00
Total	$ 617 00

Prince George.

Equipment—	
One Ford car	$ 210 00
Four hand-speeders	363 00
Fire-fighting tools	481 00
One geared fire-fighting pump	85 00
Three hand tank pumps and pack-boards	54 00
One rowboat	25 00
Total	$ 1,218 00
Improvements—	
Goat River Speeder-house (addition)	$ 6 00
Giscome Speeder-house	97 00
Summit Lake Cabin	260 00
Vanderhoof Tool-cache	198 00
Willow River Trail	272 00
Total	$ 833 00

PRINCE RUPERT.

Equipment—	
Fire-fighting hose, etc.	$ 152 00
Five hand-speeders	435 00
Twelve hand tank pumps and pack-boards	210 00
Fire-fighting tools	714 00
Launch "Swifter"	600 00
Total	$ 2,111 00
Improvements—	
Burns Lake Garage	$ 675 00
Terrace Speeder-house	79 00
Smithers Garage (moving)	46 00
Total	$ 800 00

VANCOUVER.

Equipment—	
New Headquarters launch	$12,000 00
Boat and Evinrude for Hayden Lake	260 00
Three dinghies	208 00
Nine Ford cars	5,700 00
Two gasolene-speeders	2,034 00
Three bicycles	170 00
Power-grindstone at Myrtle Point	25 00
New scow	59 00
One Evinrude fire-fighting pump and hose	565 00
Four geared fire-fighting pumps and hose	260 00
Hand tank pumps and pack-boards	493 00
Fire-fighting tools	1,498 00
Miscellaneous fire-fighting equipment	1,200 00
Equipment-boxes for pumps	375 00
Fire-fighting hose, etc.	1,630 00
Total	$26,477 00
Improvements—	
Fuel-tanks at Thurston Bay	$ 767 00
Reconstruction, float at Thurston Bay	591 00
Mooring for launch "Elmera"	86 00
Camp-fire places	240 00
Pitt River Trail	823 00
Theodosia Arm Trail	200 00
Survey, Muchalet Arm Trail	921 00
Shawnigan Lake Trail	329 00
Miscellaneous	37 00
Total	$ 3,994 00
Maintenance—	
Repairs, Thurston Bay Station, etc.	$ 548 00
Repairs, etc., Myrtle Point Ranger Station	190 00
Repairs, Wellbore Ranger Station	286 00
Repairs, Squamish Ranger Station	43 00
Carried forward	$ 1,067 00

VANCOUVER—*Continued.*

Brought forward	$ 1,067 00
Maintenance—*Continued.*	
Maintenance and rent of wireless, all stations	4,517 00
Myrtle Point Telephone Line	519 00
New aerials, Vancouver Wireless	190 00
New power plant, Myrtle Point Wireless	702 00
Total	$ 6,995 00

VERNON.

Equipment—	
Two Ford cars	$ 1,264 00
One Star car	826 00
Four hand tank pumps and pack-boards	71 00
Fire-fighting hose	85 00
Total	$ 2,246 00
Improvements—	
Manning Creek Trail	$ 66 00
North Fork China Creek Trail	66 00
Upper Shuswap Trail	792 00
Little White Mountain Telephone Line and Trail	932 00
B.X. Mountain Telephone Line	98 00
Total	$ 1,954 00

GRAZING.

RANGE CONDITIONS.

Grazing conditions during the past season on the open range have been excellent throughout all of the grazing districts. While the rainfall was heavier than usual during the early part of the season, the weather during the haying period was settled, and in consequence the heavy hay-crops were harvested with very little loss. The hay-supplies left over from the mild winter of 1922–23, together with the abundant crops this past season, provide heavy supplies for feeding this winter.

PRICES.

The prices paid for beef during the past year have been low when overhead expenses under present methods of handling range stock are considered. The lack of proper management among the general herds results in lack of service from good bulls, a consequent low calf-crop, lack of growth in the beef animal, the carrying-over from year to year of numerous cows that never bring calves, and in many other serious leaks which, if stopped, would make even present prices appear attractive. On the average it would appear that the price for good-quality beef from the British Columbia ranges has during the past two years been slightly higher than Calgary stockyard prices. The British Columbia ranges cannot be surpassed for the production of good-quality range beef. Better attention must be paid to breeding, winter feeding, dehorning, and, in particular, more careful distribution on the open range where the cows are bred, the calves are born, and the beef makes practically its only growth.

The prices for mutton and lamb have been very good and in many cases 11 cents per pound at country points have been paid. The demand for small cuts of meat and the superior quality of British Columbia mutton and lamb and its comparative scarcity is responsible for the excellent price to the grower.

SHEEP PRODUCTION.

The recovery of the sheep business from its chaotic condition of two years ago has awakened a deep interest in increased sheep production in the Province. A vigorous campaign has been

carried on to stimulate and keep up this interest, and the result is seen in the increase in numbers of sheep in the Province.

Inquiries as to where sheep can be obtained are very numerous, and while a few have been able to secure small flocks, the bulk of inquirers have not been able to purchase.

This is owing, in the first place, to local growers being unable to supply the demand for breeding ewes, and again to the dearth of breeding ewes in neighbouring Provinces for sale. The main source of supply for British Columbia needs are the States of Washington, Oregon, and Idaho, in the United States, where large numbers of sheep are raised. While there is a good home market accessible to the sheepman of those States for all of the breeding ewes he has to spare, the British Columbia sheepman could obtain the good ewes at reasonable prices at Washington, Oregon, and Idaho points, but he is hindered and practically prevented from purchasing by the existence of the duty of 25 per cent. on the purchase price of all sheep brought into Canada. This duty does not affect the market for United States breeding ewes, but it does prevent the sheepman of the Province from stocking up. The suspension of this duty, so far as it relates to breeding ewes, would benefit the Province greatly, for there is abundant room for twenty times the sheep we now raise, and the necessity for importing mutton and mutton products for home consumption requires purchases being made outside the Province to the extent of over $500,000 annually.

AUTHORITY.

Authority was granted to graze the following numbers of the different classes of live stock on the Crown ranges during the 1923 season :—

District.	Cattle and Horses.	Sheep and Goats.
Cranbrook	2,500	10,000
Fort George	500	.....
Kamloops*	34,000	5,500
Nelson	2,000	500
Prince Rupert	300	.....
Vancouver	200	.....
Vernon (Nicola and Princeton)	15,000	5,000
Vernon (Okanagan and Similkameen)	5,500	5,000
Totals	60,000	26,000

The records to date show that permits for the following numbers of stock have been applied for for 1923 :—

District.	Cattle and Horses.	Sheep and Goats.
Cranbrook	714	.....
Kamloops—		
Kamloops	943	238
Cariboo Grazing District	32,955	953
Nelson	1,748	.....
Vernon	17,768	1,280
Totals	54,128	24,712

Stock in the Fort George and Vancouver Grazing Districts graze on private lands. In addition to these numbers a very large number of milk cows and work-horses belonging to small settlers are allowed on the Crown ranges free of charge.

The amount of grazing fees collected for the period January 1st to December 31st, 1923, is $13,651.01. The receipts for grazing leases for the same period total $6,478.72.

The continued low price of beef is responsible for failure to keep up the annual payment of fees in many cases. Collections of current fees and of arrears are, however, rapidly cutting down the total of amounts due.

ORGANIZATION.

The organization of the stockmen under the grazing regulations for range-management work is extending. The stockmen in some units of the district, where in the past co-operation received

* Includes present Cariboo Grazing District.

has been somewhat lacking in spirit, are now awakening to the fact that the Government has the range stockman's interests at heart and are keenly desirous of having proper organizations operating in all the districts, so that their problems may be properly brought to the attenion of the Department and be satisfactorily solved and all difficulties adjusted. The ultimate objects to be attained and the system of organizations was very fully discussed in the report for 1921 season, and it need only be said here that a big advance has been made in this work during the past two seasons.

RANGE IMPROVEMENTS.

An extremely important phase of the grazing-management work is that relating to the improvement of the ranges. It is gratifying to note that the progress made in the organization of the stockmen has led to such active co-operation that this office has been enabled to investigate, examine, undertake, and carry to completion many urgent range improvements throughout the actively co-operating districts.

The following summary of range-improvement expenditures to November 23rd, 1923, will indicate the interest that is now being taken by the stockmen in the improvement of the range for their benefit.

The amount available for expenditure each year equals one-third of the grazing fees collected as required by section 11 of the "Grazing Act."

Receipts.		
Special appropriation, 1919	$5,000 00	
Special appropriation, 1920*	72 11	
		$ 5,072 11
Expenditures.		
Drift-fence, Creston Stock-range	$ 250 00	
Drift-fence, Aspen Grove Stock-range	752 15	
Drift-fence, Allen Grove Stock-range	140 34	
Drift-fence, Lundbum Common	167 63	
Experimental reseeding plot, Nicola Range	20 80	
Grasshopper-control on range	65 84	
		1,396 75
Returned to Consolidated Revenue		$ 3,675 35
Receipts.		
1919. March 31st, 1920, one-third grazing fees	$3,398 00	
1920. March 31st, 1921, one-third grazing fees	5,314 89	
1921. March 31st, 1922, one-third grazing fees	3,602 38	
1922. March 31st, 1923, one-third grazing fees	2,948 99	
		$15,264 26
Expenditures.		
Drift-fences	$5,970 58	
Mud-holes	2,614 39	
Stock-trails	838 50	
Water-development	50 00	
Corrals	50 00	
Grasshopper-control	328 22	
Experimental reseeding	103 55	
Salt demonstration	31 00	
		$ 9,986 24
Projects partially completed, partially paid for—		
Drift-fences		1,081 51

* For the year 1920 a special range-improvement vote of $3,500 was made. This, less $72.11 expended, was returned to the Treasury on the receipt of $3,398, representing one-third of the grazing fees for the year April 1st, 1919, to March 31st, 1920.

Total receipts under section 11, "Grazing Act, 1919"		$15,264 26
Expenditures from established Range Improvement Fund—		
Projects complete	$9,986 24	
Projects partially complete	1,081 51	
Total expenditures to November 23rd, 1923		11,067 75
Credit balance, November 23rd, 1923		$ 4,196 51

The following summarized statement of projects completed but not yet settled for and projects under way is indicative of the active interest now being taken in the development and careful management of the ranges. In all of this work the most satisfactory co-operation and interest is being taken by the stockmen and associations. Many of the projects included in this summary will be completed by December 31st, 1923.

Projects completed, not yet paid for—	
Drift-fences	$2,057 56
Mud-holes	528 50
Water-development	135 00
	$2,721 06
Projects under way, not completed—	
Drift-fences (estimated cost)	$ 430 00
Mud-holes (estimated cost)	245 00
Stock-trails and bridges (estimated cost)	140 00
Breeding-pastures	.....
Corrals	500 00
	$1,315 00
Projects authorized, not yet begun—	
Mud-holes (estimated cost)	$ 435 00
Corrals (awaiting report)	.....
Breeding-pastures (awaiting report)	.....
Holding-grounds (estimated cost)	1,800 00
Water-development (estimated cost)	40 00
	$2,275 00
Projects recommended, approval pending—	
Drift-fences (awaiting report)	.....
Mud-holes (estimated cost)	$ 550 00
Stock-trails (awaiting report)	.....
	$ 550 00

The cost of the above projects will be met from the credit balance and sum equal to one-third of fees paid since April 1st, 1923.

BURNING AND RESEEDING ON THE CROWN RANGES.

The further examination of burns occurring on the Crown ranges indicate the wisdom of continued forest-protection as a means of maintaining at its capacity the range and water thereon. The change from an open Douglas-fir type to that of the present lodgepole type now found on the Cariboo-Lillooet Plateau is due entirely to the heavy fires of about sixty years ago. Only the best of protection will restore it to its former valuable grazing condition.

The reseeding of this year has been restricted to a little reseeding with Chewing's fescue and White Dutch clover at the Alberta Lake experimental area in the Lillooet District and the establishment of an experimental area on the Fernie Stock-range, Cranbrook District.

The examinations made during the past season of the Alberta and Nicola sowings did not disclose very satisfactory results. The fescue sown on the Alberta Lake area has made a good growth, but it remains to be seen whether it will grow in competition with the native vegetation

now rapidly coming in. Unfortunately the high degree of palatability in the cultivated species leads to heavy grazing, which is also most likely to prevent the sowing from developing successfully. There are indications also that the burning is to be followed by a very dense growth of lodgepole, which will destroy for many years the grazing value of the area burned over.

The sowing on the Nicola area is practically a failure owing to heavy competition from native forage. Cultivated species of forage must be given a measure of protection if they are to establish themselves. This protection is exactly suited to the more hardy native plants; they recover rapidly and choke out the cultivated species.

GENERAL.

In spite of the general feeling that the price for range beef received is too low, it may be said that the past year from a general range-management view-point was most satisfactory. The season opened after a very mild winter with a good growth of forage, particularly heavy on the lower or grass-producing ranges. Hay-supplies were plentiful, and those cattlemen who came through the winter with well-fed beef were enabled to ship it early and in good condition and reap the benefit of the better prices being paid during the early summer and before the market was glutted by heavy shipments of beef in inferior condition.

Hay-crops during 1923 were heavy and an abundance of forage for the 1923–24 winter is available. If beef is well fed this winter the price for early 1924 beef will be very satisfactory, and possibly there will be an advance over 1923 prices for even the inferior offerings.

The "low" prices of the last two years have had the good effect of turning the stockmen's attention to losses occurring on the range and due entirely to lack of supervision of the herds during the open grazing season.

The range stockman of British Columbia is seriously handicapped in the matter of competent help, to whose discretion he can leave the supervision of the stock when it is on the open range and be sure that progressive methods will govern all the important operations which necessarily must be performed in the handling of the stock.

This lack of competent assistance suggests that all range cattlemen will do well to consider the employment of men with the intensive and careful live-stock experience demanded by the highly developed farming conditions of the Mother-country and who are now coming to Canada under recently inaugurated immigration plans. It must be kept in mind that the ability to sit on the back of a bucking horse does not make a cowman, and that a knowledge of the trails and other physical features of a range does not constitute the experience necessary to care for cattle on the open range in these days of heavy, all-round competition in the marketing of beef. The work of the Department in improving the ranges and making possible better attention being given the breeding and beef herds is having a great influence in stimulating activity where activity is needed. From now on it is predicted there will be a great improvement in the range-cattle industry in British Columbia.

APPENDIX.

REPORT OF COMMITTEE ON FOREST FIRE PROTECTION, BRITISH EMPIRE FORESTRY CONFERENCE, 1923.

Report of Committee appointed to "make suggestions for better forest-fire protection in the British Empire, with special reference to the Canadian forest-fire problem."

The Committee beg to report as follows:—

(1.) IMPORTANCE OF FOREST-FIRE PROTECTION.

At the outset we draw attention to the widespread damage done by uncontrolled forest fires both to the timber resources of various countries and provinces and to the lives and property of settlers in forest tracts. The forest-fire problem in Canada being the particular subject entrusted to us, this report will deal largely with that problem, noting similar phases arising elsewhere in the Empire as occasion warrants. Canadian forest-fire statistics and methods of organization to meet the fire situation have already been given in detail in papers presented to the Conference* and will therefore not be touched on in this report, which will be confined to questions of policy. To such extent does this damage from fire militate against the practice of forestry that no proper management can be instituted until satisfactory methods of fire-protection have been devised and inaugurated. This problem of fire-protection is believed to be the most fundamental requirement of Canadian forestry. In particular the danger of total loss through forest fires is the greatest single deterrent to the practice of forest-management, not only by the State, but by private individuals or corporations, on whom to a very considerable extent the continuous production of timber from forest lands must in future depend.

(2.) NECESSITY OF DEDICATION AND CONCENTRATION OF EFFORT.

From the forester's standpoint forest-fire protection is pure insurance against loss through fire of capital stock in soil and timber. Reduction of expenditure to the minimum as well as ease of attainment of adequate protection both point to the necessity of dedicating by law definite areas as reserved forests. The permanent retention of absolute forest lands for continuous timber production is also, of course, fundamental to proper forest policy. Neither the present population of Canada nor the population which may be expected within the next generation can hope to support the expenditure which would be involved in providing adequate fire-protection for the entire forest area. This being the case, it appears to us that a wise protection policy should work towards concentration of effort on areas where soil, growth, and market conditions provide optimum opportunity for forest-management, leaving other areas with a modicum of protection until such time as the more valuable districts have been fully organized. Capital values, present and future, together with risk, must in the long run determine the proper expenditures for insurance against loss.

(3.) PROPER SEGREGATION OF EXPENDITURE.

We must take cognizance of the fact that in Canada, and possibly other parts of the Empire, additional duties devolve on the forest authorities, duties concerned primarily with the protection of community and private property in forest regions liable to loss through uncontrolled fire in forest and brush lands. As settlement becomes organized this duty may be relegated to communal authorities, but in the extensive unorganized areas found in Canada the responsibility must rest for a long time with the forest authority. Except in so far as forest property is directly or indirectly protected by such procedure, funds expended in protection of life and property should not be considered as a part of Government expenditure of forest-management.

* See Proceedings of Second British Empire Forestry Conference.

We realize that the two conditions merge and no line of distinction other than one selected on an arbitrary basis can be defined until forest policy has developed to the stage where all absolute forest land has been permanently dedicated to forest purposes. Such purposes include timber production, watershed (catchment area) protection, and recreational use. The point to be stressed is that only that part of the total expenditure on fire-protection rightly debitable to fire insurance on forest capital should be charged against forestry.

(4.) Direction of Settlement.

In the protection from fire, as in the management of any forest property, compact settlement areas are essential to success, and while this is a matter of general governmental as distinct from purely forest policy, we think it incumbent to stress the necessity of direction of settlement in forest regions on a community basis rather than allowing indiscriminate location with consequent increase in the fire hazard. This is particularly important at the present time because the dedication of forest lands to timber production is just starting and will necessarily continue over a long period of time, increasing as forest policy is defined and accepted. Indiscriminate settlement in the interim will greatly enhance the difficulty of proper dedication in the future. Particular stress must be laid on the fact that proper land classification and restriction of settlement to agricultural lands in forest regions is an essential of general Government policy. These considerations apply also to conditions in Australia.

(5.) Fire-prevention.

Fire-prevention outweighs in importance all other factors in securing adequate forest-fire protection. No forest authority can cope with the situations developing under adverse conditions without the whole-hearted support and co-operation of the general public. In education and publicity, beginning with the children in the schools and extensive enough to reach all classes of the population, lies the only hope of attaining adequate forest-fire protection. The attention given to this subject by forest authorities in the past has been, in general, intermittent and casual only. In the self-governing Dominions in particular, staffs must be built up and expenditure on education and publicity largely increased if the forest resources of the Empire are to be conserved.

Education of the young, in our opinion, is particularly important, and in this connection it is thought that proper courses of instruction should be a part of the curriculum of all students in training to become school-teachers. Teachers who are themselves totally ignorant of the fundamentals of forest-fire protection cannot be expected to make any lasting impression on their pupils.

Slash-disposal in logging operations must be secured before adequate fire-protection can be hoped for. While this will undoubtedly mean increased logging costs, we are not convinced that such costs will represent a total economic loss to Canada. In the first place, it may be assumed that decreased fire hazards resulting from proper slash-disposal will permit of considerable reduction in protection expenditure, particularly fire-fighting costs. In the second place, slash-disposal will undoubtedly facilitate removal of timber from the woods, resulting in a saving which may in part offset cost of slash-disposal.

We feel it necessary to call attention to the carelessness of certain Government road departments, evidenced throughout Canada, in not making provision for disposal of slash resulting from road-construction in forest regions. Slash piled contiguous to timber along routes of travel is particularly dangerous, as well as setting an unfortunate precedent by Governments to private individuals and companies.

The slash-disposal problem in Canada is divisible into two main parts—slash-disposal in British Columbia and slash-disposal in the rest of Canada.

As regards British Columbia, in the spruce-lodgepole pine type, which covers the northern interior and the central upper slopes of the mountains, slash-disposal offers no essential differences from Eastern Canada. In the yellow-pine stands of the Dry Belt the accumulation of slash is not heavy and the disposal thereof is not of primary importance from the standpoint of fire-protection. Solution of the bark-beetle problem, however, involves slash-disposal. We are of the opinion that this can be done successfully only by piling and burning under proper supervision.

In the coastal forests of British Columbia the accumulation of debris after logging is so great that broadcast burning affords the only hope of securing slash-disposal. The hazard can

be materially reduced only by a hot burn. This involves intensive control. The effects of such burning on the soil must, however, be seriously considered, particularly on thin peaty soils.

So far as the country east of the Rockies is concerned, we agree on the point that proper slash-disposal is quite feasible. It is a fact that slash-disposal is now being practised successfully in certain operations in Ontario and on national forests. The problem is an economic one and can be solved only when the costs can be equalized between competitive operations. This points to joint action by the Provinces of Ontario, Quebec, and New Brunswick and the Dominion authorities for lands under their control. We endorse the suggestion that a conference be proposed to consist of the Ministers of the Crown responsible for forest administration, together with their Chief Foresters and Federal representatives, meeting together with representatives of the forest industries, to lay down a fixed course of action. Such a conference should suggest the procedure necessary to enforce slash-disposal on private lands also, because without this the necessary results cannot be secured.

(6.) FIRE-CONTROL.

While fire-prevention must be looked to as the principal factor necessary for adequate fire-protection, fire-control must continue to play a very important part in Canada, where unfavourable climatic conditions may result in sudden emergency periods of great danger. For proper fire-control it is essential that forest officers should be clothed with powers adequate to enable them to deal with emergency situations. These powers should include, in our opinion, authority to conscript labour at prescribed rates of pay for fire-fighting purposes.

Adequate protection of any forest region from fire presupposes complete control by the forest authority over all forest activities on such an area. During danger seasons fire should be set out only under permit, which should be issued only after actual inspection of the area to be burned. Permits should contain specific detail conditions prescribing effective precautions against the spread of fire and should be issued by one authority only in each area.

The forest authority enforcing fire-protection need not be governmental, but may consist of municipalities, timber-owners' associations, or private corporations, providing these are properly endowed with legislative authority and organized in accordance with governmental requirements. It seems essential, however, that there should be only one authority operating in any one area.

Fire reports are renowned for incompleteness and divergence of information given. It seems essential to a proper presentation of the facts to the people at large that there should be a clear idea between forest authorities of the essential data required in fire reports. Standardization of forms or, at least, of details to be reported on is recommended.

We are impressed not only with the value but with the necessity of using air-craft in protecting the forests of the inaccessible and uninhabited north country of Canada, where absence of means of transportation and communication prohibits fire-detection or quick action on fire starting, by any other means. The use of air-craft is fundamental to fire-protection in such cases because only by their use can access to the location of the fire be obtained within a period of time short enough to permit of successful efforts at control. Unfortunately costs of operation are so high as to restrict use below the point of efficiency where forest authorities are required to pay in full for services received.

In view of the importance of this subject, we feel that the attention of the Governments should be drawn to the national necessity of providing free or at moderate rates for the use of existing air services to the fullest extent in forest-protection work. Where Government air service facilities are not adequate to meet all the requirements, we are of the opinion that subsidies should be granted to commercial air companies sufficient to allow them to carry out forest-protection work at rates which are within the economic means of forest authorities.

(7.) CONCLUSION.

The present condition in Canada and in certain other parts of the Empire with regard to forest-fire protection is unsatisfactory. Nevertheless, hopeful signs exist; areas of individual fires and the amount of timber losses thereon are decreasing; in Canada the damage done by fire along railways has been reduced to the stage where it now represents a minor loss only. Therefore, after careful review of the forest-fire problems confronting forest authorities in different parts of the Empire, and of the organization and methods designed or proposed to meet

such problems, while we admit the seriousness of the obstacles intervening, we desire to record our faith in the ability of forest authorities to handle the situations confronting them, provided they are given full public support and the requisite assistance from Government in proper legislation and funds. In this connection we would refer to Sweden and the Baltic Provinces of old Russia, where general timber and climatic conditions are comparable to those found in Canada, and where enlightened public sentiment is responsible for the fact that forest fires are practically unknown.

D. ROY CAMERON, *Chairman.*
AVILA BEDARD.
P. Z. CAVERHILL.
OWEN JONES.
C. G. TREVOR.
L. S. WEBB.
E. J. ZAVITZ.

REPORT OF COMMITTEE ON SILVICULTURE IN CANADA, BRITISH EMPIRE FORESTRY CONFERENCE, 1923.

The Committee appointed to report on Silviculture in Canada beg to report as follows:—

1. By silviculture we understand the treatment of forests in such manner as to ensure continuous production of timber and other forest products for the uses of trade and industry. It includes not only the common conception of planting, but also the direction of natural regeneration and the tending of the timber-crop to maturity. Its objects and processes are parallel with those of agriculture, both turning to account the productivity of the soil.

2. Silviculture and protection against fire, insects, and fungi obviously go hand in hand. Without adqeuate protection it is a waste of money to practise silviculture on a given area. On the other hand, correct silvicultural methods facilitate protection against such enemies.*

3. A form of silviculture has been practised in Canada for several decades. In imposing a diameter limit on licence-holders, the Provincial Governments and others doubtless had in mind that forests were not mines to be exploited once and for all, but that by intelligent treatment they could be made to yield continuous supplies. We have seen enough of the way in which this treatment of the forests has worked to feel justified in stating that it has not produced the results anticipated. It has led, for example, to the depletion of the more valuable and the predominance of inferior species.

In other words, the development of silviculture in Canada has not kept pace with the requirements of continuous production.

CONDITIONS PRECEDENT TO THE PRACTICE OF GOOD SILVICULTURE.

4. To secure good results in silviculture, definite objectives, fixity of purpose, and sustained effort are required. In effect, this means that the State must commit itself to a definite forest policy, and having so committed itself be content to leave that part of policy which deals with timber-growing to the expert silviculturist.

5. Before the silviculturist can practise his work successfully, certain steps dependent on forest policy have therefore to be taken. The procedure has already been successfully worked out in a number of countries, on the following lines, viz.:—

(1.) Classification of forest areas into those which are to remain forest and those which are suitable for other purposes.
(2.) Dedication to forestry of those parts which are to remain forest.
(3.) Demarcation of the dedicated parts so that they are definite and tangible areas known to all men.
(4.) Regulation of the demarcated forests under definite plans of management (working-plans).

6. It is in the regulated forest that silviculture finally becomes most effective and the rate of production of timber reaches the maximum. The forest is divided into units of convenient

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* See Report of Committee on Forest Fire Protection.

size, processes of treatment are devised, put into operation, improved as experience directs, and intensified as the economic conditions permit.

7. In detailing the procedure which leads up to the regulated forest, we do not intend to imply that silviculture cannot be practised in a preliminary way without going through all the steps in order, or that for adequate reasons the steps may not be retraced. But we do insist that they represent the logical order of development, and that the last stage—the regulated forest—is that to which the forest must finally come if continuous production of timber is to be secured.

APPLICATION OF GENERAL PRINCIPLES TO CANADA.

8. We now proceed to consider to what extent these general principles are applicable at this stage to Canadian conditions. It appears to us highly desirable in the first place that the principle of classifying lands should be put into operation without delay. We have not failed to observe in every province the bad effects of attempting to farm lands unsuited to agriculture. Further, the mere fact of classifying land as permanent forest should have a moral effect in indicating that the forest is a thing of value and something to be respected.

9. The classification of land will lead to the differentiation of large amorphous masses of forest, held partly by the Crown, partly by lessees, and partly by freeholders. The last constitutes a very small part and may for that and other reasons be disregarded for the present. With regard to the remainder, we see no reason why the process of dedication and demarcation should not be applied in due course to the whole; to such areas we would apply the term "reserved forests." From this stage onward we envisage two lines of procedure:—

(1.) The constitution within the reserved forests of regulated State forests, and, on licensed areas, co-operation with the licensees under conditions determined by the Government.

(2.) The balance of reserved forest developed and protected, and portions thereof brought under regulations as economic conditions justify.

REGULATED STATE FORESTS.

10. By the term "regulated State forests" we mean forests managed by the State for the production of timber and other forest products. The essential part of a State forest is that all the operations which affect the silvicultural development of the crop should be under the direct control of technical forest officers. The question as to whether the timber is sold on the stump or logged by State agency is immaterial to the final conception and we can cite examples where both methods have been followed with success.

11. It will be observed that our conception of the regulated State forest involves far more than the ordinary conception of the term "forest reserve" in this country. We can illustrate the difference by referring to Timagami Forest Reserve, which impressed us very strongly with its potentialties if worked as a regulated State forest. Here is an area of more than 3,000,000 acres stocked with much overmature pine and with young and intermediate growth of different kinds. At present the area, doubtless, produces nothing; the mature pine is gradually dying and decaying on the stump, and this loss, which is just as real as if the timber were burned, probably offsets the increment on the immature timber. We are prepared to state from our knowledge of similar type of forest in Europe that the lowest yield capacity of this land under systematic management would be 40 cubic feet per acre per annum in timber and pulp-wood. This yield of 120,000,000 cubic feet per annum for the total area could obviously not be secured at once, but the presence of so much mature timber makes the problem of working up to this figure in a comparatively short time unusually easy. It may be objected that the area has been reserved as a national playground. We reply that this restriction is not inimical to good silviculture, and can cite numerous examples from the Vosges, Black Forest, and the Alps where the two have been successfully combined.

CO-OPERATION BETWEEN THE STATE AND LIMIT-HOLDERS.

12. As we see the position in Canada, it will be economically impossible, even if otherwise desirable, to embrace within a system of regulated State forests the whole of the area which should be dedicated to forestry. There are, however, large tracts of forests on which it appears absolutely necessary that better methods of silviculture should be practised. How is this end to be achieved? We suggest that it can be brought about only by co-operation between the two

parties interested in the timber—viz., the State and the lessees or licence-holders. At the present time there exists undoubtedly a large gap between the demands of rational silviculture and those of the lumbering interest. If it is not bridged the production of timber must decline in due course, and with this diminished out-turn very important industries will pass into decay. We suggest that it is urgent and not impossible to find a compromise between the two parties. We do not feel competent to advise as to the form which it should take, but we think it reasonable to start from the assumption that if the State concedes something the timber and pulp-wood operator should be prepared also to help in securing the permanency of his industry.

SILVICULTURAL METHODS.

13. With regard to the silvicultural methods to be applied in the regulated State forests, we desire to point out that while very many of the problems of Canadian silviculture differ in degree from those of countries where systematic silviculture is being successfully practised, they do not differ in general character. We see no reason, therefore, why Canadian officers trained in the principles of silviculture should not begin at once to take charge of operations without waiting until an exclusively Canadian technique can be laid down. Obviously, however, time is required fully to effect the necessary changes—time for the forest officer to study conditions, to try out and perfect his proposals; time for the results of investigative work to become apparent. By reason of the importance of the time element it is the more necessary to make a beginning and thus to permit the full organization which will ultimately be required to develop steadily and naturally.

THE SILVICULTURAL CONSTITUTION OF THE CANADIAN FORESTS AND THE POSSIBILITIES OF SUCCESSFUL AND ECONOMIC MANAGEMENT.

Eastern Canada.

14. The following descriptions are based on forest types, observed by us on our tour across Canada, which we believe to present definite silvicultural problems.

15. Most of the original mixed-forest type of the Atlantic–St. Lawrence drainage-basin has been cut over several times for the softwoods, but the hardwoods have been cut only in close proximity to the markets. In general the hardwoods have been left and they have filled up the spaces formerly occupied by the softwoods. Beneath them there is an abundant regeneration of balsam fir and some spruce, varying in size from seedlings to trees approaching merchantable dimensions. These small softwoods constitute a very valuable asset in terms of future pulp-wood supplies, but they are now being retarded in growth, and eventually an unnecessarily large number will be killed by the overshading hardwoods. Enormous quantities of material could be saved for the pulp and paper industry by the removal of the hardwoods. In certain localities this can already be done with profit, and in others the utilization is prohibited by the cost of transportation. We urge more extensive experiments in the transportation of hardwoods by water or otherwise and the investigation of wider market uses of these woods in order that their utilization may lead to the development and final use of the small pulp-wood material through silvicultural treatment.

16. The hardwood forests that are of silvicultural concern in Eastern Canada consist chiefly of the farm woodlots in the southern portion of Ontario and Quebec and in the Maritime Provinces. Fire, disease, and injudicious cutting have reduced them to a low state of productivity. Since they are situated near markets, and since the farmers are experiencing serious difficulty in getting fuel and cheap materials for building purposes, the rehabilitation of these farm woodlots through constructive silvicultural methods constitutes a very important economic problem. We believe the forest authorities should co-operate with the farmers in developing and carrying out measures for the effective handling of woodlots.

17. The poplar and white birch which have taken possession of very extensive burned areas in Eastern Canada are suppressing and crowding out the young growth of pine which has so extensively established itself beneath the hardwood crown cover. Much of the future supply of white pine must come from these areas, yet the young growing stock upon which such supply depends is being effectively reduced in quantity and quality by the suppressing effect of the overtopping hardwoods. Large areas in this condition are relatively near the markets. Liberation cuttings must be employed on these areas if the pine is to be reserved as a valuable

component of the forest. Extensive areas of old burns also have an under-story of suppressed spruce and balsam fir. These should be saved for the pulp-wood industry by similar silvicultural treatment.

18. Among the softwood types that of white pine is of the greatest value. Under the present logging system there is practically no regeneration, and this tree is being crowded out of the forest and replaced by inferior species. Since, with the exception of the use of pulp-wood and a few minor purposes, the white pine surpasses all others in Eastern Canada in adaptability to the varied commercial uses, a fact reflected in its leadership in stumpage value for more than 100 years; since the processes of its utilization have contributed many millions of dollars to the national wealth, and since under proper treatment it could undoubtedly be maintained as the leading timber tree in Eastern Canada, we believe that the initial steps should be taken at once to place the remaining virgin stands of white pine under silvicultural management. This might be done in a forest reserve, such as the Timagami Reserve, as pointed out above.

19. The spruce-balsam fir forests in Northern Ontario, Quebec, and the Maritime Provinces are being utilized for pulp and paper manufacture as well as for sawlog material. The system of logging employed is such that practically no regeneration of the more valuable species follows. As a certain portion of the area from which the forest is thus removed, especially in Northern Ontario and Quebec, will eventually be used for farming purposes, the method of cutting on this, therefore, is justified, but much of the area, however, is unfit for agricultural production. The softwood forests of the north constitute a priceless heritage, situated as they are in the midst of a region that will undoubtedly become the centre of a large agricultural population. The distribution of the agricultural and non-agricultural soils is such that the production of farm crops and forest crops should go hand in hand. We believe that the "Empire of the North" can reach its full destiny only by such purposeful direction of its natural resources, and in such we include the treatment of the forest in such a manner as to secure continuous production. We see no outstanding difficulties in achieving such an objective.

20. We heartily commend the forest planting of waste lands in Eastern Canada as a measure supplemental to the intelligent management of existing forests, which latter, we emphasize, must always constitute the main source of future supplies.

Prairie Provinces.

21. We were deeply impressed by the beneficial results of planting shelter-belts on the prairie farms, and we urge material extension of such activities.

Western Canada.

22. The spruce-balsam fir forests of the middle and upper slopes of the Rocky Mountain region and of the northern interior of British Columbia, although of different species composition, are practically the same in silvicultural requirements as are the spruce-balsam fir forests already mentioned for Eastern Canada, and apparently the same treatment will hold good for this type.

23. The lodgepole pine forests are very extensive in Western Canada and are beginning to be extensively exploited. The facility with which this pine reproduces and the rapidity with which it attains merchantable size make its silvicultural treatment fairly easy. These forests present an immediate opportunity for profitable silvicultural management.

24. The yellow pine of the interior region is the only tree of commercial importance in the Dry Belt, where the rainfall is limited to 10 or 15 inches a year. The forest of this type is being rapidly exploited, and at the present rate of cutting it is estimated that the supply will be exhausted within twenty years, and this period is being materially shortened by such causes as the ravages of bark-beetles. The method of clear-cutting now employed is not conducive to the success of natural regeneration, and we believe from experience with a similar tree abroad that an adequate regeneration could be secured by leaving a proper number of suitable seed-trees.

25. The coastal forests, consisting of Douglas fir, cedar, and hemlock, are being chiefly exploited at present under the "high-lead" type of logging, which results in the practically complete destruction of the small trees, and leaves on the ground an enormous amount of debris which, though it gives a certain amount of beneficial shade and shelter to the seedlings, on the whole is detrimental to the re-establishment of the forest by natural processes. This is due

partly to the fact that in places it covers the ground too completely, but chiefly to the fact that it remains inflammable for many years and constitutes a dangerous fire risk in the application of any method of regeneration. It appears quite evident that so long as repeated fires are probable, little dependence can be placed upon seed stored in the soil, and therefore the logging methods should make provision for other methods of regeneration, such as the leaving of individual seed-trees or logging in compartments small enough to permit seeding from adjacent stands. We have seen many illustrations of magnificent regeneration of Douglas fir on burned logged-over areas where seed-trees were left.

We may say in connection with the debris that we have been greatly impressed by the waste in logging operations in this region and others we have visited. We realize that this is largely the result of economic conditions, but still it represents an enormous loss in the timber-supply, and in the interests of the Empire, as well as Canada, it should be reduced to a minimum.

EXPERIMENT AND RESEARCH.

26. In beginning systematic silviculture in Canada, it is obviously not to be expected that detailed systems can be laid down with final precision. The fundamental principles of silviculture are sufficient to ensure a good start. On the other hand, in experiment and research, there exist two powerful aids, to practise which will eliminate much waste and avoid large-scale disappointment. We wish to emphasize in the business of forest production the necessity of research and experiment which have proved their efficiency in all the industries to which they have been applied.

We would urge in this connection that work be proceeded with along two main lines:—

(1.) Research-work of a fundamental nature into the silvicultural characters and requirements of the principal species of trees, including their regeneration.

(2.) The practical application on a commercial scale of the results obtained under (1).

27. The agency for securing progress on these lines should be (1) a staff of research investigators and (2) an adequate staff of trained forest officers placed in charge of definite areas of forest of manageable size; such trained officers should be in a position to carry out, as part of their regular duties, large-scale experimental operations with the object of evolving silvicultural systems best adapted to local conditions.

28. We have seen enough of the conditions after logging, of the ravages of fire, insects, and fungous diseases, to convince us that without a definite objective towards continuous forest production one of the largest Canadian industries will inevitably decline. Therefore, our appeal is for decisive action. The matter is of such importance that the State is justified in making expenditures for the perpetuation of the wood-using industries. We believe that the ultimate results of an investment in such an objective would lie to the great advantage of the State, in the increase of forest revenues, in permanency of effort, and in stability of social and political conditions in the forest regions of the country.

(Signed) C. D. HOWE, *Chairman.*
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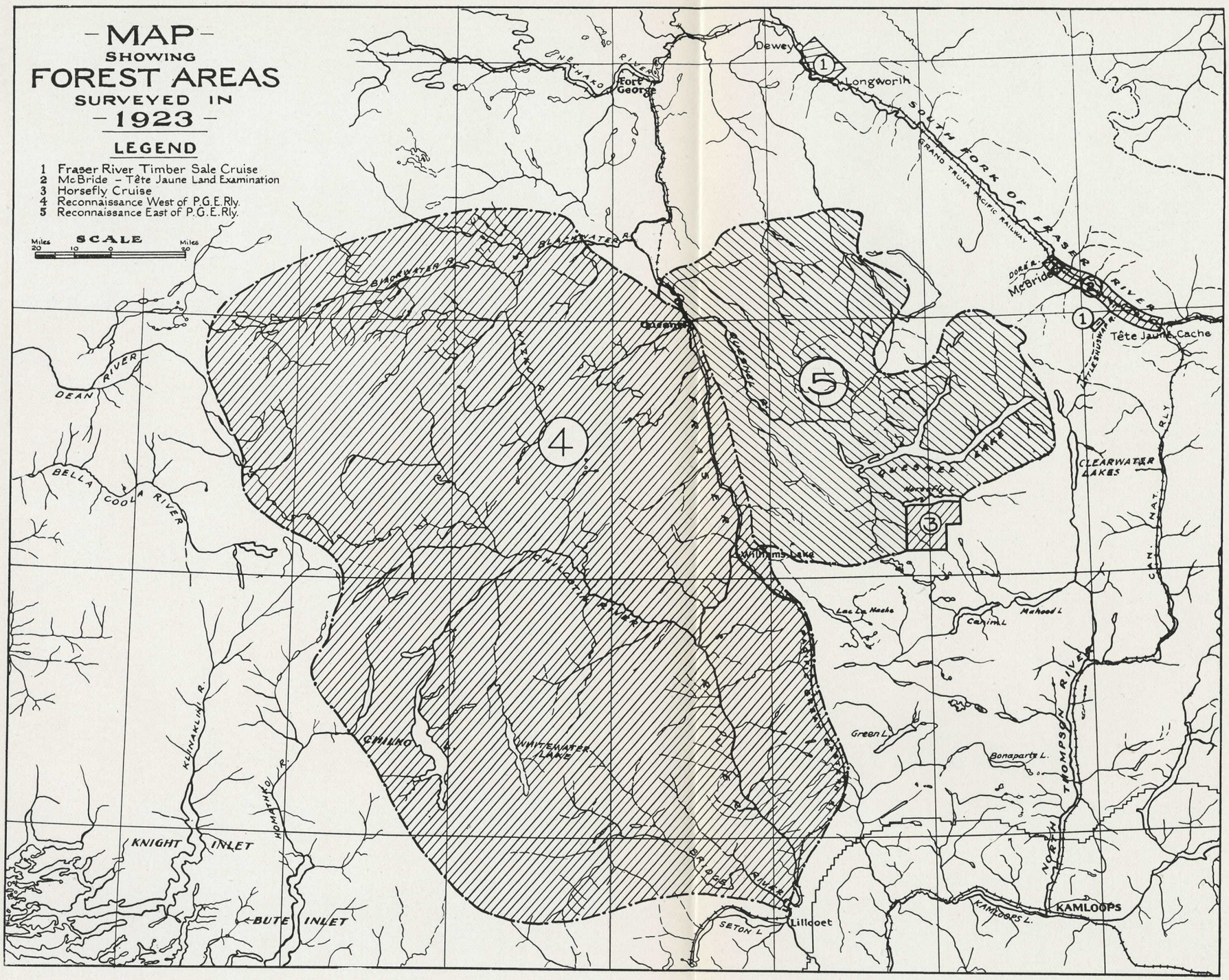
MAP
SHOWING
FOREST AREAS
SURVEYED IN
1923
LEGEND
1 Fraser River Timber Sale Cruise
2 McBride – Tête Jaune Land Examination
3 Horsefly Cruise
4 Reconnaissance West of P.G.E. Rly.
5 Reconnaissance East of P.G.E. Rly.
SCALE
Miles
20
10
0
Miles
20
Dewey
Longworth
Fort George
PINEHAKO RIVER
SOUTH FORK OF FRASER RIVER
GRAND TRUNK PACIFIC RAILWAY
McBride
Tête Jaune Cache
TETE JAUNE R.
BLACKWATER R.
Quesnel
QUESNEL R.
DEAN RIVER
BELLA COOLA RIVER
CHILCOTIN RIVER
Williams Lake
Horsefly L.
CLEARWATER LAKES
CAN. NAT. RLY.
Lac La Hache
Canim L.
Mahood L.
Green L.
Bonaparte L.
NORTH THOMPSON RIVER
KLINAKLINI R.
HOMATHKO R.
CHILKO
WHITEWATER LAKE
BRIDGE RIVER
KNIGHT INLET
BUTE INLET
SETON L.
Lillooet
KAMLOOPS L.
KAMLOOPS